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Youth Unemployment and Retirement of the Elderly: the Case of Italy

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Youth Unemployment and Retirement of the Elderly: the Case of Italy

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Abstract
This paper shows that the "lump of labor" assumption fails in Italy. The direct relationship between the unemployment rate of the young and the labor force participation of the old is pro-cyclical, i.e. a higher labor force participation of the old is related to a lower unemployment rate of the young. Hence both vary with the business cycle. In order to overcome endogeneity problems in explaining unemployment of the young, we resort to a simulated variable: "the inducement to retire", which is constructed by simulating the social security benefits. We related the unemployment rate of the young to this incentive measure and find that a higher inducement to retire is associated to a higher unemployment rate – quite the opposite of the "young-in-old-out" story.

Keywords
lump of labour, youth unemployment, early retirement

JEL Codes
H3, J2, J6

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1. Introduction

The dramatic increase in life expectancy at older ages and the trend towards earlier withdrawal from the labor force are changing the age composition of the labor force in many European countries, but especially in Italy. The Lisbon targets (2000) set by the European Union (EU) have emphasized the importance of increasing labor supply by setting an ambitious target participation rate of 70%. Besides women, the segments of the Italian population which are furthest away from this target are the youth and the elderly. As for the elderly, the financial incentives of the Italian social security system have encouraged retirement at relatively young ages throughout the 1980's and part of the 1990's (Brugiavini Peracchi 2003 and 2007), and only recently these trend have shown some sign of reversal.

We have shown in previous work (Brugiavini and Peracchi, 2007) that the welfare gains of the elderly are large both in absolute and in relative terms, that is, relative to other demographic groups, particularly the young. The issue that we address in this paper is whether early exit prompted reductions in the youth unemployment rate, as often claimed by union leaders, thus partly compensating for the welfare redistribution operated in favour of the elderly. This question necessarily relates to the labor market policies enacted during the last decades and the impact that these had on the participation rate of younger workers. The aim of this paper is to analyze the interaction of these policies and the social security legislation in shaping the age profile of the labor market and the trends in labor force participation.

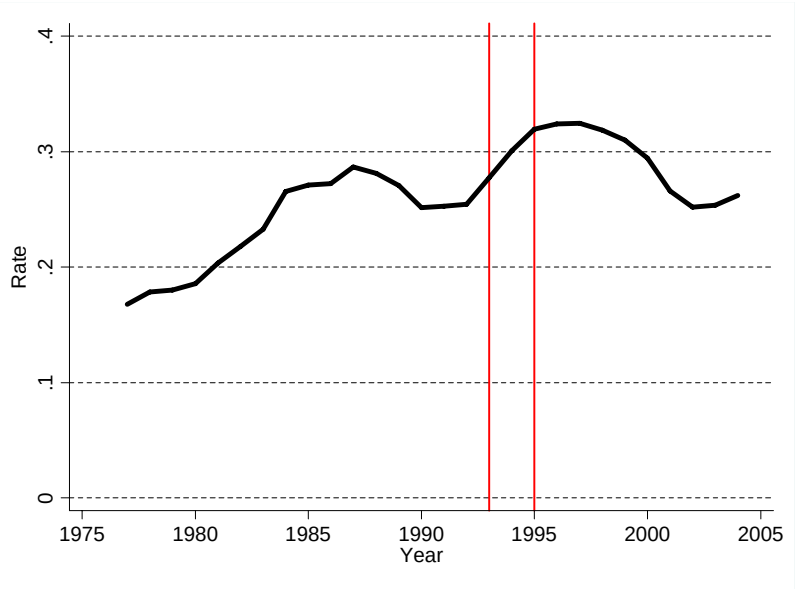
2. Unemployment Trends in Italy

The Italian labor market is characterized by relatively high unemployment rates, particularly for the young. The two main characteristics of the youth unemployment rate in Italy are (i) an extraordinary regional variability, and (ii) a high percentage of first job seekers among young unemployed, particularly in the Southern regions.

Figure 2.1 shows the trend in unemployment rates of young people (aged 20-24) between 1977 and 2004, both in aggregate terms and separately for males and females. The vertical bars indicate the years of the main reforms in the social security system. The youth unemployment rate shows a clear upward trend with a strong cyclical component, and reaches a first peak of 28.6% in 1987 and a second peak of 32.5% in 1998. It is clear that Italy is a country with a serious youth unemployment problem.

The large variability across regions is documented in Figure 2.2 , which distinguishes five regions: North-East (NE), North-West (NW), Center (C), South-East(SE) and South-West (SW). While in the Southern regions the unemployment rate for the age group 20-24 can be as high as 50%, Northern regions witness youth unemployment rates below 20% and, for the regions in the North-East, even below 10%.

Figure 2.1. Italy: Trends in Youth Unemployment Rate



Several explanations have been put forward to interpret these figures. One strand of the literature looks at the issue of labor mismatch. In particular, some authors have explored the hypothesis that the unbalanced evolution of labor demand and supply across different geographical areas, i.e. regional mismatch, is partly responsible for the increase in aggregate and youth unemployment, particularly in the Southern regions.[1] According to this view, the determinants of the regional unemployment differential can be seen in the following elements: employment performance in the South has worsened in the presence of a sustained labor force growth; labor force mobility from the South to the Northern and Central areas has sensibly declined with the reduction of earnings differentials and with the increase in social transfers per head; real wages in the South are not affected by local unemployment conditions but depend on the unemployment rate prevailing in the leading areas, i.e. Northern regions (Brunello et al, 2000). In other words, despite the increasing unemployment in the South, labor mobility from the South to the North has been low, and relative wages have not adjusted to reflect worsened local labor market conditions.

[1] See Attanasio and Padoa Schioppa (1991), Bodo and Sestito (1991), and Manacorda and Petrongolo (2005).

Together with the regional mismatch and the lack of geographical mobility, also the skill mismatch plays a role in determining high youth unemployment rates in Italy. Some authors (see for example Caroleo 1999) stress the fact that, despite the higher educational attainments of the new entrants into the labor market, the educational mix does not match well the trends in labor demand.

Figure 2.2 Italy: Trends in the Regional Youth Unemployment Rate

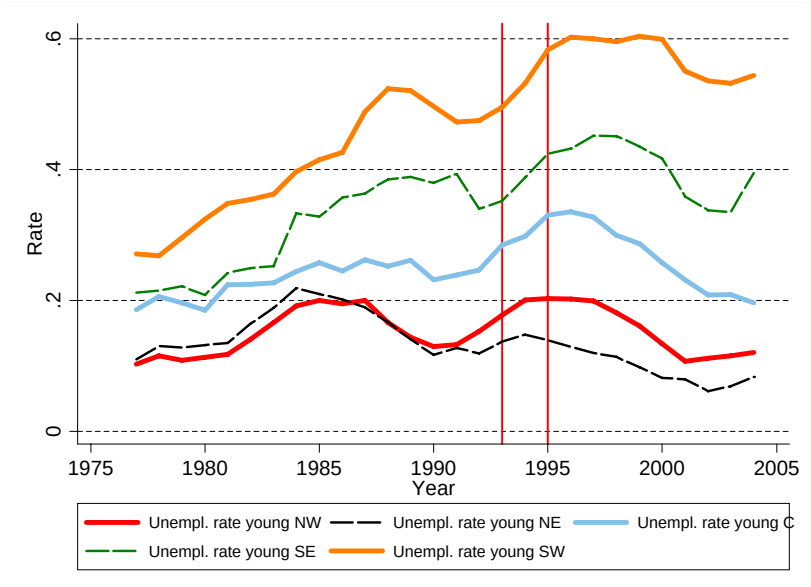


Figure 2.3 Trend of Educational Attainments in Italy: Rate of high school diploma and university degrees – Workers of Age 20-29

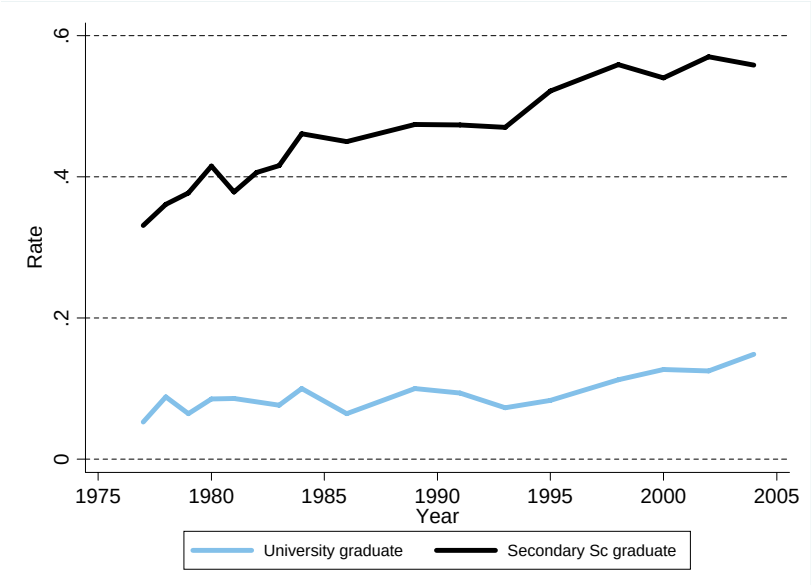


Figure 2.3 shows the time trend in the percentage of people with high school diploma and university degree among people aged 20-29. This percentage has increased sharply over the last 30 years. The percentage of people with high school degrees has nearly doubled, from less than 30% in 1977 to almost 60% in 2004. During the same period, the percentage of people with university degrees has increased by nearly three times, from about 7% to almost 20%. The increase in the educational attainments of the younger cohorts implies a delayed entry into the labor market (Contini, 2005). It also gives rise to problems of mismatch between skills supplied and skill demanded. The relevance of these problems differs across regions (Caroleo, 1999). In the Southern regions the mismatch between skills supplied – often generic and of low qualification – and skills demanded is just one of the explanations of youth unemployment. In the Northern and Central regions, instead, skill mismatch seems to represent the main problem. In this case, employers ask for specialized manual workers, whereas young suppliers offer a medium high, but generic, educational level.

Another element that has been often considered in explaining the high level of youth unemployment in Italy is the high reservation wage of the young, particularly in the South. This high reservation wage – combined with the fact that, particularly in the South, the majority of young unemployed are first-job seekers – is surely a relevant determinant of the high youth unemployment. It is generally agreed that the absence of welfare support for first-job seekers, i.e. the absence of minimum income provisions and unemployment benefits, and the strengthening of the role of the family have contributed to increase the level of the reservation wage of young job seekers. Moreover, particularly in the South, the public sector has represented for long time the only access to a "regular" job and young people have built their own human capital and their own aspiration on this type on job. Consequently, their reservation wage is built on the public sector wages level (Caroleo, 1999).

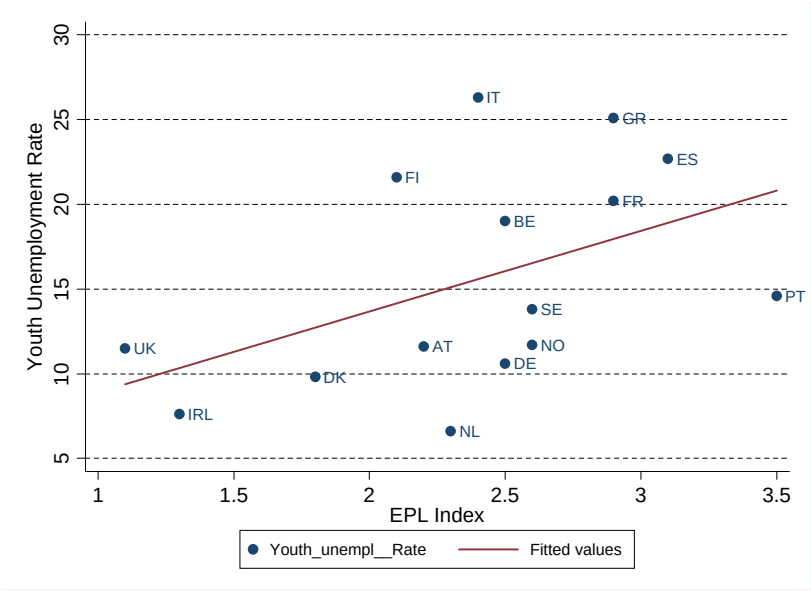
The existence of a legal minimum wage is usually regarded as a barrier to the recruitment of young workers. The situation in Italy represents somewhat of a paradox. In fact, Italy has no legal minimum wage. On the other hand wage increases, especially in the public sector, depend mainly on seniority. The combination of these two features is often viewed as an important cause of the dramatic increase in the wage differential between younger and older workers observed during the last two decades. Instead of inducing a natural substitution between older and younger workers, the existence of this wage differential is often taken as a justification for early retirement policies, especially in the case of industries subject to negative sectoral shocks, which have only provoked a dramatic exit of older workers with little incentives to new entry of younger workers (Contini, 2005).

A very popular explanation for the rigidity of the Italian labor market are its institutional features, and especially the strictness of the Italian Employment Protection Legislation (EPL). The available empirical evidence about the effects of the EPL on aggregate labor dynamics[2] indicates that the EPL affects the composition of employment. In particular, countries like Italy where the EPL is stricter tend to

[2] See, for example, Bentolila and Bertola (1990) and Bertola (1999).

display higher youth unemployment.[3] Figure 2.4 shows the relationship between youth unemployment and an index of EPL strictness for some European countries in 2003. The index we use is Version 2 of the overall EPL strictness index computed by the OECD in its 2004 Employment Outlook. Although Italy has been scoring at the highest level till the late 1990s, the changes to the temporary employment legislation introduced in the last two decades have somewhat lowered its EPL index. Table A1 in the Appendix shows the EPL index and its components as computed by the OECD in its 1999 and 2004 Employment Outlook. We report data for Italy and a few other European countries (France, Germany, Spain, and the UK). It is evident that the Italian EPL is particularly restrictive on two dimensions, namely "temporary employment" (although things have improved substantially between the late 1980s and 2003) and "collective dismissal".

Fig. 2.4. EPL index and youth unemployment rate in Europe



The **"young-in-old-out"** paradigm has been advocated in Italy mainly by trade unions and left-wing parties. With reference to the Social Security reforms of the 1990's and the more recent enactment of these reforms, one leading Italian trade union has argued that "*one should not forget that raising the retirement age implies, not only that workers will be forced to work longer, but that two million jobs for the young will be lost*".[4] Furthermore the left-wing party "Rifondazione Comunista" claims that "*the intergenerational exchange can be interpreted as the 50-years-old generation leaving their good jobs for the young. Would that be so dramatic for the social security administration? We do not think so*".[5]

[3] See OECD (1999) for a survey on the main empirical evidences about the effects of the Employment Protection Legislation on aggregate labour market.
[4] Circolare Cobas October 2003
[5] From the website of "Rifondazione Comunista"

Although Boldrin et al. (1999) clearly argue that the "lump of labor" story is not operating in Europe, one could get the impression that a "young-in-old-out" policy was pursued in Italy in the years between 1985 and 1990 as a result of the incentives for firms to hire younger workers (Contini, Rapiti, 1999) and the incentives for workers to retire at very young ages (before age 55) due to the lack of any actuarial penalty on pension benefits. The overall effect on total labor force participation was basically close to zero, as the inflow of new workers balanced out with the outflow into retirement. However this substitutability between workers of different age groups seems just temporary, and in any case not necessarily "endogenous" but driven by separate determinants and, partly, by the business cycle. Indeed, the explanations for the changes in labor force participation, and particularly its composition, are less straightforward after the year 1990.

One interpretation starts from the observation that two contrasting trends have taken place: after a period of "jobless growth" during the 1980s and mid 1990s a total reversal occurred such that labor markets appeared fairly lively in contrast with a stagnant economy and an output growth close to zero.
Some authors (Boeri and Garibaldi 2007) have referred to a "honeymoon effect" of labor market policies creating such discrepancies in observed patterns of employment and unemployment data on the one hand and output data on the other hand, taking effect well after the onset of the labor market reforms.

The claim of Boeri and Garibaldi is that there is a link between growth-less job creation and the asymmetric labor market reforms in EPL carried out in several European countries in the 1990s. In fact, such reforms introduced in Italy a two tier system, as the labor market became more flexible mainly through a series of marginal reforms that liberalized the use of temporary (fixed term) contracts, while leaving unchanged the legislation applying to the stock of workers employed under permanent (open-end) contracts. These authors emphasize that the changes of EPL and their impact on labor demand do not produce any sizeable permanent employment effect[6]. The mechanism is that the reduction in EPL is bound to increase employment variability over the business cycle, while not having any permanent effect on average labour demand. This is because EPL affects both the incentives to hire and to dismiss workers, and there is no reason to expect a priori that one effect could dominate the other.

Finally some attention has to be devoted to reforms to the educational system which have fostered the growth in school attendance - particularly at the University level. In 1969 a reform was passed that allowed access to the University from any secondary school, while previously only students coming from a "lyceum" could access. In the Appendix, we present evidence[7] for two groups of people: the "treatment group" are people who could benefit from the reform as they were around age 12 at the time of the reform (young cohorts), while the "control group" are people who could not benefit as they were much older. In Figures A1 to A3 we look at the status of these

[6] See also Bentolila and Bertola, 1990; Bertola,1990
[7] The data set used is the Survey of Income and Wealth pof the Bank of Italy for several years.

people well after the University age. In particular we are interested in the difference in the prevalence of people by educational attainments. It is clear that the educational reform of 1969 has encouraged people to obtain a secondary school "diploma" and also a University degree (laurea). This is particularly evident for women.

3. Institutional Background: Main Features of the Social Security System

The Italian social security system is based on a variety of institutions administering public pension programs for different types of workers (private-sector employees, public-sector employees, self-employed, professional workers)[8]. All programs are of the unfunded pay-as-you go (PAYG) type. Despite a process towards convergence during the 1990s, the various programs maintain quite different rules.

Currently, about two thirds of the labor force is insured with the National Social Security Institute (INPS). The Institute is responsible for a number of separate funds, of which the most important covers the private-sector non-agricultural employees (Fondo Pensioni Lavoratori Dipendenti or FPLD). Because the basic aspects of the system are well documented elsewhere (see Brugiavini, 1999; Franco, 2002 and Brugiavini and Peracchi, 2004), we describe very briefly its main rules (eligibility, pensionable earnings, benefit computation, indexation and taxation of benefits).

Starting in 1992, a sequence of legislated changes thoroughly modified the Social Security system originally designed in 1969. The main reforms took place in 1992, 1995 and 1997. They are known, respectively, as the Amato, Dini and Prodi reforms, from the names of the Prime Ministers at the time. In addition, smaller changes to the system have been made nearly every year since 1992. Further changes are expected to take place in the near future. Of the three main reforms of the 1990s, the Dini reform appears as the most radical, because it completely redesigns the system by modifying the eligibility rules and by changing the benefit formula back from defined-benefits to defined-contributions, which was the type of formula in place prior to 1969. However, because it will only be introduced gradually, through a very long transitional period, the direct effects of the Dini reform may be considered small compared to the less radical Amato reform.
Overall, because of the long transitional periods, the cohorts that reached the retirement age during the 1990s and those currently retiring remained largely unaffected by the reforms of the 1990s, as most of the burden of the adjustment fell on the younger cohorts (Franco, 2002; Brugiavini and Galasso, 2003). More precisely, the **1992 (Amato) reform** explicitly distinguishes between workers with at least 15 years of contributions at the end of 1992 and all other workers. The old system (introduced in 1969) applies, with some changes, to the former, whereas the

[8] Social security system and pension system are in this paper used as synonymous. In fact, in Italy the social security is the main source of publicly provided income in old age. Contributions are compulsory for employers and employees and benefits are earnings related. There is only a minor flat component granted to very old people (over 65) under means testing, if the beneficiary has no other incomes.

new system only applies to the latter. The adoption of different rules for older and younger workers is maintained in the subsequent **1995 (Dini) and 1997 (Prodi) reforms**. In particular, with the exception of the new eligibility rules, very few changes apply to workers with 18 or more years of contributions at the end of 1995, beyond those already introduced in 1992.

The following list of legislative changes highlights exogenous variations in benefits envisaged by the reforms that are potentially relevant to our study and, in an ideal data set, could be identified. We limit ourselves to the years 1976 to 2004, corresponding to the sample period and focus particularly on changes which affect the decision to retire, hence particularly changes to eligibility rules.

- In 1992 (Amato Reform) the age requirement for an old-age pension is gradually increased by one year of age every two years, starting from 1994, until reaching age 65 for men and age 60 for women in 2002.

The new requirements for an old-age pension (age 65 for men and age 60 for women) apply starting from 1994 to managers and self-employed workers. Also from 1994, the requirement is set at age 65 for state employees (irrespective of gender) and age 60 for local government employees (again, irrespective of gender). The old requirements remain unchanged for a few special categories (army and police personnel, flight personnel, travelling personnel of public transportation services, firemen and employees of the entertainment industry).

The numbers of years of contribution required for an old-age pension is gradually increased by one every two years starting from 1993, until reaching 20 years of contributions in 2000.

For workers with less than 15 years of contributions at the end of 1992, the reference period for computing pensionable earnings is gradually increased until including the whole working life, with past wages adjusted to inflation on the basis of the annual rate of change of the cost-of-living index increased by 1%.

New rules for combining pensions and earned income apply to pension granted after 1992: seniority pensions now cannot be combined with earned income, whereas disability and old-age pensions can be combined, but only partially. The possibility of combining seniority pensions with income from self-employment was subsequently reintroduced in 1993.

Pensions are automatically adjusted, on an annual basis, only to the changes in the cost of living.

- In 1995 (Dini Reform) the payroll tax rate increases from 27% to 32%.

Gradual introduction of an age limit for seniority pensions, equal to age 57 for both men and women in year 2008.

A new defined contribution (DC) system based on notional accumulated contributions applies to workers who start their career after 1995.

A “pro-quota” system applies to workers with less than 18 years of contributions at the end of 1995.

- After 1995, the main changes are an acceleration in the introduction of an age limit for seniority pensions and a further harmonization of the pension rules for public-sector and private-sector employees.

4. Institutional Background: Labor Market Legislation and Reforms

The rigidity of labor market rules in Italy goes back to 1966 when legislation on unfair dismissals established that employers had either to re-employ the worker or pay him a generous severance lump sum. The payment was higher for firms with more than 60 employees. An important change took place in 1970 (Statuto dei Lavoratori) establishing that firms with 15 employees or more had to hire back workers undergoing unfair dismissal and also pay them the foregone wages, while firms below 15 employees were total exempted from this rule.

The important changes to the labor market legislation between 1970 and 2004 can be allocated into four main periods (Boeri and Garibaldi, 2007): pre 1985, between 1985 and 1997, between 1997 and 2003 and post 2003.

As for the first period an important change occurred **in 1985**, when special hiring conditions were granted to firms for contracts which envisaged on-the-job training (contratti formazione lavoro). These were clearly aimed at reducing youth-unemployment and indeed hiring of younger workers (age 25 or less) became sizeable particularly in the industrial sector.
The second period goes **from 1985 to 1997**. This is characterized by a wider use of fixed term contracts (if allowed by industry-level collective agreements) and a reorganization of public employment agencies (Law 28/2/1987 nr.56) which should in principle guarantee a more efficient matching process.

The first important landmark is the **1997 reform known as the "Treu Package"**. This includes a reduction of the penalties occurring in case of violation of the fixed term contracts' discipline (conversion of fixed-term contract into an open-ended one). It allows for temporary work agencies to operate in the labor market. Non-permanent labour contracts are encouraged by reducing social security contributions and pension provisions into open-ended ones. The package also makes it easier to make use of apprenticeship and work-training contracts and sets further incentives for on-the-job training.

A fourth period starts with the **"Biagi Law" of 2003.** New types of labour contracts come into life: job-on-call, job sharing, supplementary work, "lavoro a progetto", which slightly tightened the regime for the already existing short term contracts (known as "Co.co.co").

Overall the Treu Package and the Biagi Law regulated in a less restrictive way the labor market and opened the way to temporary contracts.

5. Descriptive evidence on the Italian Labor Market

This section briefly describes the data sources used in the paper and the way we constructed the key variables for the analysis. It then shows descriptive evidence on the Italian labor market.

Our main data sources are the Labor Force Survey (*Indagine sulle Forze di Lavoro*) or FLS, conducted by the Italian national statistical institute (ISTAT) and the Survey of Household Income and Wealth (*I Bilanci delle Famiglie Italiane)* or SHIW, conducted on behalf of the Bank of Italy.

The FLS data set

The Labor Force Survey is a quarterly sample longitudinal survey first conducted in 1959. It was carried out every second working week of each quarter (i.e. January, April, July and October) until 2004. From 2005 it is carried out continuously during the year. The Labor Force Survey covers 300 thousands households, 800,000 individuals distributed in 1351 Italian municipalities. In this paper we use the quarterly Labor Force Survey data from 1977 to 2004.

The statistical units are *de facto households* and the questionnaire is administered to all household members with more than 15 years of age. The classification of the individuals in the different professional classes is based on the self reported status of the individuals and on a series of answers regarding the job activity of the respondent during the week before the interview. Moreover, the classification of the respondent is constructed following a hierarchical process: first, the employed are identified; secondly, among all the non employed the job seekers-unemployed (both previously employed and first time seekers) are identified; finally, all the remaining individuals are classified as out of the labor force.

All the definition and classification used in the Labor Force Survey are based on the principles stated by the International Labour Office in 1982 and they are the result of an harmonization process that make them comparable with the ones adopted by all the European countries. In particular, the definition of unemployed has been changed during the years. First, in 1984, the definition of job seeker was changed to capture the criterion of self-reported "willingness to work". In 1986, the definition of job seekers was restricted to those individuals who self-report to have actively searched for work. Finally, in 1992 the job search period of the unemployed was limited to 30 days before the interview date.

Trends in the labor force

By making use of the different waves of the LFS we can show trends of the activity rates and employment-unemployment rates for the different age groups in the population. In particular these groups are

- **Young**: people in age 20-24
- **Prime age**: people in age 25-54
- **Old age**: people in age 55-64

However, we can look at finer aggregations of age groups which are relevant for the labor market (e.g. distinguish the group aged 15-19 from the group aged 20-24). One advantage of our data sets is that we can also exploit, both for the LFS and the SHIW sample, the important regional variation of the Italian labor market, in particular we distinguish 5 geographical areas: North-West, North-East, Center, South-West and South-East.
The most intuitive description of the labor force trends by age-groups is provided by time series presented in levels. One point to be stressed is that the LF series have a break due to the recording methods in 1993: the Italian Statistical Office has revised the series before 1993 so that the break is no longer visible in the unemployment rate and the activity rates[9].

Figure 5.1 shows the labor force participation rate for young workers and older workers and the unemployment rate for the young, for the period 1977-2004. The vertical bars refer to the years of the social security reforms. The unemployment rate is defined according to the standard labor market definition, as the ratio of unemployed people on active people, i.e. the unemployed over the LF. Hence this rate is more sensitive to business cycle fluctuations than employment rates, particularly for the youth-unemployment rate.

The descriptive evidence suggests that there is no simple relationship between the labor force participation of the old and the unemployment rate of the young. In the 1970's and 1980's the labor force participation of the old had a steady decline while the unemployment rate of the young increased. It is only in recent years that the effect of the social security reforms are felt: a reversal in the declining trend is observed in the labor force participation for the age group 55-64, i.e. workers for which the age-limits to access early retirement have gradually become binding, around the year 2000[10].
Overall these trends suggest that the reforms had- independently for the social security system and the labor market - some impact: the youth unemployment rates decrease after 1997 and social security reforms increased labor force participation amongst the older workers.

[9] We are grateful to the Italian Statistical Office ISTAT for letting us have access to the MARRS data base
[10] Appendix: he same rates are presented in index form, where 1977 is the base-year (set at 100).

Figure 5.1 Italy: Trends on labor force participation of the young and old workers compared to the unemployment rate of the young

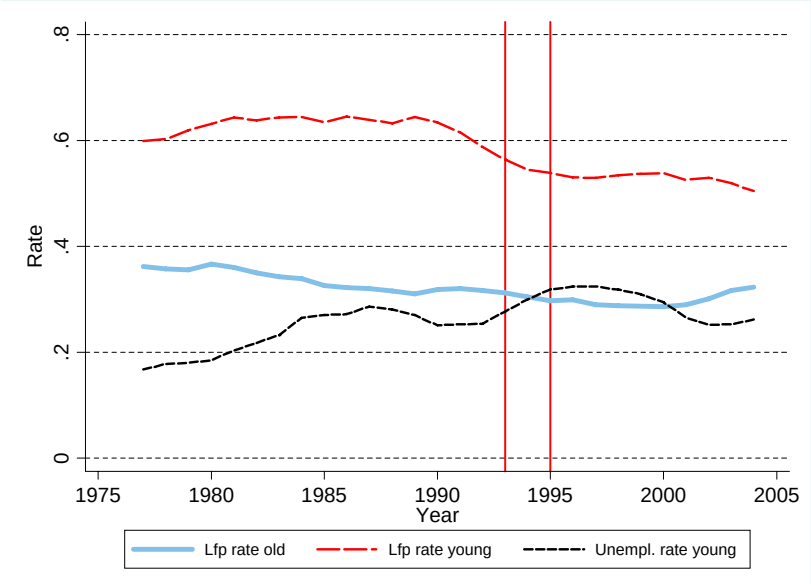


Figure 5.1A Italy: Trends on labor force participation of the young and old workers compared to the unemployment rate of the young- Males

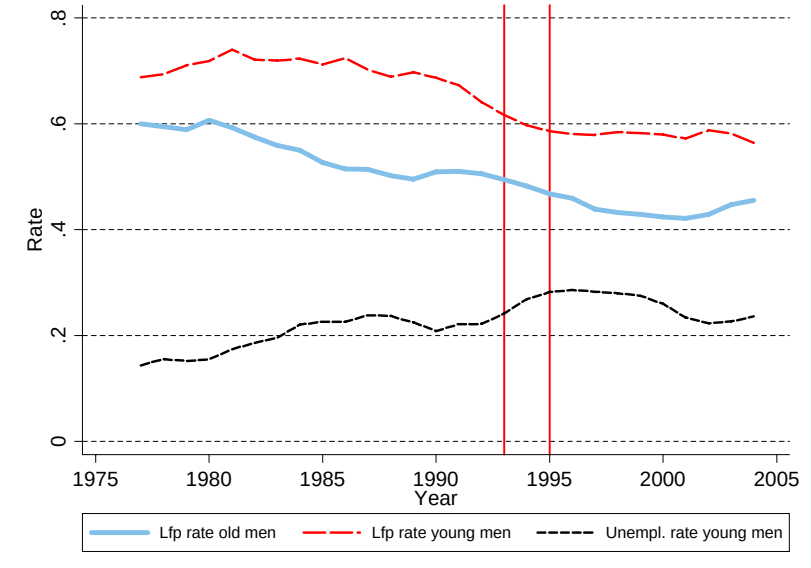


Figure 5.1B Italy: Trends on labor force participation of the young and old workers compared to the unemployment rate of the young – Females

There is no evidence of substitutability between older workers and younger workers: the two time series seem to be positively correlated, when the unemployment rate of the young increases there are also more older workers leaving the labor market. The fact that these times series vary in a pro-cyclical fashion is also confirmed by the time series of youth labor force participation.
However the aggregate figures conceal important gender differences. Figures 5.1A and 5.1B report the same times series distinguishing between male workers (5.1A) and female workers (5.1B). The unemployment rate of the young shows the same trend and cycles for males and females, the level of the unemployment rate for females is higher in each year. The labor force participation of older workers shows marked gender differences: male workers in the age group 55-64 exit the labor force at an increasing rate over time, apart from the reversal in the trend after the year 2000, for female workers of the same age group the time series is flat or even increasing, due to relevant cohort effects.

Figure 5.2 shows the same patterns but the emphasis is on the trend in the unemployment rate of prime age workers (age 25-54). For this group the unemployment rate is at a much lower level, hence confirming that youth unemployment is the main determinant of total unemployment.

Figure 5.3 stresses once more that the labor force participation of the youngest group and of the oldest group are pro-cyclical. The decline in labor force participation of the young occurring in the late 1980's early 1990's is largely due to an increasing participation to schooling and to the rigidity of the labour market in those years. Only in the recent years the labor force participation rate of the elderly is reversing the trend (due to the pension reforms). For these trends too there is a clear gender

difference: due to cohort effects there is a growth in older female workers after the year 1997. For younger females the pattern is similar to that observed for younger males as schooling also plays an important role in this case.

Figure 5.2 Italy: Trends in the labor force participation rate of the old and unemployment rate of the young and prime age

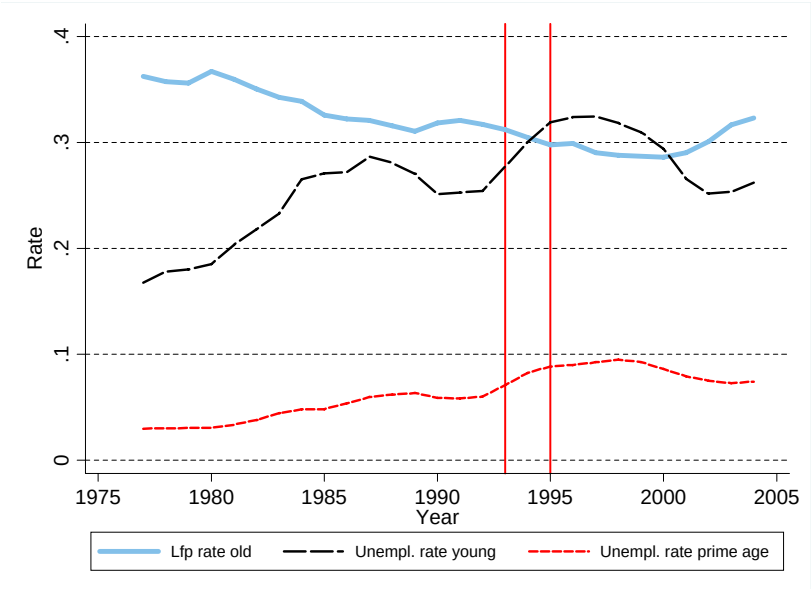


Figure 5.2A Italy: Trends in the labor force participation rate of the old and unemployment rate of the young and prime age (males)

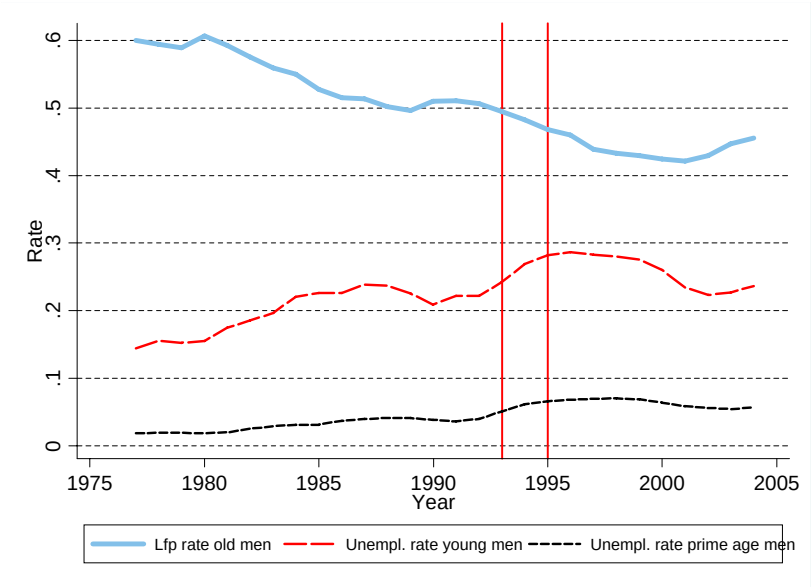


Figure 5.2B Italy: Trends in the labor force participation rate of the old and unemployment rate of the young and prime age (females)

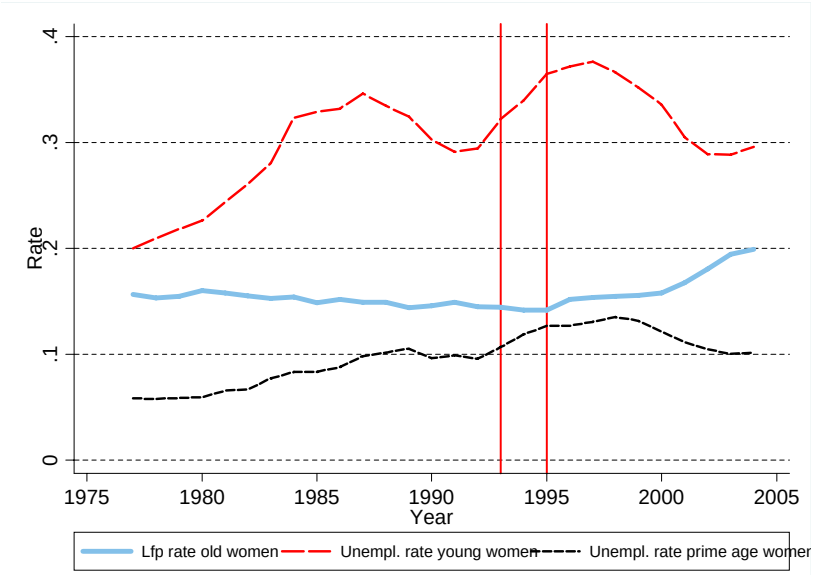


Figure 5.3 Italy: Trends in the labor force participation rate of the old, of the young and of the prime age group

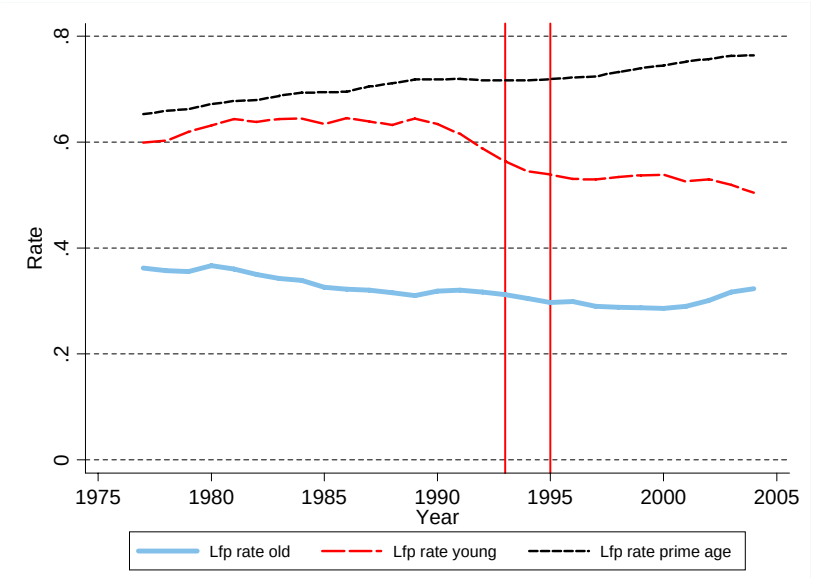


Figure 5.3A Italy: Trends in the labor force participation rate of the old, of the young and of the prime age group (males)

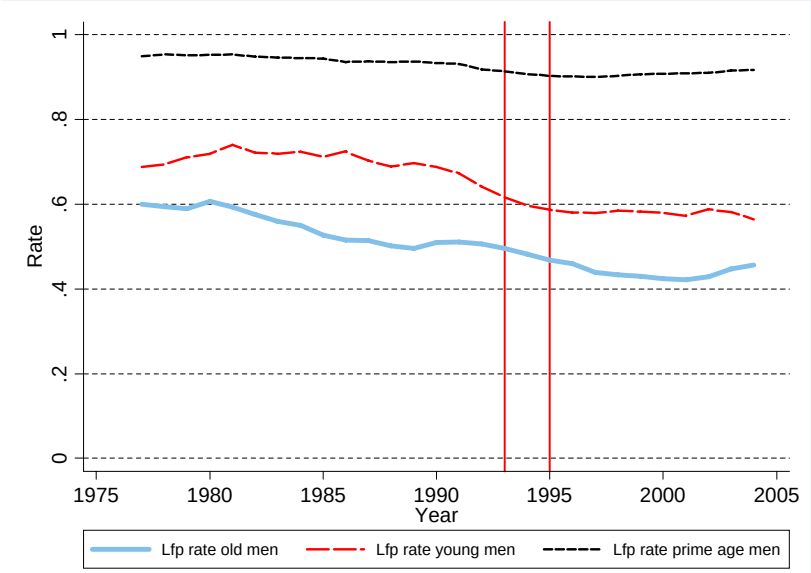
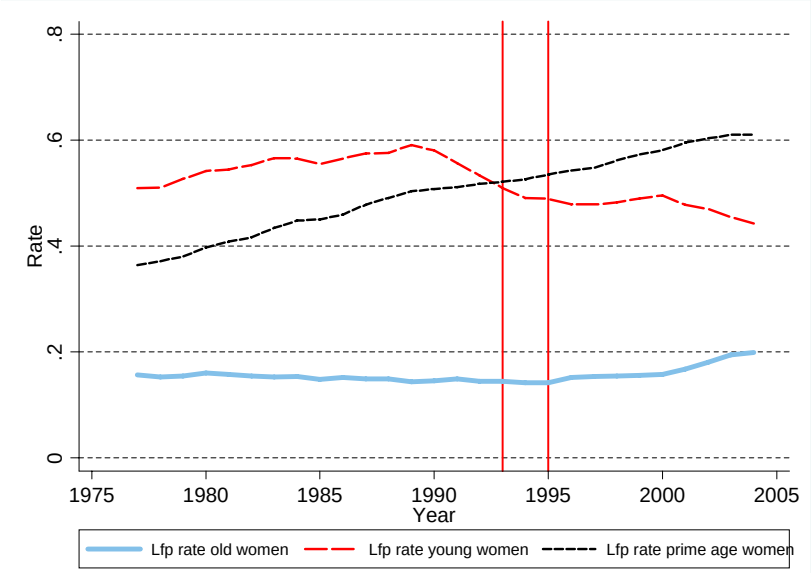


Figure 5.3B Italy: Trends in the labor force participation rate of the old, of the young and of the prime age group (females)



As for the exits from the labor force Italy has two main routes: old age and early retirement. Invalidity pensions were relevant until the beginning of the 1980's, but regulation on access to invalidity benefits became much stricter in those years and the inflow of such benefits was driven down to very small numbers within a ten years period.

Figure 5.4 shows the stock of outstanding benefits, by type of benefit and by year[11]. Unfortunately we cannot distinguish the early retirement route, it is clear that

[11] ISTAT, Casellario delle Pensioni

invalidity benefits gradually become negligible as invalidity beneficiaries become old age beneficiaries at age 65, if still receiving the benefit. The other explanation is that the cause of disability is no longer applicable or that the beneficiary dies.

Figures 5.5A and 5.5B provide the stock of early retirement/ old age benefits: from the year 2000 we can distinguish by age class. Under the assumption that in the age brackets 50-54 and 55-59 we find early retirement benefit and that in some cases these are also claimed between the ages 60 and 64, one can draw the conclusion that the restrictions on eligibility rules have indeed been biting in recent years.

Figure 5.4. Italy: Beneficiaries of benefits by type of benefit and year

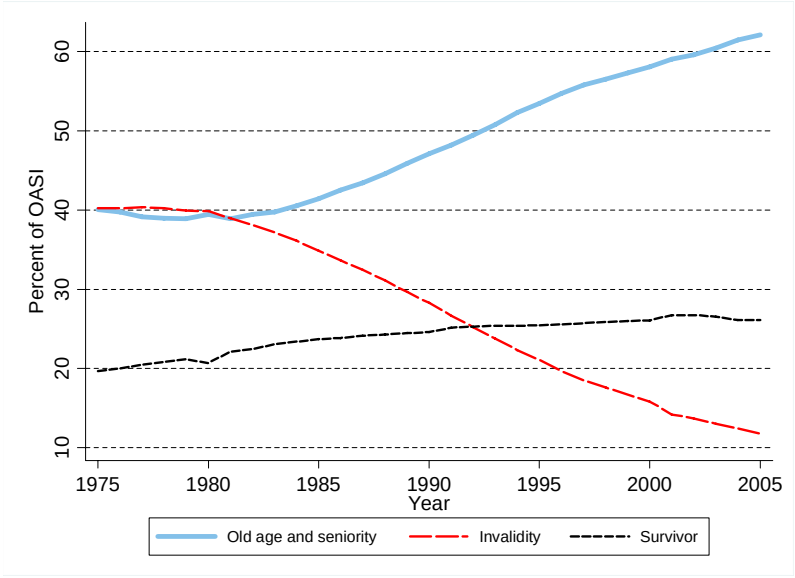


Figure 5.5A Number of recipients of early retirement/old age social security

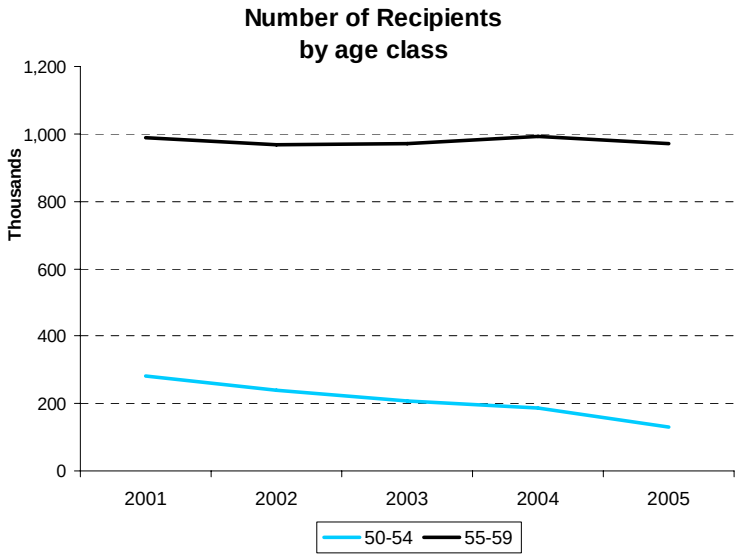
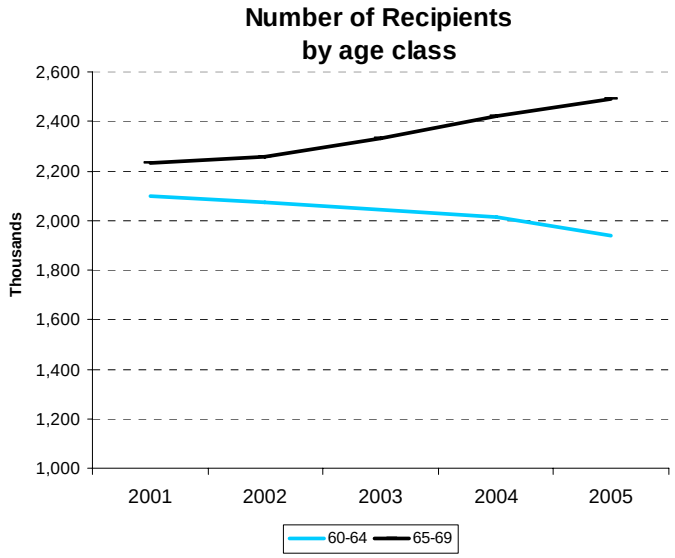


Figure 5.5B Number of recipients of early retirement/old age social security



6. *Incentives to retire*

In order to capture the effects of changes in legislation, particularly the ones due to pension reforms, we contrast several measures of the incentives with the labor force time series.
We will develop a simulation method to construct our incentives measures: this way we will embed, in each year, legislation changes in the social security system (i.e. benefit calculation and eligibility rules) at the same time avoiding the endogeneity problems contaminating actual social security data series.
In order to carry out this simulation (based on Brugiavini and Peracchi 2005) we make use of Survey (Survey of Household Income and Wealth) containing detailed information on several characteristics of individuals in Italy.

The SHIW data set

The variables concerning social security benefits analyzed in this paper are based on information drawn from the SHIW sample. The SHIW is a repeated cross-sectional survey first conducted in 1965. It was carried out annually until 1987 (except for 1985), every two years until 1995, and then again in 1998, 2000 and 2002. The most recent survey, conducted with reference to the year 2002, covers about 8,000 households and 21,000 people. From 1989, the survey contains a panel component. Currently, about half of the sample (4,000 households in all) is included in the panel. In this paper we use the historical data base (Bank of Italy 2004), which contains the harmonized micro-level data for the period 1977-2002.
The survey units are *de facto* households. All household members (including those aged less than 15) are asked to indicate their income in the year before the survey. Questions about the household are submitted to the head of the household (see also

Appendix 1 for details). Because of the over-sampling of certain population strata in some years (especially in 1987), and differential non-response and attrition rates, it is crucial to use the survey weights when estimating features of the population, such as means, variances and percentiles.
The quantity and quality of the information collected by the survey increased through time. For example, until 1983 age was only recorded in broadly defined brackets. From 1984, age is recorded in years and so one can study the behavior of birth cohorts defined by single years of age. Until 1989, little information was available for those who do not receive any income. Basically, only gender, age, relationship to the head and main activity (housewife, student, etc.) were recorded, but
there was no information on, for example, educational attainments and marital status. The frequent changes in the definitions complicate the task of constructing time consistent measures. This is particularly true for variables such as the schooling level, the sector of employment and
the type of job. However the "historical archive" of the Bank of Italy provides harmonized measures that mostly overcome these problems for the purpose of this study.

Incentive Measures

Before turning to the simulation methodology we look at a simple measure capturing changes in eligibility rules: this is the sum of minimum age requirements and number of years of seniority necessary to apply for an early retirement benefit. In fact workers could retire in Italy either with a sufficiently high age (the legal retirement age for old age benefits which is now 65 for men) or with a given number of years of contributions (for example any age if 40 years of contributions have been completed) or a combination of the two (for example 57 years of age and 35 years of contributions). We call this variable **"quota"**: before 1995 this was equal to 60 because one could retire with 20 years of contributions at "any age", for example age 40, it then grew suddenly in 1995 to reach level 83 and increased gradually thereafter.

Figure 6.1 shows the relationship between unemployment rate of the young and the "quota" variable: they both jump around the years 1993-1996, however while the quota "index" keeps growing until the most recent years the unemployment rate of the young shows a relevant swing. The most interesting picture in this respect is Figure 6.2, showing the relationship between the employment rate of the old and the variable quota**.** The trend in the "quota" indicator anticipates of a few years the rise in employment of the old group.
However the "quota" variable is a rather rough measure of the complex financial incentives of the social security system: we construct incentives which capture different dynamic features of the social security system.

Figure 6.1. Italy: Trends in the unemployment rate of the young and the "quota" indicator

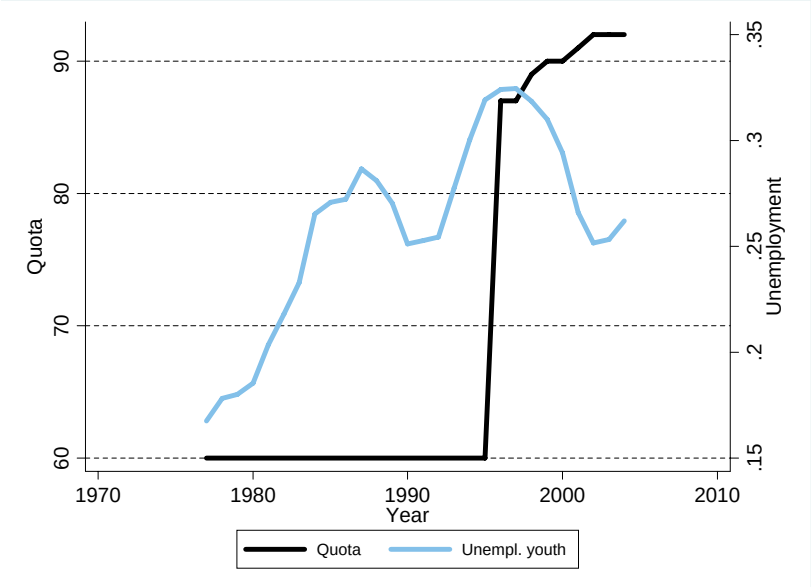
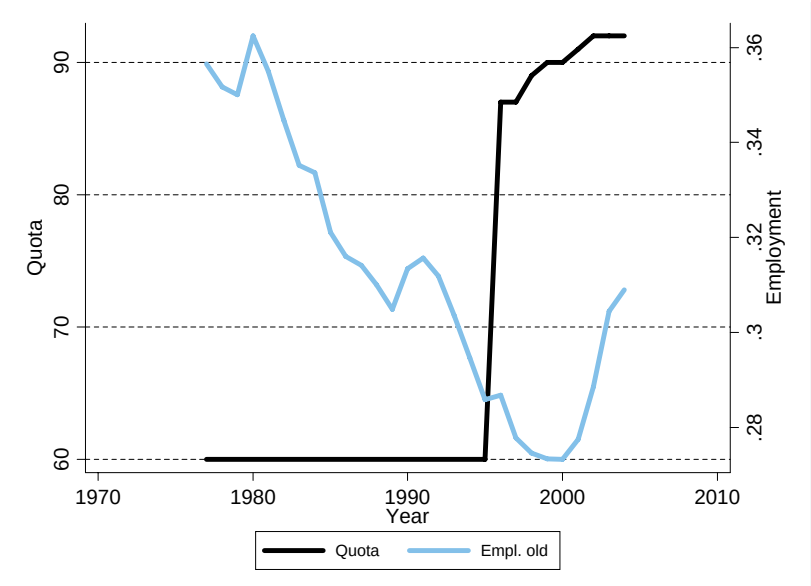


Figure 6.2. Italy: Trends in the employment rate of the old and the "quota" indicator



Social Security Wealth and Incentives

In the SHIW sample we have variation with respect to all individual characteristics and we can also distinguish whether the pension benefit originates from a private sector occupation, public sector occupation or from self-employment (in this paper we refer to these as "employment types" or simply "jobs").
To compute the simulated benefits, we start from the profile of median earnings of a given cohort, as in Brugiavini and Peracchi (2004), we focus on cohorts born before the Second World War, in particular individuals born in 1938 and 1939 and carry out the estimate separately for men and
women and by employment type (private-employee, public-employee and self-employed). We smooth the earnings profiles by means of age polynomials and also by non parametric smoothers. The same real earnings profile is then imputed (taking account of the relevant job-gender group) to members of that group. Productivity growth of the different cohorts is attributed by shifting the age profile[12].

Simulated benefits are then obtained according to the prevailing legislation for each employment type, taking account also of eligibility rules. For example, we model the Reform of 1992 (implemented in 1993) known as the "Amato" reform: changes affected both currently retired people (trough a reduced indexation- based on inflation only) and future retirees through a changes in the benefit calculation, eligibility rules and indexation of future benefits (see Brugiavini and Peracchi, 2004 for details). Hence effects on current variables, such as disposable social security benefits, are immediately captured after 1992, both because of the effects on pensioners and because of the changes (gradually less and less generous) to newly awarded benefits during the transitional period. It should be noted that there are differences both in the way rules changed for different types of employment and in the way these changes impacted on individuals' behaviour (e.g. consumption) because these groups of the population started from different conditions (public sector employees had more generous pensions to start with). All monetary amounts are measured in Euros at constant 2005 prices.

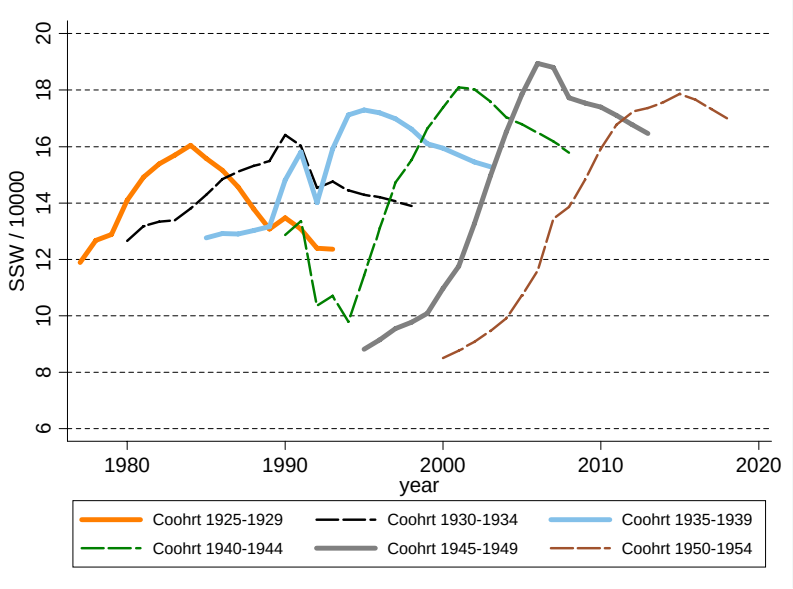
Although in Italy there have been a number of changes to the benefit computation rules, eligibility rules have been almost unchanged in the relevant years until the 1992 reform. Also the existence of a generous early retirement option has allowed retirees to have plenty of flexibility on the timing of retirement, so that the introductions of more restrictive eligibility rules of the 1990's had little impact in the current cohorts of retirees. The effects of the minimum requirements are felt more recently especially for the younger old.

Figure 6.3 provides a graphical representation of social security wealth by year and cohort for hypothetical "median wage earners" of that cohort. The cohort- times series are obtained as weighted averages of the social security wealth of men and women and of the different employment types.

[12] Growth rates in earnings for the different cohorts are computed on the basis of two sources: Rossi-Sorgato-Toniolo 1993 for the data before 1990 and the SHIW data set for the more recent years.

For each cohort the patter is generally hump-shaped, i.e. there is a peak value reached at some eligible age and W declines thereafter. Besides a secular increasing trend in the level of W one can observe also a larger dispersion: after the reforms of the 1990's, the W starts at a lower level and it reaches a peak value at a much older age. Part of this variability across cohorts is also due to changes in productivity and changes in mortality[13]. It is clear that changes in eligibility conditions, particularly the minimum age requirement for access to early retirement plays an important role in shaping the SSW profile. Changes in the benefit computation rules occurring after 1992 explain why retirees who claim early retirement would have low benefits due to lower average "pensionable earnings", despite the fact that there is no actuarial penalty on early retirement in Italy.

Figure 6.3. Italy: Social Security Wealth (W) by Cohort and Year (pooled data)



When aggregating the age-year values of social security wealth one obtains an yearly index of the incentives faced by different cohorts in that particular year. We make use of two incentive measures, both are weighted averages: the first one called $\overline{W}$ is the weighted sum of W, the second is called $\bar{I}$ and it combines both the level of social security wealth and the peak value. $\overline{W}$ is a synthetic incentive measure which reflects the mean expected social security benefit faced by each cohort *a* in year *y*:

$$[1] \qquad \overline{W}(a,y) = \sum_{t=0}^{a-50} \frac{LFP(a-t,y-t-1)}{\sum_{t=0}^{a-50} LFP(a-t,y-t-1)} W(a-t,y-t)$$

This is an average of *W(a,y)*, the social security benefit, between the year cohort *a* enter eligibility until year *y*. Weights are based on the labor force participation rate by

[13] We experimented by fixing both the productivity and the mortality probabilities so that the only variability is in the age-earnings profile and in legislation. Important variability across cohorts is still observed due to the reforms.

year and cohort (data source: ISTAT). With this formula we are implicitly assuming that, before age 50, i.e. before eligibility, cohort *a* social security benefit is zero. The rationale is that *W(a,y)* accounts for the forgone benefit by a member of cohort *a* if she decides not to retire in year *y*. Hence, if cohort a is not eligible in year *y*, individuals of that cohort have no choice whether to retire or not, and therefore have no forgone benefits.
The further step now is to build an aggregate measure of expected social security benefits across cohorts for a given year: we average $\overline{\mathrm{W}}(\mathrm{a},\mathrm{y})$ over cohorts' population in a given year:

[2]

$$\overline{\boldsymbol{W}}(\boldsymbol{y}) = \sum_{\boldsymbol{a}=50}^{64}\left[\frac{\boldsymbol{P}(\boldsymbol{a},\boldsymbol{y})}{\sum_{\boldsymbol{a}=50}^{\boldsymbol{a}=64}\boldsymbol{P}(\boldsymbol{a},\boldsymbol{y})}\right]\overline{\boldsymbol{W}}(\boldsymbol{a},\boldsymbol{y}) = \sum_{\boldsymbol{a}=50}^{64}\left[\frac{\boldsymbol{P}(\boldsymbol{a},\boldsymbol{y})}{\sum_{\boldsymbol{a}=50}^{\boldsymbol{a}=64}\boldsymbol{P}(\boldsymbol{a},\boldsymbol{y})}\right]\left[\sum_{\boldsymbol{t}=0}^{\boldsymbol{a}-50}\boldsymbol{W}(\boldsymbol{a}-\boldsymbol{t},\boldsymbol{y}-\boldsymbol{t})\frac{\boldsymbol{LFP}(\boldsymbol{a}-\boldsymbol{t},\boldsymbol{y}-\boldsymbol{t}-1)}{\sum_{\boldsymbol{t}=0}^{\boldsymbol{a}-50}\boldsymbol{LFP}(\boldsymbol{a}-\boldsymbol{t},\boldsymbol{y}-\boldsymbol{t}-1)}\right]$$

$\mathrm{P}(\mathrm{a},\mathrm{y})$ is the proportion of retired person in the given year and it is estimated in the SHIW Survey, LFP is the labor force participation in a given year and age, this is taken from the Labor Force Survey .
Note that for Italy we regard age 50 as the first eligibility age. Also we have available gender variation and regional variation, hence this measure has been computed conditional on gender, and macro region, then aggregated at the "national-pooled" level.

A second index is based on the peak value $\mathrm{PV}^{*}(\mathrm{a},\mathrm{y})$: this may vary with ***y*** and it may also vary with age in a given year because of different earnings histories for different cohorts. The peak value is defined as the maximum present value of *W(a,y)* for ages greater than ***a***. The measure *I(a,y)* takes into account both social security benefits an the peak value using a discount factor and weights q, which represent the proportion of individuals in the labor force at a given age and year (LFP):

[3] $$I(a,y) = \{W(a,y) + \alpha[W(a,y) - PV^{*}(a,y)]\}q(a,y)$$

$\mathrm{PV}^{*}(\mathrm{a},\mathrm{y})$, consistently with the underlying measure W(a,y), is set to zero if the current age is below the eligibility age. The value of will be chosen optimally as discussed below.
By averaging over the different cohorts I(a,y) becomes an annual time series (as we did with W(a,y)), hence $\bar{I}(y)$ is defined as:

[4] $$\bar{I}(y) = \sum_{a=50}^{64} \left[\frac{P(a,y)}{\sum_{a=50}^{a=64} P(a,y)} \right] \left[\sum_{t=0}^{a-50} I(a-t, y-t) \frac{LFP(a-t, y-t-1)}{\sum_{t=0}^{a-50} LFP(a-t, y-t-1)} \right]$$

The intuition of the index I is to combine both the wealth effect generated by the social security wealth variabòle and the dynamic gains from waiting to retire. It explicitly models the trade off that a higher social security wealth W may induce the worker to retire early, however this has to be set against the gains from postponing retirement (W-PV) which represent the advantage of staying at work. The latter is discounted by the appropriate discount factor which depends on the impatience of the individual, if =0 we have an extreme case where individuals are so impatient that they not take into account future gains or losses.

In order to obtain endogenously the optimal discount factor we make use of two methodologies: the first one is the ***iteration procedure*** and the second the ***regression approach***. Both build on a simple relationship of the type:

[5] $$LFP_{old,t} = \gamma \overline{W}_t + \theta(\overline{W}_t - PV_t) + \beta X_t + \varepsilon_t$$

Where W and (W-PV) are the two terms in the index I and X is a matrix of controls. When the iteration procedure is implemented we perform a simplified maximum likelihood approach by setting =1 and letting vary in a given grid, in order to maximize the resulting R-squared. The value of which gives the highest R-squared is chosen as the optimal . In the regression approach we let both parameters and vary freely and compute as the ratio between the two.

Both indexes W and I are computed on the basis of data relating to the median worker derived from the SHIW Survey.

Table 1 reports the estimates of these parameters through the two methodologies. We also distinguish a case where workers are "constrained", i.e. they cannot access their benefits before the eligibility age and therefore both W and (W-PV) are set to zero.
As it emerges from Table 1 our preferred specification (delivering the highest R-squared) in the iteration method is with **α=1.50** both in the unconstrained and the constrained case[14]. As for the latter we obtain opposite signs, which is counterintuitive, but these estimates are hardly significant. Hence in the remainder of the paper we focus on estimates of the effect of incentives on labor force participation obtained with α equal to 1.50

Figures 6.4 and 6.5 show the times series of the incentive indexes obtained. The I-index is more hump-shaped as it reflects the dynamic in the peak value which emerges from Figure 6.3. It is interesting to note that when liquidity constraints are

[14] It should be noted that in this paper α is exactly the discount factor presented in equation [3]

introduced the I-index is rather sensitive to this change as for Italian workers such constraints are binding by effectively reducing the access to early retirement benefits.

Figure A4 in the Appendix shows the effect of the different parameter configuration on the index I, the higher α, the more pronounced is the hump. The index W is dominated by the growth of generosity of the system in the early years and by the fact that older cohorts started collecting benefits having completed full careers in the years 1970s. The Index-W peters out at the end of the 1990's both as an effect of reduced generosity and as a result of the demographic changes.

Figure 6.4: Italy. Incentives to retire by year (W and I)
No constraints

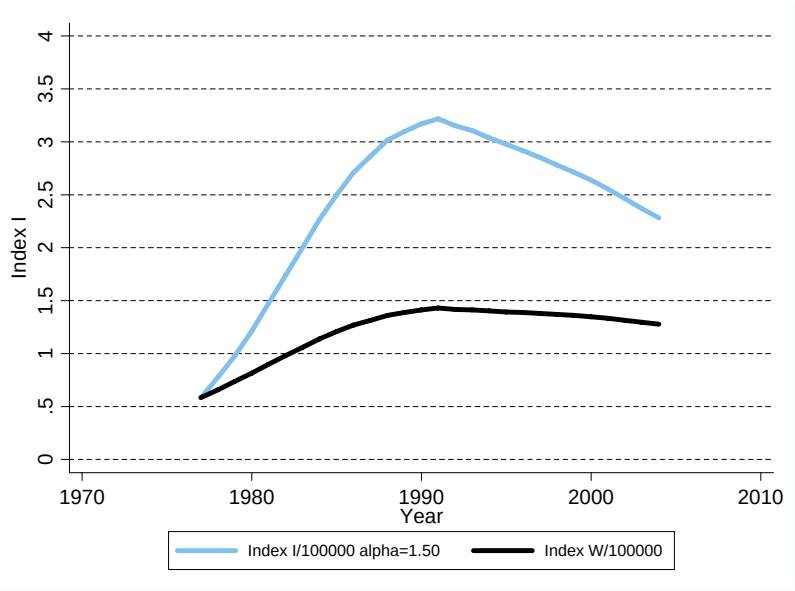


Figure 6.5: Italy. Incentives to retire by year (W and I)
With constraints

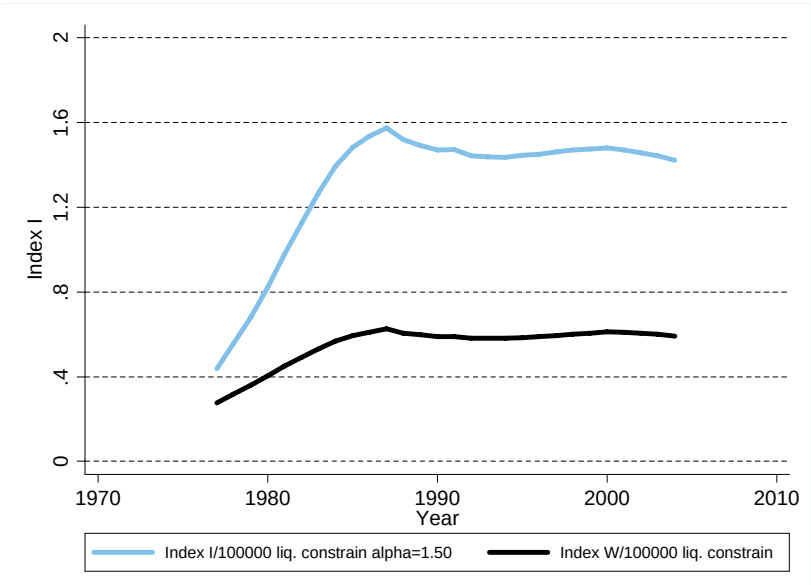


Figure 6.6. Italy Unemployment rate of the young and of the prime age group and the incentive variable W. No constraints

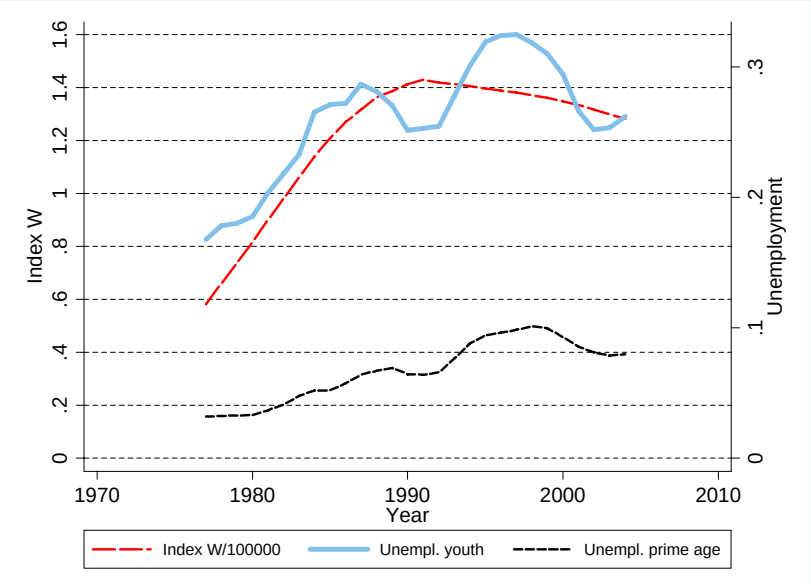
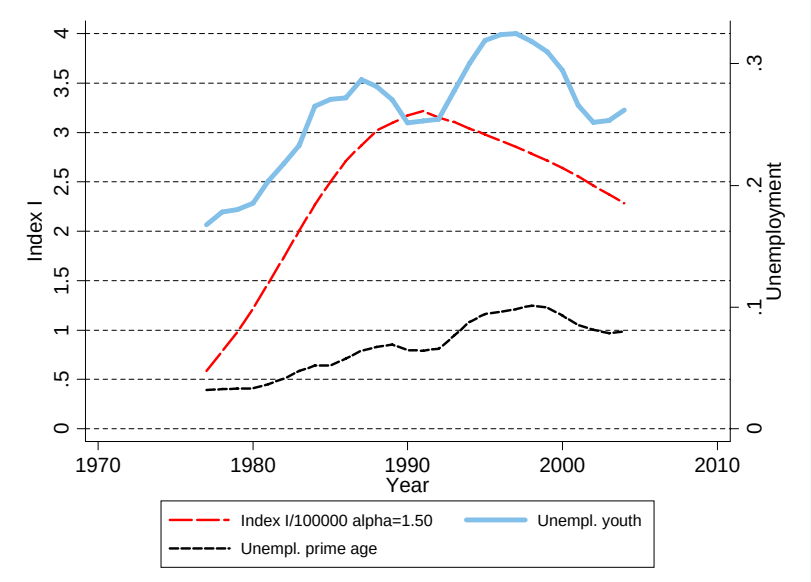


Figure 6.7. Italy Unemployment rate of the young and of the prime age group and the index I
No constraints



Figures 6.6 and 6.7 show the relationship between the Index "W" of equation [2], the index I and the unemployment rate of the young and of the prime age group. Although there seem to be some correlation between the secular trends in the time

series, this correlation fails after the reforms when the unemployment rates fluctuate while the indexes decline steadily.

A similar picture emerges from Figures 6.8 and 6.9 which relate the incentive measures to the employment rates of the young and of the prime age group.

Figure 6.8. Italy: Employment rate of the young and of the prime age group and the incentive variable W. No constraints

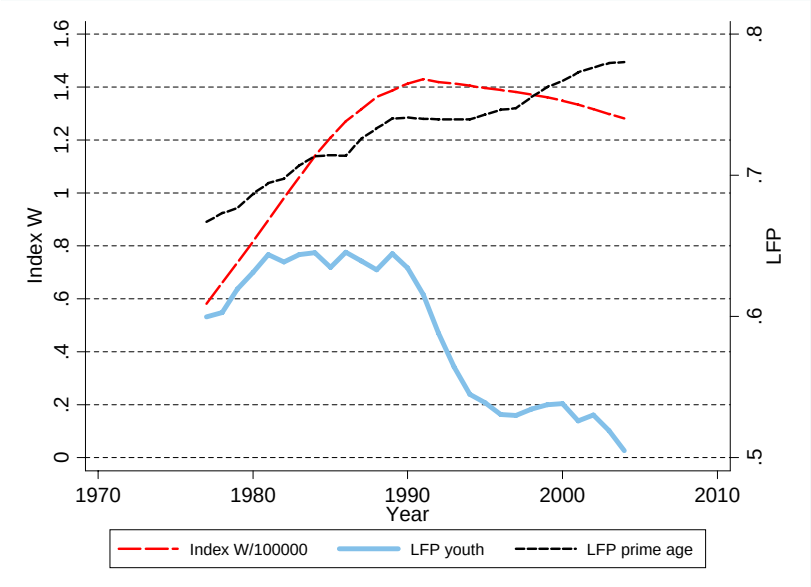
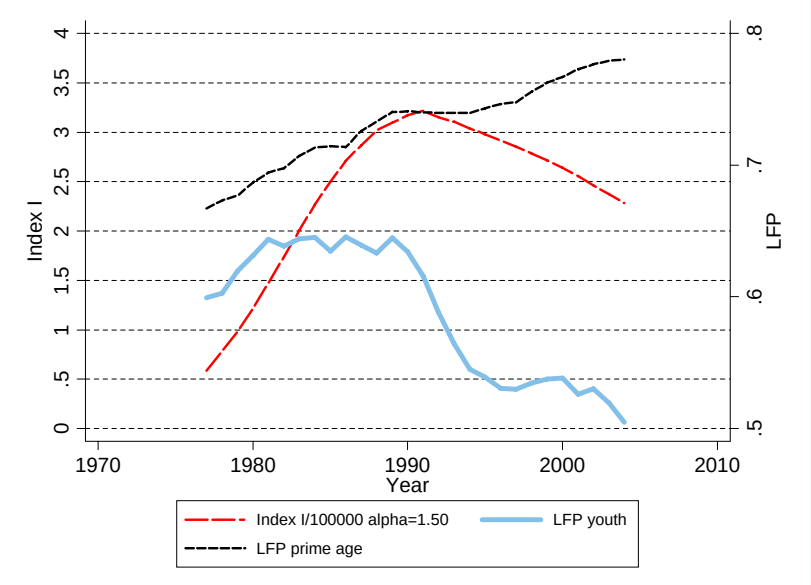


Figure 6.9. Italy: Employment rate of the young and of the prime age group and the incentive variable I. No constraints



7. Regression Analysis

The descriptive evidence has shown some possible correlations between the unemployment rate of the young and the labor force participation of the old, however we argued that this correlation is mainly due to the underlying business cycle. Incentive variables, which represent our "instrumental variables" in capturing the possible nexus between pension policies and labor market trends, also seem to play a role in explaining the behaviour of the older workers (but presumably not of the young people).
These questions can be better addressed in a more structured fashion by resorting to the regression analysis.
In a first set of regressions (referred to as "OLS regressions") we investigate a simple relationship between the labor market trends for the young (prime age) and that of the old. The relationship is of the type

[7] $$Y_t = \gamma + \theta V_t + \beta X_t + \varepsilon_t$$

Where $\boldsymbol{Y_t}$ represents either the unemployment rate or the employment rate of the young and $\boldsymbol{V_t}$ represents either the labour force participation or the employment rate of the older workers. In a different specification we also model the percentage of young individuals in education.
In a first set of regressions we use the pooled time series (no gender variation).
The covariates are: GDP, a dummy for the change in compulsory education age, the median wage, the contractual wage (variation only over time), the percentage of people in school. Apart from GDP, which is derived from the ISTAT-Yearly Statistical Bulletin, all the other series are derived from the SHIW data.

Results are shown in **Table 2A , 2B and 2C,** Table A2 in the Appendix also shows the results with the full list of covariates. We consider both a specification with the pooled data (Table 2A) and one where we allow for gender variation and make use of a "male" dummy. This variation is quite relevant in Italy as the graphs on unemployment rates and labour force participation show. There are four specifications for each regression: one is in levels and the others experiment with different lag structures. We also distinguish a case with no other covariates besides the labour force participation, one with a full set of covariates (including the median wage, contractual wage, GDP per capita etc…) and one specification where we select a subset of covariates (GDP per capita, GDP growth and the share of GDP produced by the industrial sector)[15].

In all cases where we relate the unemployment rate (or employment rate) of the young to the labor force participation of the older workers we confirm the descriptive evidence that they tend to move in a pro-cyclical fashion, i.e. when the labor force participation of the old goes up the employment rate of the young also increases (unemployment decreases), these estimates are also significant and robust the

[15] It should be noted that in Italy there is no such thing as "minimum wage" going back for the entire time period. This is mainly because contracts envisage only at time a minimum wage, they usually define a contractual wage.

inclusion of covariates. As for the young people in schooling we get mixed evidence: for the level specification an increase in labor force participation of the old is negatively related to the trend in schooling attendance, however this result is usually reversed in the regression with five years differences, suggesting that there might be a long wave in this relationship. Our intuition is that this result is dominated by the basic increasing trend in schooling which is not sensitive to business cycle variations. Interestingly enough when we consider the employment (unemployment) of prime age workers we get mostly a pro-cyclical pattern: employment of the prime wage workers and labor force participation of the old grow together. We run a simple "causality" test by looking at the impulse response functions of the unemployment rate of the young and the activity rate of the old in response to a one-time change in GDP per capita. Results are shown in the Appendix (Figures A5 and A6): the unemployment rate of the young is much more reactive to GDP changes and is less precisely estimated, however one can see that both series respond to GDP in a pro-cyclical fashion. In particular the unemployment rate of the young anticipates the response to GDP with respect to the activity rate of the old, so that one might be induced to infer e reverse causality from the youth-UR to the old-AR. But the impulse response function clearly suggests that GDP is the main driver. These results are also robust to the introduction of gender variability (Table 2B) and of regional variability (Table 2C). Overall the time series of employment and unemployment of the young do not seem to be directly affected by the labor force participation in alleviating the unemployment problem, the "young-in-old-out" paradigm is contradicted by the data.

As we argued there are potential endogeneity problems in relating the unemployment rate of the young directly to the labor force participation of the old. In order to overcome these problems we test a set of specifications where the main explanatory variables are the incentive variables. Results are presented in Table 3.

Table 3 contains different cases:
(i) a first difference is drawn by choosing different levels of the parameter. This can take value zero (effectively focusing on the incentive variable W only) or value 1.5, which is our preferred specification, or finally it can take the value emerging from the regression methodology (albeit of the wrong sign and not significant)

(ii) a second difference is the inclusion of liquidity constraints in the estimation of the index I

(iii) a third difference is with the use of covariates

(iv) a fourth difference is with the lag/differencing structure, starting as usual from the specification in levels.

Results are very robust to the different variants described above. By focusing the attention on the case where =1.5 and there are no liquidity constraints, one can see that a larger inducement to retire has a positive and significant effect on the unemployment rate of the young (negative on the employment rate). Hence incentives directed to the elderly have no beneficial effect on the unemployment rate of the

younger generations. A similar lesson is drawn when the dependent variable is the schooling rate of the young. The only cases where some of the effect is lost is when we resort to five-years differences (which reduces the sample size). On the other hand, incentives to retire have a strong and positive effect on exits from the labor force of the elderly as the labor force participation of the older groups shows a negative and significant coefficient.
Results are stable also if we allow for the effects of liquidity constraints on the inducement to retire: this could be relevant in Italy as the restrictions imposed by the legislation on eligibility would be more strongly felt.

8. Conclusions

Italy is a country characterized by high rates of unemployment, particularly for the younger generations. The generosity of the pension system prior to the reforms of the 1990's has induced many workers to retire early and some policy makers, particularly unions, have supported the "Young-in-Old-out" paradigm. However we prove that for Italy the "lump of labor" assumption fails and we do this through two main routes.

First we show that the direct relationship between the unemployment rate of the young (age 20-24) and the labor force participation of the old (55-64) is pro-cyclical, i.e. a higher labor force participation of the old is related to a lower unemployment rate of the young. Hence both vary with the business cycle. This results is very robust to the lag structure we impose, so it is not just an artefact of the timing in the business cycle. It is also robust to a variation that distinguishes groups by gender, given the important gender-differences in labor market behaviour.

The second route recognizes that in the previous approach there might be an endogeneity problem, hence we resort to a simulated variable: "the inducement to retire", which is constructed by simulating the social security benefits to the median worker taking into account the relevant social security legislation. There are two versions of this incentive variables, one is simply the average social security wealth and the other is an index which also includes the potential gains (losses) from postponing retirement, hence it is more dynamic.
We have related the unemployment rate of the young to these incentive measures and found that a higher inducement to retire is associated to a higher unemployment rate – quite the opposite of the "young-in-old-out" story. The variables capturing the inducement to retire have a significant effect on the labour force participation of older workers, this is of the expected sign (the higher the incentive the lower labor force) and very robust to the different specifications, hence suggesting that Italian workers have responded to social security incentives.

Table 1. Italy: Estimates of the parameters of the I-index

	UNCONSTRAINED					LIQUIDITY CONSTRAINED				
Iterating over alpha with gamma==1 with 0.25 intervals and regressing LFP of old on Ibar										
LFP OLD	GAMMA	ALPHA	RATIO	R^2	Ibar weighting	GAMMA	ALPHA	RATIO	R^2	Ibar weighting
	1	1.50	1.50	0.8134	1*W+1.50*(W-PV)	1	1.50	1.50	0.8038	1*W+1.50*(W-PV)
Time series regression of LFP old on W and (W-PV)										
LFP OLD	GAMMA	ALPHA	RATIO	R^2	Ibar weighting	GAMMA	ALPHA	RATIO	R^2	Ibar weighting
	0.2991315	-0.2480815	-0.83	0.8201	0.299*W-0.248*(W-PV)	0.7126528	-0.5474849	-0.77	0.7809	0.713*W-0.547*(W-PV)

Note: I is divided by 100000.

Note: The estimates of ALPHA and GAMMA for the regression method, though being of different sign, are not significant.

Note: Covariates have been used to estimate the best alpha; both in the regression method and in the iteration method.
Covariates includes: Year, GDP per head, GDP per capita growth , median wage of the age group under study, percentage of people in school on the age group under study, share of added value by industry on the GDP.

Table 2A.
DIRECT EFFECT OF LFP OLD ON UNEMPLOYMENT OR EMPLOYMENT OF YOUNG AND PRIME AGE GROUPS.
DIRECT EFFECT OF LFP OLD ON SCHOOLING PARTICIPATION OF THE YOUNGER AGE GROUP

POOLED GENDERS – NATIONAL LEVEL DATA

	Direct effect of elderly LFP rate on young and prime age									
	Youth (20-24)						**Prime Age (25-54)**			
	UR		ER		School		UR		ER	
	Pooled						**Pooled**			
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (28 obs.)	-1.624	0.157	1.955	0.204	-1.259	0.264	-0.823	0.047	-0.380	0.125
3 year lag on elderly LFP (25 obs.)	-0.712	0.247	1.709	0.234	-1.010	0.164	-0.608	0.087	-0.464	0.090
5 year difference (23 obs.)	-2.177	0.377	1.104	0.415	0.657	0.334	-0.684	0.105	0.593	0.176
5 year log difference (23 obs.)	-2.564	0.502	0.848	0.322	0.551	0.387	-3.443	0.476	0.285	0.082
ALL COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (27 obs.)	-2.706	0.458	0.477	0.363	1.176	0.619	-0.619	0.072	0.559	0.115
3 year lag on elderly LFP (25 obs.)	0.355	0.974	-0.633	0.827	-0.388	0.627	0.407	0.371	-0.355	0.354
5 year difference (23 obs.)	-2.794	0.308	0.935	0.260	0.837	0.496	-0.527	0.066	0.451	0.109
5 year log difference (23 obs.)	-4.993	0.695	1.488	0.349	1.589	0.317	-3.380	0.321	0.337	0.022
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (27 obs.)	-2.758	0.201	1.071	0.177	0.501	0.309	-0.653	0.056	0.597	0.108
3 year lag on elderly LFP (25 obs.)	0.144	1.404	0.028	0.989	0.671	0.656	0.233	0.360	-0.105	0.318
5 year difference (23 obs.)	-2.769	0.179	0.997	0.150	0.389	0.312	-0.613	0.040	0.527	0.077
5 year log difference (23 obs.)	-4.583	0.641	1.165	0.346	1.483	0.339	-2.736	1.057	0.343	0.084

SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (27 obs.)	-2.250	0.333	1.058	0.410	0.540	0.319	-0.662	0.096	0.585	0.119
3 year lag on elderly LFP (25 obs.)	0.947	1.460	-2.842	1.216	1.897	0.561	0.641	0.472	-0.623	0.488
5 year difference (23 obs.)	-2.276	0.277	1.099	0.182	0.388	0.285	-0.628	0.044	0.525	0.073
5 year log difference (23 obs.)	-2.893	0.544	1.013	0.175	0.254	0.415	-3.515	0.517	0.297	0.041

DEPENDENT VARIABLES
Unemployment and employment of young and prime age,
Percentage of people in school of young people

ALL COVARIATES:
- Year (not in the 5 years difference case),
- GDP per capita/1000,
- GDP growth (not in the difference case),
- percentage of people in school,
- share of industry in the GDP,
- median wage/1000,
- contractual wage/1000,
- dummy for changes in the compulsory school leaving age (dropped in the 5 years log difference case).

SELECTED COVARIATES:
- GDP per capita/1000,
- GDP growth (not in the difference case),
- share of industry in the GDP

SPECIFICATION OF REGRESSIONS:
Levels: Y= employment of old + year + gdp per capita + ...
3 yea lag on elderly employment: Y= employment of old [n-3] + year + gdp per capita + ...
5 year difference: Y-Y[n-5]= (employment of old -employment of old [n-5]) + (gdp per capita-gdp per capita [n-5]) + ...
5 year log difference: Y-Y[n-5]= [log (employment of old)-log(employment of old [n-5])] + [log(gdp per capita)-log(gdp per capita [n-5])] + ...

Table 2B. DIRECT EFFECT OF LFP OF THE OLD

GENDER VARIABILITY – NATIONAL LEVEL DATA

Direct effect of elderly LFP on young and prime age										
	Youth (20-24)						Prime Age (25-54)			
	UR		ER		School		UR		ER	
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (56 obs.)	-0.251	0.030	0.447	0.034	-0.101	0.038	-0.159	0.014	1.222	0.036
3 year lag on elderly LFP (50 obs.)	-0.236	0.026	0.417	0.034	-0.118	0.031	-0.157	0.013	1.134	0.037
5 year difference (46 obs.)	-0.735	0.243	0.562	0.193	0.518	0.113	-0.236	0.077	0.840	0.111
5 year log difference (46 obs.)	-1.148	0.293	0.390	0.165	0.441	0.145	-1.903	0.312	0.407	0.084
ALL COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (54 obs)	-0.201	0.137	0.614	0.082	0.476	0.067	-0.003	0.032	1.225	0.060
3 year lag on elderly LFP (50 obs.)	-0.055	0.101	0.644	0.104	0.392	0.066	0.007	0.036	1.379	0.071
5 year difference (46 obs.)	-0.629	0.301	0.460	0.189	0.475	0.183	-0.198	0.075	0.288	0.082
5 year log difference (46 obs.)	-1.858	0.356	0.610	0.144	0.394	0.208	-1.808	0.333	0.149	0.045
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (54 obs.)	-0.306	0.208	0.597	0.098	0.467	0.065	-0.052	0.030	1.224	0.053
3 year lag on elderly LFP (50 obs.)	0.310	0.168	0.395	0.135	0.372	0.070	-0.056	0.036	1.366	0.060
5 year difference (46 obs.)	-1.410	0.301	0.615	0.164	0.478	0.141	-0.383	0.069	0.364	0.069
5 year log difference (46 obs.)	-1.975	0.370	0.595	0.141	0.370	0.207	-2.268	0.417	0.081	0.042

SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (54 obs.)	-0.283	0.131	0.508	0.102	0.443	0.069	-0.032	0.044	1.240	0.062
3 year lag on elderly LFP (50 obs.)	-0.103	0.141	0.381	0.138	0.386	0.075	0.037	0.050	1.241	0.085
5 year difference (46 obs.)	-1.372	0.266	0.681	0.146	0.474	0.147	-0.413	0.072	0.377	0.068
5 year log difference (46 obs.)	-1.735	0.364	0.627	0.131	0.341	0.194	-2.247	0.387	0.126	0.044

DEPENDENT VARIABLES
Unemployment and employment of young and prime age,
Percentage of people in school of young people

ALL COVARIATES:
- Year (not in the 5 years difference case),
- gender (not in the NO COVARIATES case),
- GDP per capita/1000,
- GDP growth (not in the difference case),
- percentage of people in school,
- share of industry in the GDP,
- median wage/1000,
- contractual wage/1000,
- dummy for changes in the compulsory school leaving age (dropped in the 5 years log difference case).

SELECTED COVARIATES:
- GDP per capita/1000,
- GDP growth (not in the difference case),
- share of industry in the GDP
- gender

SPECIFICATION OF REGRESSIONS:

Levels: Y= employment of old + year + gdp per capita + ...+ gender
3 yea lag on elderly employment: Y= employment of old [n-3] + year + gdp per capita + ...+ gender
5 year difference: Y-Y[n-5]= (employment of old -employment of old [n-5]) + (gdp per capita-gdp per capita [n-5]) + ...+ gender
5 year log difference: Y-Y[n-5]= [log (employment of old)-log(employment of old [n-5])] + [log(gdp per capita)-log(gdp per capita [n-5])] + ...+ gender

Table 2C. DIRECT EFFECT OF LFP OF THE OLD

POOLED GENDERS - REGIONAL VARIATION (North West of Italy as benchmark)

Table 1A: Direct effect of elderly LFP on young and prime age										
	Youth (20-24)						Prime Age (25-54)			
	UR		ER		School		UR		ER	
	Pooled- Regional Variability						Pooled-Regional Variability			
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (140 obs.)	-0.783	0.201	1.334	0.129	-0.531	0.096	-0.490	0.088	-0.539	0.087
3 year lag on elderly LFP (125 obs.)	-0.042	0.189	1.153	0.133	-0.662	0.098	-0.352	0.086	-0.600	0.072
5 year difference (115 obs.)	-1.625	0.235	0.774	0.194	-0.007	0.178	-0.477	0.071	0.452	0.081
5 year log difference (115 obs.)	-2.295	0.346	0.657	0.168	-0.025	0.129	-2.521	0.321	0.219	0.041
ALL COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (135 obs)	-0.800	0.171	0.423	0.135	-0.076	0.194	-0.192	0.055	0.261	0.073
3 year lag on elderly LFP (125 obs.)	0.236	0.218	-0.332	0.184	0.303	0.244	0.042	0.077	-0.218	0.099
5 year difference (115 obs.)	-0.873	0.203	0.424	0.171	0.089	0.219	-0.286	0.060	0.255	0.070
5 year log difference (115 obs.)	-2.461	0.345	0.918	0.137	0.134	0.206	-2.737	0.328	0.279	0.036
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (135 obs.)	-1.632	0.199	0.866	0.134	-0.010	0.165	-0.330	0.064	0.361	0.074
3 year lag on elderly LFP (125 obs.)	0.049	0.339	-0.255	0.240	0.311	0.240	0.095	0.104	-0.268	0.116
5 year difference (115 obs.)	-1.821	0.208	0.036	0.007	0.094	0.175	-0.513	0.067	0.501	0.073
5 year log difference (115 obs.)	-2.495	0.347	0.890	0.144	0.131	0.205	-2.785	0.336	0.262	0.037

SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (135 obs.)	-1.374	0.333	0.669	0.205	-0.024	0.169	-0.311	0.147	0.334	0.134
3 year lag on elderly LFP (125 obs.)	-0.119	0.464	-0.442	0.307	0.378	0.242	-0.032	0.210	-0.166	0.190
5 year difference (115 obs.)	-1.845	0.210	0.916	0.172	0.098	0.177	-0.523	0.065	0.498	0.073
5 year log difference (115 obs.)	-2.548	0.353	0.915	0.148	0.098	0.205	-2.760	0.327	0.278	0.038

DEPENDENT VARIABLES
Unemployment and employment of young and prime age,
Percentage of people in school of young people

ALL COVARIATES:
- Year (not in the 5 years difference case),
- regional dummies,
- GDP per capita/1000,
- GDP growth (not in the difference case),
- percentage of people in school,
- share of industry in the GDP,
- median wage/1000,
- contractual wage/1000,
- dummy for changes in the compulsory school leaving age (dropped in the 5 years log difference case).

SELECTED COVARIATES:
- GDP per capita/1000,
- GDP growth (not in the difference case),
- share of industry in the GDP
- regional dummies

SPECIFICATION OF REGRESSIONS:

Levels: Y= lfp of old + year + gdp per capita + ...+ gender
3 yea lag on elderly employment: Y= lfp of old [n-3] + year + gdp per capita + ...+ gender
5 year difference: Y-Y[n-5]= (lfp-lfp of old [n-5]) + (gdp per capita-gdp per capita [n-5]) + ...+ gender
5 year log difference: Y-Y[n-5]= [log (lfp)-log(lfp [n-5])] + [log(gdp per capita)-log(gdp per capita [n-5])] + ...+ gender

TABLE 3
EFFECT OF INCENTIVES ON LFP OF THE OLD AND ON EMPLOYMENT, UNEMPLOYMENT AND IN-SCHOOL POPULATION OF THE YOUNG.

POOLED GENDERS – DIFFERENT VALUES OF ALPHA AND GAMMA (N=28)

ALPHA = 1.50, NO LIQUIDITY CONSTRAINTS								
	Youth (20-24)						**Old (50-64)**	
	UR		ER		School		LFP	
	Pooled							
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.050	0.006	-0.042	0.011	0.037	0.009	-0.021	0.003
3 year lag of incentive	0.034	0.006	-0.052	0.008	0.021	0.007	-0.017	0.003
5 year difference	0.041	0.014	-0.001	0.013	0.005	0.010	-0.021	0.006
5 year log difference	0.335	0.084	0.014	0.055	0.134	0.052	-0.075	0.028
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.082	0.015	-0.025	0.015	0.001	0.011	-0.036	0.010
3 year lag of incentive	0.075	0.020	-0.042	0.015	0.004	0.012	-0.042	0.011
5 year difference	0.067	0.009	-0.027	0.004	0.010	0.008	-0.058	0.009
5 year log difference	0.691	0.083	-0.231	0.033	0.207	0.066	-0.091	0.024
SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.040	0.009	-0.002	0.010	-0.001	0.007	-0.022	0.004
3 year lag of incentives	0.036	0.009	-0.014	0.011	-0.012	0.005	-0.025	0.004
5 year difference	0.054	0.010	-0.015	0.008	0.010	0.008	-0.026	0.005
5 year log difference	0.513	0.074	-0.120	0.038	0.214	0.047	-0.121	0.026

ALPHA = 1.50, LIQUIDITY CONSTRAINTS
(SSW=0 BEFORE ELIGIBILITY; W-PV=0 BEFORE ELIGIBILITY)

	Youth (20-24)						**Old (50-64)**	
	UR		ER		School		LFP	
	Pooled							
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.123	0.015	-0.106	0.028	0.111	0.019	-0.045	0.009
3 year lag of incentives	0.078	0.016	-0.111	0.025	0.054	0.018	-0.036	0.009
5 year difference	0.110	0.030	0.001	0.030	0.046	0.021	-0.041	0.016
5 year log difference	0.432	0.105	0.025	0.070	0.230	0.057	-0.077	0.038
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.151	0.028	-0.020	0.030	0.006	0.021	-0.053	0.022
3 year lag of incentives	0.146	0.057	-0.051	0.043	0.010	0.029	-0.086	0.032
5 year difference	0.180	0.008	-0.061	0.011	0.038	0.017	-0.053	0.018
5 year log difference	0.975	0.098	-0.230	0.070	0.296	0.072	-0.067	0.036
SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.118	0.022	0.0005	0.027	0.020	0.019	-0.056	0.013
3 year lag of incentives	0.066	0.027	-0.001	0.029	-0.037	0.012	-0.050	0.014
5 year difference	0.137	0.019	-0.021	0.019	0.039	0.016	-0.055	0.012
5 year log difference	0.587	0.095	-0.104	0.051	0.276	0.050	-0.120	0.036

ALPHA = -0.248 GAMMA=0.299, NO LIQUIDITY CONSTRAINTS								
	Youth (20-24)						Old (50-64)	
	UR		ER		School		LFP	
	Pooled							
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.528	0.058	-0.516	0.104	0.454	0.081	-0.208	0.033
3 year lag of incentives	0.345	0.063	-0.565	0.078	0.260	0.070	-0.160	0.036
5 year difference	0.523	0.168	-0.005	0.161	0.087	0.120	-0.256	0.080
5 year log difference	0.691	0.173	0.028	0.113	0.250	0.111	-0.159	0.058
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	1.017	0.176	-0.282	0.190	0.013	0.137	-0.437	0.127
3 year lag of incentives	0.935	0.236	-0.501	0.179	-0.007	0.140	-0.533	0.133
5 year difference	0.840	0.102	-0.333	0.047	0.150	0.098	-0.659	0.114
5 year log difference	1.364	0.159	-0.465	0.060	0.383	0.143	-0.196	0.048
SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.521	0.104	-0.030	0.122	0.003	0.088	-0.285	0.051
3 year lag of incentives	0.455	0.112	-0.188	0.134	-0.150	0.064	-0.313	0.052
5 year difference	0.671	0.119	-0.163	0.095	0.150	0.092	-0.316	0.059
5 year log difference	1.110	0.146	-0.273	0.077	0.426	0.105	-0.267	0.052

ALPHA = -0.547 GAMMA= 0.713, LIQUIDITY CONSTRAINTS (SSW=0 BEFORE ELIGIBILITY; W-PV=0 BEFORE ELIGIBILITY)								
	Youth (20-24)						**Old (50-64)**	
	UR		ER		School		LFP	
	Pooled							
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.438	0.047	-0.434	0.084	0.398	0.062	-0.166	0.028
3 year lag of incentives	0.282	0.054	-0.460	0.069	0.221	0.057	-0.128	0.031
5 year difference	0.470	0.138	0.005	0.136	0.125	0.099	-0.208	0.069
5 year log difference	2.098	0.491	0.069	0.331	0.636	0.334	-0.483	0.167
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.798	0.137	-0.167	0.152	0.022	0.107	-0.312	0.104
3 year lag of incentives	0.736	0.215	-0.351	0.164	0.020	0.120	-0.424	0.120
5 year difference	0.758	0.062	-0.284	0.040	0.148	0.079	-0.402	0.095
5 year log difference	3.871	0.319	-1.261	0.160	0.842	0.454	-0.599	0.141
SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.474	0.089	-0.019	0.108	0.003	0.088	-0.247	0.047
3 year lag of incentives	0.359	0.101	-0.114	0.117	-0.135	0.054	-0.251	0.049
5 year difference	0.594	0.091	-0.123	0.081	0.149	0.075	-0.263	0.050
5 year log difference	3.531	0.335	-0.908	0.212	1.105	0.345	-0.860	0.137

ALPHA = 0.0, NO LIQUIDITY CONSTRAINTS								
	Youth (20-24)						Old (50-64)	
	UR		ER		School		LFP	
	Pooled							
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.156	0.017	-0.152	0.031	0.134	0.024	-0.061	0.010
3 year lag of incentives	0.102	0.019	-0.167	0.023	0.077	0.021	-0.047	0.011
5 year difference	0.154	0.050	-0.001	0.048	0.025	0.035	-0.076	0.023
5 year log difference	0.685	0.172	0.028	0.112	0.248	0.110	-0.158	0.057
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.300	0.052	-0.083	0.056	0.004	0.040	-0.129	0.037
3 year lag of incentives	0.275	0.070	-0.148	0.053	-0.002	0.041	-0.157	0.039
5 year difference	0.247	0.030	-0.098	0.014	0.044	0.029	-0.195	0.033
5 year log difference	1.350	0.158	-0.460	0.059	0.379	0.142	-0.194	0.048
SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.153	0.031	-0.009	0.036	0.001	0.026	-0.084	0.015
3 year lag of incentives	0.134	0.033	-0.055	0.040	-0.044	0.019	-0.092	0.015
5 year difference	0.198	0.035	-0.048	0.028	0.044	0.027	-0.093	0.017
5 year log difference	1.100	0.145	-0.270	0.077	0.421	0.104	-0.265	0.052

ALPHA = 0.0, LIQUIDITY CONSTRAINTS
(SSW=0 BEFORE ELIGIBILITY; W-PV=0 BEFORE ELIGIBILITY)

	Youth (20-24)						**Old (50-64)**	
	UR		ER		School		LFP	
	Pooled							
NO COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.402	0.049	-0.363	0.089	0.381	0.058	-0.143	0.030
3 year lag of incentives	0.251	0.055	-0.371	0.081	0.190	0.058	-1.112	0.031
5 year difference	0.361	0.105	0.018	0.104	0.161	0.070	-0.130	0.056
5 year log difference	0.693	0.168	0.046	0.111	0.355	0.094	-0.121	0.061
ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.514	0.099	-0.060	0.105	0.016	0.072	-0.175	0.075
3 year lag of incentives	0.438	0.202	-0.120	0.148	0.058	0.097	-0.264	0.112
5 year difference	0.624	0.031	-0.205	0.039	0.139	0.057	-0.161	0.062
5 year log difference	1.464	0.164	-0.325	0.111	0.447	0.123	-0.098	0.060
SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels	0.410	0.082	0.012	0.096	0.001	0.026	-0.191	0.047
3 year lag of incentives	0.219	0.096	0.007	0.100	-0.124	0.043	-0.166	0.050
5 year difference	0.461	0.070	-0.063	0.065	0.140	0.055	-0.181	0.044
5 year log difference	0.967	0.148	-0.172	0.081	0.429	0.085	-0.198	0.057

NOTE:
I-bar is divided by 100000

ALL COVARIATES:
- Year (not in the 5 years difference case),
- GDP per capita/1000,
- GDP per capita growth (not in the difference case),
- percentage of people in school,
- share of industry in the GDP,
- median wage/1000,
- contractual wage/1000,
- dummy for changes in the compulsory school leaving age (dropped in the 5 years log difference case)

SELECTED COVARIATES:
- GDP per capita,
- GDP per capita growth (not in the difference case),
- share of industry in the GDP

SPECIFICATION OF REGRESSIONS:
Levels: Y= I + year + gdp per capita + ...
3 yea lag of incentives: Y= I [n-3] + year + gdp per capita + ...
5 year difference: Y-Y[n-5]= I([n-5]) + (gdp per capita-gdp per capita [n-5]) + ...
5 year log difference: Y-Y[n-5]= [log I-log(I[n-5])] + [log(gdp per capita)-log(gdp per capita [n-5])] + ...

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Appendix

Figure A1: Prevalence of a secondary degree (diploma) or university degree (laurea) or work for different cohorts.

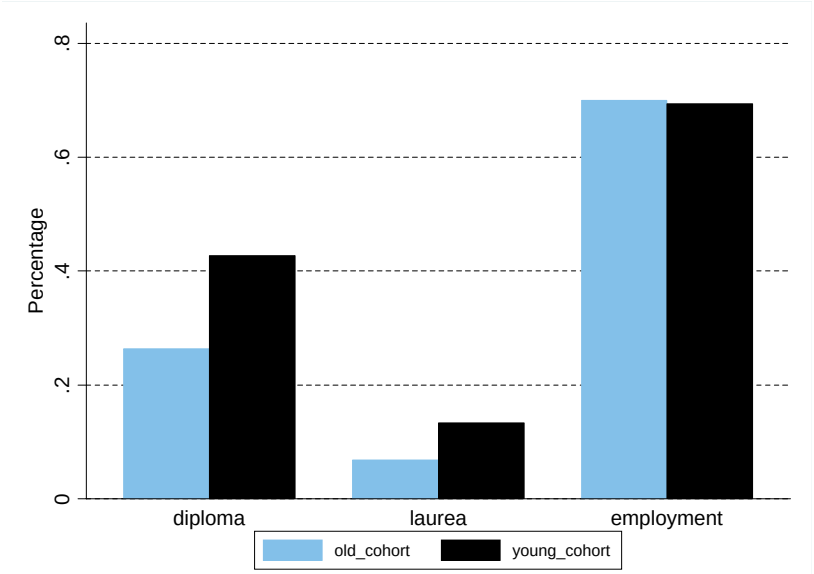


Figure A2: Prevalence of a secondary degree (diploma) or university degree (laurea) or work for different cohorts. Males

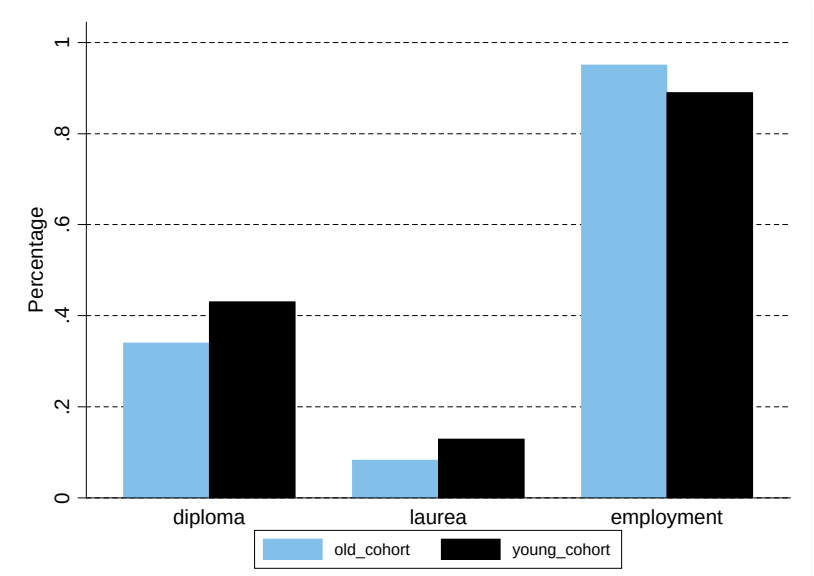


Figure A3: Prevalence of a secondary degree (diploma) or university degree (laurea) or work for different cohorts. Females

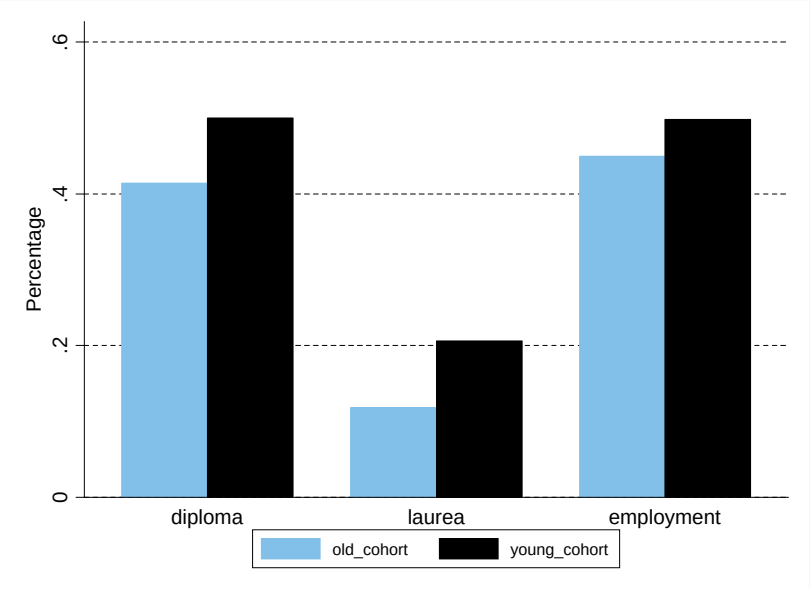


Figure A4. Italy: Index I for different values of ALPHA

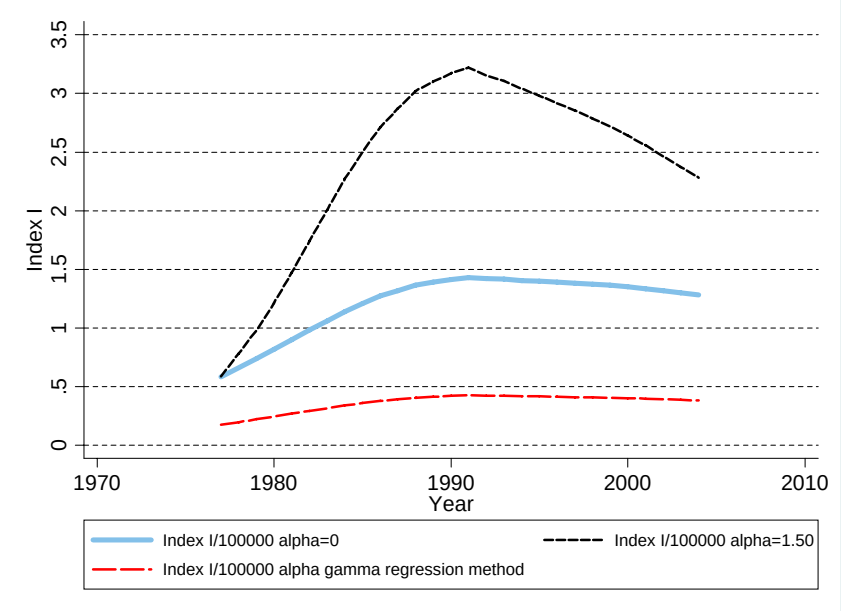


Figure A5 Impulse response function of the activity rate of the old (AR3) and the unemployment rate of the young (UR1) in response to GDP per capita

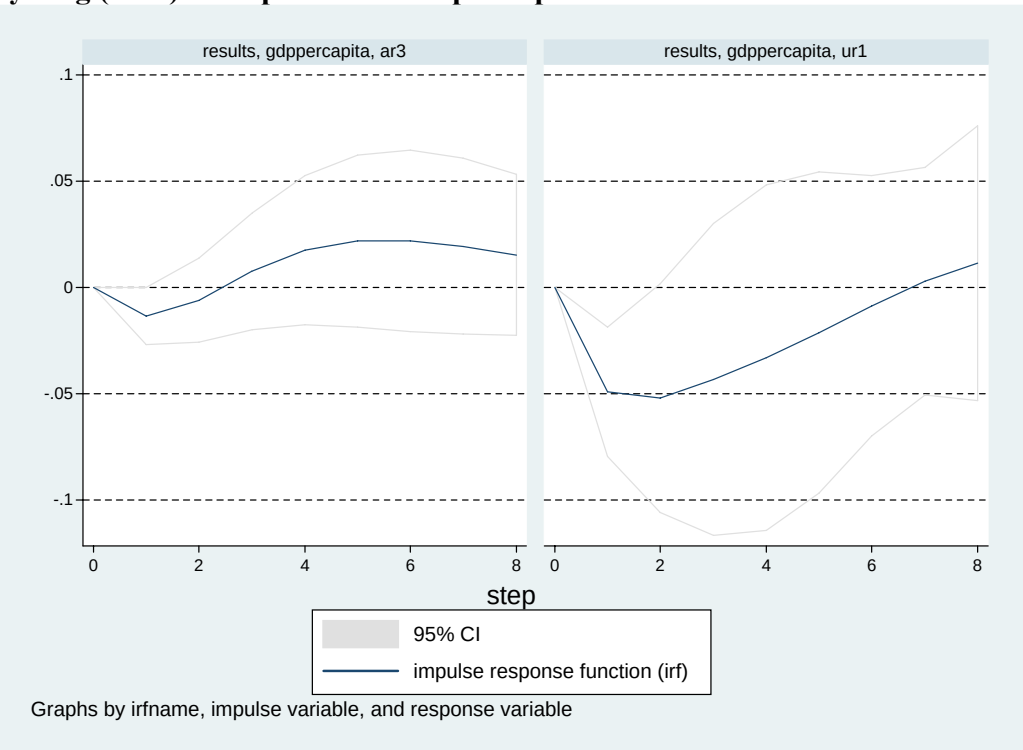
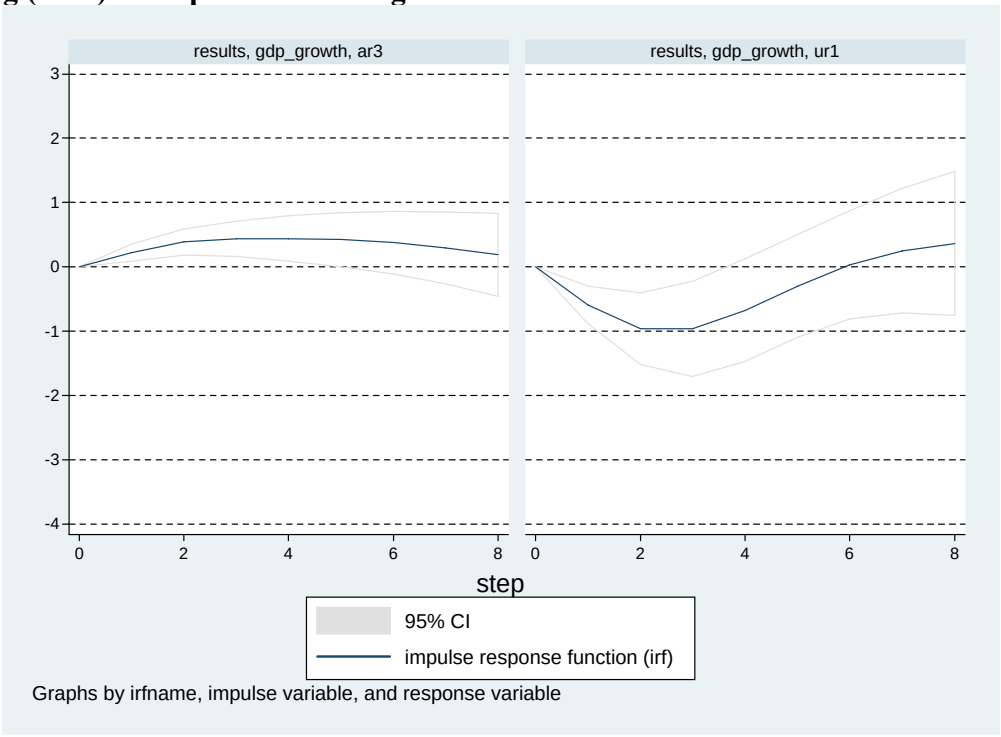


Figure A6 Impulse response function of the activity rate of the old (AR3) and unemployment rate of the young (UR1) in response to GDP- growth



The Impulse response function, computed after running a VAR regression, shows the change over time of the variables UR1(unemployment young), or AR3(Activity old), in response to a one-time impulse of the variables GDP per capita or GDP growth. This is done keeping all the other variables of the VAR regression constant.

A1 EMPLOYMENT PROTECTION LEGISLATION Index

Table A1 – Source: OECD Employment Outlook 1999 [16]

	Regular employment		Temporary employment		Collective dismissals	Overall EPL Strictness [17]		
						Vers. 1		Vers. 2
	Late 80s	Late 90s	Late 80s	Late 90s	Late 90s	Late 80s	Late 90s	Late 90s
France	2,3	2,3	3,1	3,6	2,1	2,7	3,0	2,8
Germany	2,7	2,8	3,8	2,3	3,1	3,2	2,5	2,6
Italy [18]	**2,8**	**2,8**	**5,4**	**3,8**	**4,1**	**4,1 (1)**	**3,3 (3)**	**3,4 (3)**
Spain	3,9	2,6	3,5	3,5	3,1	3,7	3,1	0,1
UK	0,8	0,8	0,3	0,3	2,9	0,5	0,5	0,9

Table A2 – Source: OECD Employment Outlook 2004

	Regular employment			Temporary employment			Collective dismissals		Overall EPL strictness				
									Vers. 1			Vers. 2	
	Late 80s	Late 90s	2003	Late 80s	Late 90s	2003	Late 90s	2003	Late 80s	Late 90s	2003	Late 90s	2003
France	2,3	2,3	2,5	3,1	3,6	3,6	2,1	2,1	2,7	3,0	3,0	2,8	2,9
Germany	2,6	2,7	2,7	3,8	2,3	1,8	3,5	3,8	3,2	2,5	2,2	2,6	2,5
Italy	**1,8**	**1,8**	**1,8**	**5,4**	**3,6**	**2,1**	**4,9**	**4,9**	**3,6 (3)**	**2,7 (4)**	**1,9 (11)**	**3,1 (3)**	**2,4 (9)**
Spain	3,9	2,6	2,6	3,8	3,3	3,5	3,1	3,1	3,8	2,9	3,1	3,0	3,1
UK	0,9	0,9	1,1	0,3	0,3	0,4	2,9	2,9	0,6	0,6	0,7	1,0	1,1

[16] In the Employment Outlook 1999 the Regular Employment index for Italy is based also on the TFR (severance payment) which is regarded as "employment protection". In the 2004 Table the TFR is excluded.

[17] Version 1 excludes *collective dismissal*.

[18] In the Overall index for Italy the ranking vis-a-vis the other EU12-countries is in parentheses. Position 1 is the highest level of workers' protection..

TABLE A2
DIRECT EFFECT OF ELDERLY LFP ON UNEMPLOYMENT EMPLOYMENT OF YOUNG AND PRIME AGE GROUPS.
DIRECT EFFECT OF ELDERLY LFP ON SCHOOLING PARTECIPATION OF YOUNGER AGE GROUP

POOLED GENDERS – National Level Data

	Direct effect of elderly Employment rate on young and prime age									
	Youth (20-24)						**Prime Age (25-54)**			
	UR		ER		School		UR		ER	
	Pooled						**Pooled**			
ALL COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (27 obs.)										
LFP Old	-2.706	0.458	0.477	0.363	1.176	0.619	-0.619	0.072	0.559	0.115
Year	0.021	0.007	-0.022	0.006	-0.002	0.011	0.007	0.001	-0.006	0.002
GDP per capita /1000	-0.075	0.023	0.041	0.019	0.030	0.034	-0.017	0.003	0.024	0.005
GDP per capita growth	-0.079	0.310	-0.429	0.246	-0.182	0.456	-0.031	0.076	-0.042	0.121
People in school	0.638	0.159	0.282	0.126	-	-	-0.053	0.254	-0.482	0.405
Age end compulsory education	0.001	0.020	-0.027	0.016	0.042	0.028	0.003	0.004	-0.005	0.006
Median Wage/1000	0.018	0.009	0.014	0.007	-0.009	0.013	0.001	0.002	-0.005	0.003
Contractual wage/1000	0.002	0.003	-0.002	0.002	-0.007	0.004	0.0005	0.0005	-0.002	0.001
Share of industry on GDP	2.761	1.332	-0.956	1.056	-2.071	1.910	1.083	0.258	-0.999	0.412
R^2	0.9555		0.9834		0.8923		0.9928		0.9744	
5 year difference (23 obs.)										
LFP Old	-2.794	0.308	0.935	0.260	0.837	0.496	-0.527	0.066	0.451	0.109
GDP per capita /1000	-0.116	0.022	0.100	0.018	-0.004	0.038	-0.016	0.003	0.028	0.005
People in school	0.510	0.143	0.429	0.121	-	-	-0.259	0.174	0.052	0.289
Age end compulsory education	-0.002	0.014	-0.004	0.012	0.028	0.024	0.007	0.004	-0.011	0.007
Median Wage/1000	0.035	0.008	-0.004	0.007	-0.002	0.014	0.0004	0.002	0.006	0.003
Contractual wage/1000	-0.002	0.003	-0.001	0.002	-0.005	0.005	-0.0002	0.001	-0.003	0.001
Share of industry on GDP	4.398	0.951	-3.126	0.804	-1.493	1.624	1.220	0.237	-1.105	0.393
R^2	0.9512		0.9444		0.5550		0.9714		0.9453	

ALL COVARIATES without school leaving age dummy and contractual wage	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (27 obs.)										
LFP Old	-2.758	0.201	1.071	0.177	0.501	0.309	-0.653	0.056	0.597	0.108
Year	0.022	0.005	-0.030	0.004	0.009	0.008	0.008	0.001	-0.006	0.001
GDP per capita /1000	-0.077	0.014	0.067	0.012	-0.009	0.023	-0.018	0.002	0.024	0.004
GDP per capita growth	-0.178	0.204	-0.044	0.180	-0.004	0.333	-0.059	0.073	-0.025	0.139
People in school	0.604	0.137	0.259	0.121	-	-	0.034	0.253	-0.585	0.485
Median Wage/1000	0.020	0.005	0.003	0.005	-0.003	0.009	0.002	0.001	-0.0005	0.002
Share of industry on GDP	3.102	0.676	-2.805	0.596	-0.667	1.094	1.276	0.194	-1.434	0.372
R^2	0.9540		0.9788		0.8653		0.9919		0.9587	
5 year difference (23 obs.)										
LFP Old	-2.769	0.179	0.997	0.150	0.389	0.312	-0.613	0.040	0.527	0.077
GDP per capita /1000	-0.113	0.017	0.104	0.014	-0.029	0.030	-0.020	0.002	0.028	0.004
People in school	0.526	0.129	0.432	0.109	-	-	-0.147	0.162	-0.116	0.316
Median Wage/1000	0.031	0.007	-0.007	0.005	-0.0002	0.012	0.002	0.001	-0.0002	0.002
Share of industry on GDP	3.999	0.623	-3.487	0.522	-0.955	1.111	1.447	0.160	-1.862	0.311
R^2	0.9489		0.9426		0.4995		0.9664		0.9110	
SELECTED COVARIATES	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err	Coeff	St.Err
Levels (27 obs.)										
LFP Old	-2.250	0.333	1.058	0.410	0.540	0.319	-0.662	0.096	0.585	0.119
GDP per capita /1000	-0.007	0.003	-0.010	0.004	0.014	0.003	0.002	0.001	0.008	0.001
GDP per capita growth	-0.332	0.364	0.227	0.448	-0.102	0.349	-0.163	0.105	0.170	0.131
Share of industry on GDP	0.190	0.904	-0.257	1.112	-1.552	0.866	0.517	0.261	-1.146	0.324
R^2	0.8269		0.8447		0.8344		0.9407		0.8726	
5 year difference (23 obs.)										
LFP Old	-2.276	0.277	1.099	0.182	0.388	0.285	-0.628	0.044	0.525	0.073
GDP per capita /1000	-0.056	0.011	0.075	0.007	-0.029	0.012	-0.016	0.002	0.029	0.003
Share of industry on GDP	1.743	0.840	-3.499	0.551	-0.944	0.864	1.245	0.132	-1.944	0.221
R^2	0.8305		0.8836		0.4995		0.9536		0.9102	