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POPULATION DYNAMICS AND REGIONAL

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SUSTAINABILITY IN ITALY

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POPULATION DYNAMICS AND REGIONAL SOCIAL SECURITY SUSTAINABILITY IN ITALY

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Abstract:

Making due allowances for differences in demographics, the labour market and internal migration dynamics, this study analyses the sustainability of the Italian pension balance at a regional level. A worsening of the elderly dependency ratio and a decline in birth and employment rates have generated a negative trend particularly for regions in southern Italy, characterized by early retirement and an increase in migration outflows. The suggestion is that a decentralized pension policy is not a Pareto-efficient solution because it would favour the sustainability of the pension balance in northern regions over those in the South.

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1. Introduction

During the last two decades, the increase in life expectancy together with the sharp reduction in the birth rate has led to substantial aging of the population in most industrialized countries. As a consequence, the progressive aging and retirement of the baby-boom generation and the decrease in the ratio of active workers to pensioners raise several questions on the financial sustainability of current social security schemes.

1) According to the World Bank's Health, Nutrition and Population (HNP) statistics[1] (2011), in 2050 more than 21 percent of the world's population will be over sixty years old. As a consequence of this demographic trend the elderly dependency ratio, that is the number of people over 64 for every 100 working age individuals, will almost double over the same period. From some angles, an aging population is a positive result, since individuals have longer life expectancy due partly to better health conditions. However, for the sustainability of the social security balance, this condition becomes critical as the working age population has to sustain an increasing number of retired individuals with consequent dramatic effects on the global fiscal pressure.

The need to identify a solution which both supports the public sector and protects worker incomes has led to extensive debate on social security system reforms on the part of many researchers and policymakers. To this extent, some studies have highlighted that migratory flows, modifying the demography of the outgoing/receiving countries, could have considerable consequences for the financial sustainability of pension systems in every geographical area.

In general, inflows into industrialized countries involve young people with a broad range of education level and, on average, a higher fertility rate in comparison to those in the host country (SCHMERTMANN, 1992; WU and LI, 2003). These migration flows therefore show positive effects on the elderly dependency ratio both in the short run, due to the increasing number of active workers/contributors, and in the long run, because of the consequential demographic increase resulting from a higher birth rate. In particular, age and education level of migrants become significant in terms of their consequences on the level and duration of pension contributions (STORESLETTEN, 2000; RAZIN and SADKA, 1998, 1999 and 2000; ROJAS, 2002; MUNZ and WERDING, 2005).

That said, the effects of immigration on the pension system are not necessarily positive: a large inflow of working age people first increases contribution revenues into the pension system, reducing its debts, and then has a huge impact on its expenditure when the immigrants in question retire (WILDASIN, 1994; RAZIN and SADKA, 1995).

In Italy, however, immigration can only contribute "to alleviate", and not to solve, the problem of pension sustainability. One of the reasons is the increasing pressure on the pension balance exerted by a dramatically aging population, experienced also by other industrialized countries, aggravated in Italy by the reduction in the participation rate of the 50-65 age classes. This phenomenon arose in the 1970s when early withdrawal from the labour force was encouraged by innovations introduced in the Italian pension system. Only in the 1990s did reforms establish tighter criteria for eligibility (in terms of working life and contribution span) and early retirement.

The strong regional differences characterizing Italian economic development since political union in 1861 have affected local pension balances in different ways. First of all, pension payments in the Centre-North are on average always higher than those in the South. This is due to the greater economic prosperity of northern regions, ensuring higher employment levels and longer lives paying contributions. By contrast, southern regions have experienced a greater expansion of the welfare system as they are more exposed to low-income risks.

The demographic changes occurring in recent decades (lower fertility rates, higher life expectancy and resumption of internal migration flows) have contributed to emphasize the problems of pension sustainability driven by an aging population. These changes, however, affected differently the two areas of the country (BIANCHI *et al.*, 2001; BONASIA and DE SIANO, 2012). Resumption of migrations from the South towards the Centre-North of Italy, in particular of individuals of in the 20-40 age classes, has contributed positively to the demographic development of the latter and negatively to the South. As a consequence, the "natural dynamics" of demography has evolved differently too.

The persistence of such a change in the demographic structure could be extremely damaging to southern regions: while this area would risk exposure to the troubles of more demographically mature areas, the consequent loss of physical and human capital could hinder productivity improvements and hence the attainment of greater economic prosperity, as recently evidenced in a study by CAPASSO *et al.* (2011).

Social security represents a very important feature of the fiscal policy everywhere in the world. In Italy, in particular, political debate in the last few years has focused on decentralization of fiscal policy and on a possible new federal set-up of the pension system. The theoretical discussion about decentralization and its effects on public sector performance has become relevant especially to those areas of spending related to the welfare system. Furthermore, the decentralization process may represent a tool to allow for local needs and, due to increasing regional competition, to improve government responsiveness with gains in terms of efficiency (BESLEY and CASE, 1995; REVELLI, 2006).

The political sustainers of pension policy managed at a regional level look at some social security indicators like the ratio between pension spending and the number of employees and the index of social security coverage (the amount of pension contributions over pension benefits) at a regional level (PESTIEAU *et al.*, 2006). Such indicators reveal that northern regions are, in general, more virtuous than those in the South, which results in a burden for the entire national public pension system. On the basis of this interpretation, they stress the need to find a solution that does not penalize the more virtuous regions. However, in the authors' opinion, such an interpretation of the raw data is misleading. Hence the aim of this study is to analyse the sustainability of a decentralized pension balance, considering the impact of regional differences in terms of demography, the labour market and internal migration dynamics.

This analysis shows that an increase in migration out-flows worsens regional pension sustainability: during the period considered (1979-2008) there was a significant migration from South to North with considerable effects on local demographics. As a consequence, the working age population increased in northern regions and decreased in the South, raising the elderly dependency ratio of the latter. A further effect is the relative reduction of the average wages in the South, caused by the transfer of high-skilled workers to the North. The result is a worsening in the pension balance in the South with respect to the North due to the fall in contribution payments against an increase in social security spending. Thus the analysis suggests that a decentralized pension policy would not be a Pareto-efficient solution, as it could favour northern over southern regions.

The study is structured as follows: section two presents an historical background on the features of the Italian public pension system; section three describes empirically the financial sustainability of pension system and its major determinants (demographic development and internal migration) using a sample of all the Italian regions (20 regions at NUTS2 level) over the period 1979-2008; section four presents the results of a panel model estimation which evaluates the influence of factors like the birth rate, elderly dependency ratio, migration flows and employment rate on the local pension balance; some conclusions are drawn in section five.

2. An overview of the Italian pension system

The 1950s and 1960s experienced wide-ranging demographic and economic expansion which fostered the development of unfunded pension systems in all the industrialized countries. In such systems the oldest age class is financed through the simple transfer of resources from active to retired generations. For more than 40 years, these systems remained almost unchanged and were

characterized by the extreme generosity of the benefits distributed and their improper use by politicians in order to secure electoral support.

However, over the past twenty years, almost all public pension systems have experienced a crisis due to changes in both demographic and economic factors. As a result, the funded pension scheme[2] became the central point in the economic debate on social security policies.

In Italy, this reform process started in the 1990s and has contributed to change the current regulations in order to reduce long-term financial imbalances[3]. The reforms focus in particular on how the benefits were determined and on the raising of the retirement age.

As regards the criteria of computation, retirement benefits were transformed from "defined benefit" (DB)[4] to "notional defined contribution" (NDC). The latter shows the characteristics of both a PAYGO and a funded scheme. Like the first, it is unfunded and hence the current contributions are not accumulated in a fund but used to pay benefits to current pensioners. On the other hand, pension benefits in an NDC will depend on the accumulation of contributions and its capitalization for each member, as in a funded scheme. The sum accumulated in the *notional* account[5] will then be converted into an annuity for the retirement period. With this method, each individual owns a retirement account that is capitalized at a rate equal to the five-year moving average of the nominal GDP changing rates. Contributions of 32.7% of pensionable earnings converge in this account whose annuity will then be determined by applying a coefficient of transformation[6] to total contributions.

According to current Italian legislation (law no. 214/2011, Monti-Fornero reform), the minimum requirements for old age pension eligibility, for both men and women, are revised as follows: 66 years old and twenty years of contributions if reached in the period 1/1/2012- 31/12/2020; 67 years old and twenty years of contributions from 2021.

3. Social security sustainability: a descriptive analysis

This section analyses the financial sustainability of Italy's social security system at a regional level in the period 1979-2008. The analysis concerns the social security balance and those factors which have most affected its trend, namely demographic development, interregional migration and the labour market structure. The dataset was built on the basis of surveys carried out by the Italian National Statistics Institute (ISTAT)[7].

The measure commonly used to assess the financial sustainability of the pension system is the ratio of pension expenditure to GDP. This indicator measures the share of total income distributed to the

families in the form of pension benefits. The stabilization of this index represents the main aim of the reforms carried out during the 1990s.

Nevertheless, since the aim of this analysis is to evaluate the impact of demographic and labour market changes (due to interregional mobility and natural trends) on the pension system balance, the sustainability index considered is the social security balance in terms of GDP. This indicator allows for the changes in disbursements and revenues of the pension balance due to changing economic factors. The disbursements consist in the benefits paid for pensions of invalidity-old age-survivors (IOS) while revenues are equal to the total contributions collected by pension institutions. Table 1 presents data on expenditures, contributions and balances in terms of GDP[8] for all Italian regions, divided into northern and southern regions[9], over sample years 1979, 1989, 1999 and 2008.

[Insert table1 around here]

Pension expenditure in terms of GDP increased in all the years considered for both northern and southern regions. By contrast, contributions decreased in all regions from 1989 to 1999, due to implementation of pension reforms and the resulting boom in early retirement, and subsequently increased. The pension balances are always negative except for some regions of the Centre-North which prove virtuous only for certain years.

The financial sustainability index (fig. 1) shows negative annual average values overall, with higher negative values in the South. To be precise, until 1996 the two areas exhibit slightly opposite trends, positive for the South and negative for the Centre-North. In the late 1990s there was a global fall, followed by an improvement in the index. A possible explanation for the registered fall is the impact of the 1990s' pension reforms that led to massive early retirement, with a reduction in contributions paid and an increase in pension expenditures.

[Insert Figure 1 around here]

The question is: what factors contributed most to the financial sustainability index in the two areas and their different trends? To this extent the descriptive analysis continues with the results on the main determinants of the financial sustainability of the pension system. As regards demographic dynamics, the population is on average larger in central and northern regions than in the South (fig. 2). Both adults of working age (15-64 years, fig.2) and elderly people (> 64 years, fig.3) are more numerous in the North. The increasing population trend is due primarily to longer life expectancy, favoured by the generally better state of health.

[Insert Fig. 2 and 3 around here]

Another factor behind the demographic trend is birth rate dynamics. Initially, there was a considerable difference between the two areas (14.5 % in the South and 9.5% in the Centre-North) (fig. 4). After a period of generally declining rates, the regions showed divergent patterns. From

1987 on, the strong resumption of interregional migration contributed to increase the northern birth rate and to decrease that in the South. During the whole period, the main change concerns birth rates in the South which gradually converged to those in the North (in 2008 9.8% and 9.3% in the North and South, respectively).

[Insert Figure 4 around here]

The impact of demographics on pension sustainability passes through the elderly dependency ratio which indicates the number of elderly people as a share of the working age population[10]. Figure 5 shows a downward trend of the ratio in the first half of the 1980s and a steady increase thereafter. In 1979, the index was equal to 21 in both areas of the country while in 2008 it increased to 32 in the Centre-North and 30 in the South. Southern regions have a slightly younger population and are thus better able to sustain the burden of the elderly.

[Insert Figure 5 around here]

However, according to predictions made by SVIMEZ (2011), by 2030 the total population will be 42.198 million in the Centre-North and 19.931 million in the South of Italy, and 43.518 and 18.198 million by 2050, in the Centre –North and South respectively. At the same dates the share of the elderly will be 35.8% in the South and 31.6% in the North, while the share of the adult population will be, respectively, 51.8% and 55.1%. As a result, forecasts for the elderly dependency ratio are 69 in the South and 57.7 the Centre-North: "a Country of old people", as defined by the President of SVIMEZ, Giannola, at the presentation of the report "*150 years of Italian Statistics: North and South*". This applies more to the South than the Centre-North because of its greater decline in the adult population induced by the greater propensity to migrate from these regions.

Italy has long been characterized by substantial interregional migration flows. Hence an analysis of demographic trends cannot overlook the pattern of internal migration. Such flows can influence the sustainability of the pension system both directly, through enlargement of the labour force, modifying contribution revenues, and indirectly, by altering birth rates and the natural evolution of the population.

Figure 6 shows the trend of net migration flows[11] of the two macro areas for the period 1979-2008.

[Insert fig. 6 around here]

From the early 1980s to the mid-1990s, inflows (people registered in the region) and outflows (people deregistered in the region) show a decreasing trend both in the Centre-North and in the South. Starting from the mid-1990s, the absence of a strictly specular pattern of migration in the two areas is explained by the greater interregional mobility within the Centre-North. Net migration

flows, always positive in the Centre-North and negative in the South, show a clear opposite trend in the two areas.

These trends are also confirmed when net migration is analyzed on the basis of individual human capital endowments[12] (figs.7 and 8). It is worth noting the substantial flows from southern regions both for high- and low-skilled individuals registered during the 1990s.

[Insert Figures 7 and 8 around here]

As regards the analysis of inflows with respect to the dependency ratio (figs. 9 and 10), the latter decreases substantially in all regions until 1985 and increases steadily thereafter. However, in contrast with part of the literature which maintains that migration can contribute to the sustainability of the pension system (Rojas, 2002, Munz and Werding, 2005), the dependency ratio remains stable regardless of the size of inflows. More specifically, only nine regions out of the sample[13] show that the reduction in registered individuals may have contributed to increase the burden of pensioners on the working age population.

[Insert Figure 9 and 10 around here]

The descriptive analysis is completed by labour market conditions at the local level. Activity rates (labour force/population ≥ 15), represented in figure 11, are decreasing and similar in the two areas until 1992. Pension system reforms, implemented in the 1990s, led to a considerable "drain" from the labour market due to early retirement, especially in the public sector. As a consequence, regions in the South, with a higher percentage of employees in the public sector, registered a considerable fall in the activity rate. From 1994 to 2001 it increased in all regions. Since 2001, however, the northern regions have continued to show positive growth rates, while the South presents a new contraction that amplifies the existing gap with the Centre-North.

[Insert Figure 11 around here]

The level of employment is crucial for pension sustainability through its influence on paid contributions. Plots of the employment rate (employees/population 15-64), varying pro-cyclically with respect to the regional income, show similar trends in the two areas of the country (fig. 12). The decrease recorded in the first period can be partly attributed to both the 1970s recessions and the early retirements caused by Law no. 155[14] implemented in 1981. The employment level recovery in the mid-1980s may be attributed to legislation in favour of more vulnerable individual classes (young people and females, for example). The 1990s, known as the "season of social pacts"[15], were characterized by strong fluctuations in employment level all over the country.

Positive effects derive, finally, from the temporary employment regulation, introduced first by Law 196/1997, the so-called "Treu Law", and then by Law 30/2003, also known as the "Biagi Law".

[Insert Figure 12 around here]

As a consequence of major job losses recorded until 2000, the stability of the pension system in the South has been considerably weakened. Pension balances, on the other hand, are also conditioned by the disbursement of benefits. Once again, pension expenditure in regions in the South has risen due to a larger number of early retirements, as evidenced by their activity rate gap. This would explain the further deterioration of pension balances recorded in the South from 1989 to 1999 (tab. 1).

4. Econometric estimation results

This section presents the econometric strategy followed to estimate the contribution of the above-described indicators on Italian pension financial sustainability at a regional level. The analysis refers to the period 1979-2008 and takes into account regional differences in terms of demographics, migration and the internal labour market structure.

The panel model developed is the following:

$$y_{it} = \alpha_{it} + \beta_{it}\mathbf{x}_{it} + \varepsilon_{it}$$

where β_{it} measures the partial effect of the explanatory variables x in period t (t=1,2,…,30) on the pension balance y of each region i (i=1,2,…,20). The dependent variable (y_{it}) is given by the pension balance/GDP of region i at time t. The error term, ε_{it}, is independent and identically distributed with zero mean and variance σ^2.

The explanatory variables, whose impact suggested by the theoretical debate is expressed in parentheses, are as follows[16]:

- *edr* =elderly dependency ratio (negative);
- *txbth_15* = 15-year lag birth rate (positive);
- *txemp* = employment rate (positive);
- *nmig* = net interregional migration weighted for population (depending on migrant characteristics);
- *nmig_hs* = internal net migration of *high skilled* weighted for population (positive);
- *nmig_ls* = internal net migration of *low skilled* weighted for population (positive and smaller than high skilled).

Since it is widely recognized that migration has a different impact on pension balances depending on the human capital endowment, three models are specified: model 1 with total net migration; model 2 with high-skilled net migration; model 3 with low-skilled net migration. Each model is first estimated using the total number of regions and then dividing the sample into two sub-samples, Centre-North and South.

The empirical analysis begins with OLS estimation, as a benchmark. Then, in order to allow for unobserved individual heterogeneity (as evidenced by the Breusch-Pagan LM test), it follows with fixed and random effects panel approaches selected on the basis of the Hausman test. Table 2 shows estimation results using the whole sample of regions[17].

[Insert Table 2 around here]

For each model the Breusch-Pagan LM test reveals that the OLS is not an appropriate estimator, since individual heterogeneity fails to be captured by the explanatory variables. Moreover, results of the three models confirm what was highlighted by the descriptive analysis. The elderly dependency ratio is always negative (-0.0025) and statistically significant, which indicates that every increase in elderly people with respect to the working age population worsens the regional pension balance. The coefficient of the 15 years lag birth rate[18] is always positive and mostly significant. This result confirms the outcome of the descriptive analysis: a worsening of pension balance together with declining birth rate. As expected, also the reduction of the employment rate has a negative impact on the pension balance.

When total net migration is considered (model 1), the random effect model is selected, meaning that regional pension balances depend on time-invariant local characteristics, with a gain in terms of information and efficiency with respect to a pooled regression. In this model migration has an overall positive and significant effect, in the sense that immigrants may contribute to increase pensioner benefits with no detriment to next-generation pensions.

For models considering the education level of migrants, the Hausman test suggests using the fixed effect approach. The impact of net migration is always positive and significant, with high skilled coefficient greater than low skilled one (respectively 0.014 and 0.001). Higher wages earned by high skilled individuals increase the positive effect of net migration on pension sustainability more than low skilled migrants. The employment rate is positive but not always statistically significant.

Finally, by estimating the models relating to the two sub-samples the possible effects of differences in explanatory variables upon the pension system balance in the macro areas can be determined. The Breusch-Pagan LM test shows the presence of significant regional heterogeneity, meaning that fixed and random effect models should be preferred to pooled ones[19]. The elderly dependency ratio

has a negative impact on regional pension balance in both areas, even if it is higher in the Centre-North than in the South (respectively -0.0021 and -0.0017). This outcome confirms the evidence of the descriptive analysis, i.e. the younger population in the South is better at supporting the burden of the elderly. The lagged birth rate has a significant and positive effect only for southern regions. The employment rate seems to have no influence on the pension sustainability index in either macro area.

The total net migration coefficient is positive and significant for the South, indicating the presence of benefits deriving from the migration flows, and non-significant in the Centre-North. Of interest is the result obtained for the migration differentiated on the basis of education levels. The inflow of highly skilled individuals would appear to induce an upward pressure on wages, improving pension sustainability. This is confirmed by the positive and significant coefficient of the high skilled net migration in both areas, higher in the South than in the Centre-North (0.023 vs. 0.0093). The different size of this impact may be due to the marginal contribution of workers (incoming and outgoing) who earn more, which is higher in the South (where average wages are lower) than in the Centre-North. Likewise, low skilled net migration has a positive effect on southern pension balances while it has no significant effect on those in the Centre-North.

5. Conclusions

Aging populations, birth rate declines and the consequent gradual increase in the elderly dependency ratio raise serious questions about the financial sustainability of the pension system. Pension policy is a crucial component of fiscal policy, and is currently the subject of a widespread political and economic debate whose purpose is to rationalize and reorganize government intervention. In Italy, the political debate in recent years has focused on decentralization of fiscal policy and also on perhaps redrawing the pension system along federal lines due to regional differences in terms of the labour market structure and internal migration.

This analysis shows a worsening of the Italian pension balance, at national and regional level, due to both a considerable increase in benefits paid and a decrease in contribution revenues. The period in question (1979-2008) underwent substantial demographic changes and also experienced implementation of pension system reforms. Whilst mitigating the effect of demographic changes these reforms induced a considerable "drain" from the labour market due to early retirement, especially in the public sector.

The negative dynamics of the pension financial sustainability, albeit with regional differences, results above all from a worsening of the elderly dependency ratio, a declining birth rate and a reduction in the employment rate. This particularly holds for regions in southern Italy which have a higher share of employees in the public sector and thus experienced a considerable increase in early

retirements. Moreover, the problem of pension sustainability is exacerbated in regions with an increase in migration outflows (once again, those in the South). Of particular interest is the large incidence of highly skilled migrants. Though positive for both areas, it is larger in the South where the marginal contribution of migrants who earn more is higher than in the Centre-North.

It would therefore appear that a decentralized/federal pension policy is not a Pareto-efficient solution because it would support the sustainability of the pension balance in northern regions to the detriment of those in the South. Viewed in this fashion, a fair political solution should appropriately allow for the transfer of economic resources and the presence of accrued benefits of individuals living in both parts of the country.

ENDNOTES

[1] HNP World Bank statistics (2011) present population growth projections from 2010 to 2050, with a disaggregation by age-group and gender, covering approximately 200 economies.

[2] In a funded pension system, individuals transfer a fraction of their income, earned during their active period, to a pension fund and receive, when retired, an annuity for the remaining duration of their lives in the form of pension benefits.

[3] Reforms of Amato (1992), Dini (1995), Prodi (1997), Maroni (2004), Damiano (2007) and Monti-Fornero (2011).

[4] The defined benefit plan is an agreement between the institution and individual that fixes the relationship between pensions and wages *a priori*. The individual will receive a pension which is a fixed percentage of his/her labour income and which depends on the average number of years of contributions. The defined contribution plan, instead, fixes a relationship between contributions and wages. The individual pays a fixed percentage of his/her labour income and receives, during the retirement period, pension benefits that depend on the total contributions paid and their returns.

[5] These accounts are called *notional* because contributions are collected and capitalized without money and without a market mechanism to determine the rate of return.

[6] The coefficient of transformation, built on the basis of pensioners' expected life, is updated and uniform for men and women.

[7] ISTAT publications used are *Annuari statistici*, *Rilevazione sulle forze lavoro* (RFL) and *Movimenti demografici della popolazione* for the years 1980-2010.

[8] The pension system balance is given as follows: $\left(\frac{contributions - payments}{GDP} \times 100000 \right)$

[9] Centre-Northern regions are Emilia Romagna, Friuli Venezia Giulia, Lazio, Liguria, Lombardia, Marche, Piedmont, Tuscany, Trentino Alto Adige, Umbria, Valle d'Aosta and Veneto; Southern regions comprise Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardinia and Sicily.

[10] The elderly dependency ratio is given as follows: $\left(\frac{population \geq 65}{population\ 15 - 64} \times 100 \right)$

[11] $net\ migration = \left(\frac{registered - deregistered}{population} \times 1000 \right)$

[12] Data on migrants' education are only available until 2005.

[13] Abruzzo, Basilicata, Calabria, Campania, Puglia, Sicily in the South and only Lazio, Liguria and Piedmont for the Centre-North.

[14] Law no. 155 (April 1981) refers to adjustments of pension liquidations and unemployment treatments.

[15] The Amato Protocol (1992), the Ciampi Protocol (1993), Labour Agreement (1996), Christmas Agreement (1998).

[16] For variables construction see the previous section.

[17] Results for the two sub-samples are discussed in the paper and will be available upon request.

[18] We consider lagged values of the birth rate because it may affect pension balances only when young individuals get a job and start paying contributions.

[19] The Hausman tests suggest using the FE model.

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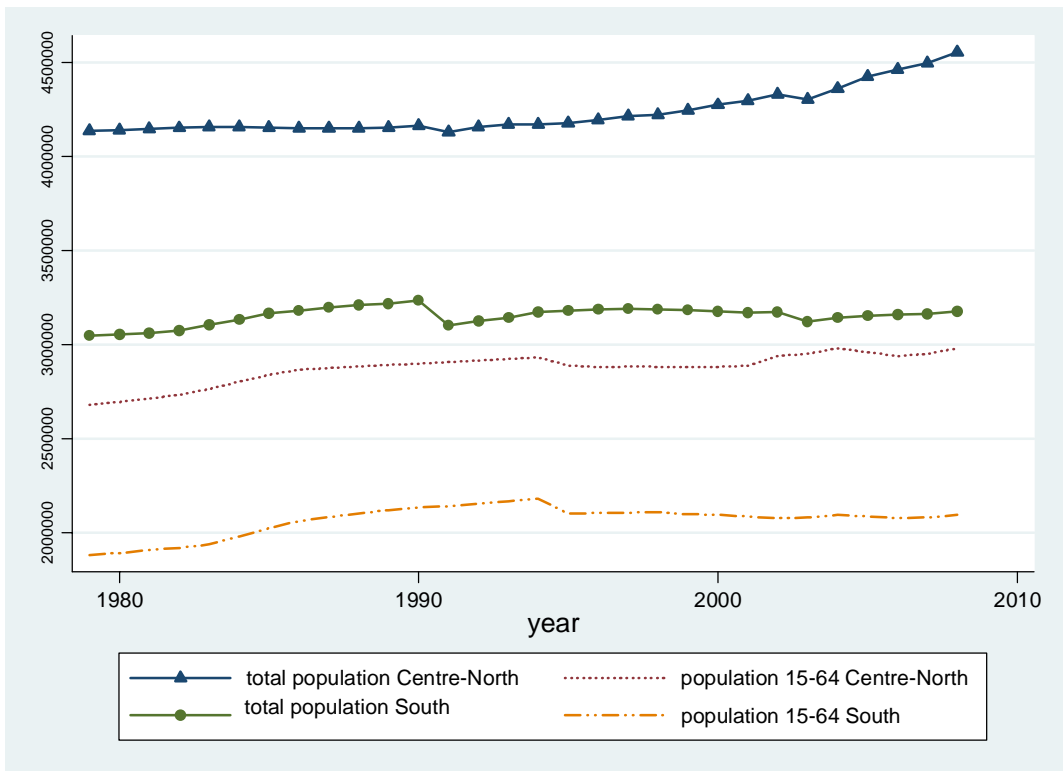
Figure 1: *Financial sustainability index of social security system of Centre-North and South.*
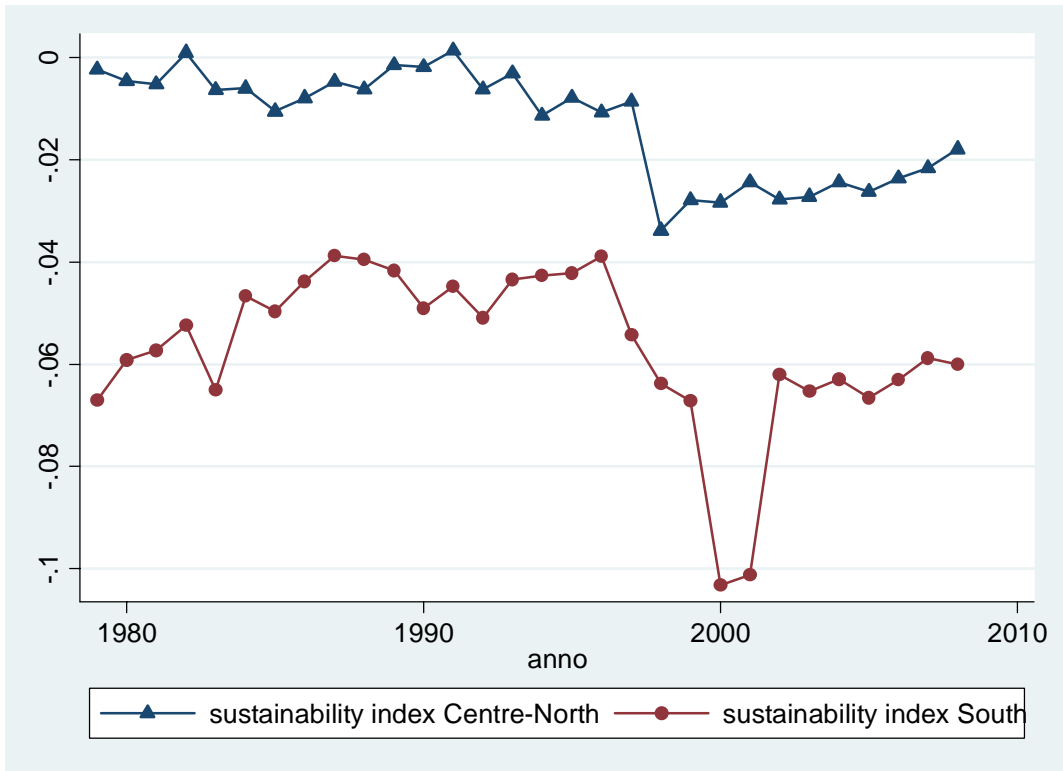
Source: Our elaboration on ISTAT data

Figure 2. *Evolution of the population in the Centre-North and South (annual averages in thousands)*
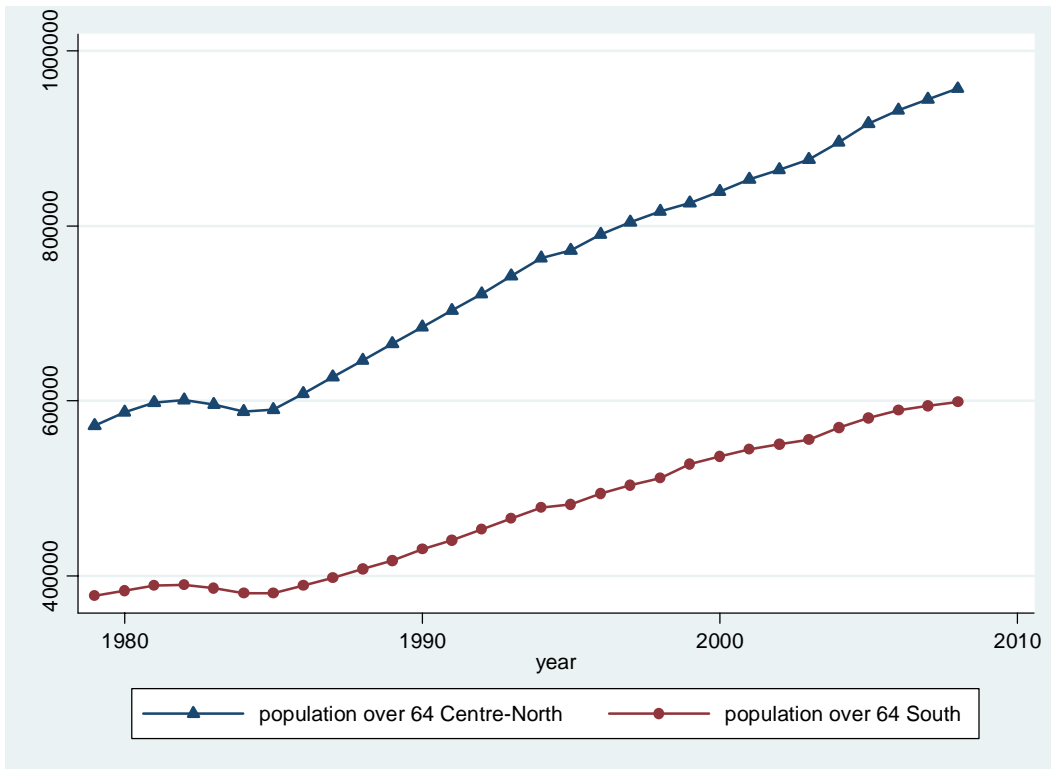

Source: Our elaboration on ISTAT data

Figure 3. *Elder population in the Centre-North and South (annual averages in thousands)*

Source: Our elaboration on ISTAT data

Figure 4. *Birth rate Centre-North and South (annual average)*
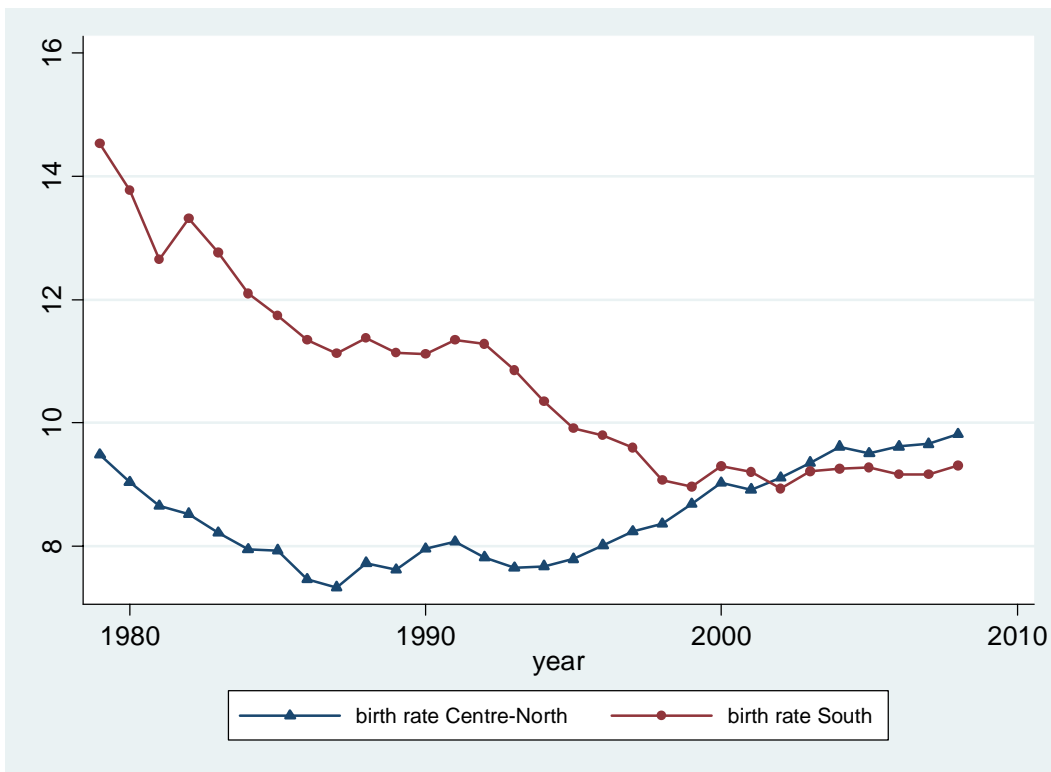
Source: Our elaboration on ISTAT data

Figure 5. *Elderly dependency ratio Centre-North and South (annual average)*
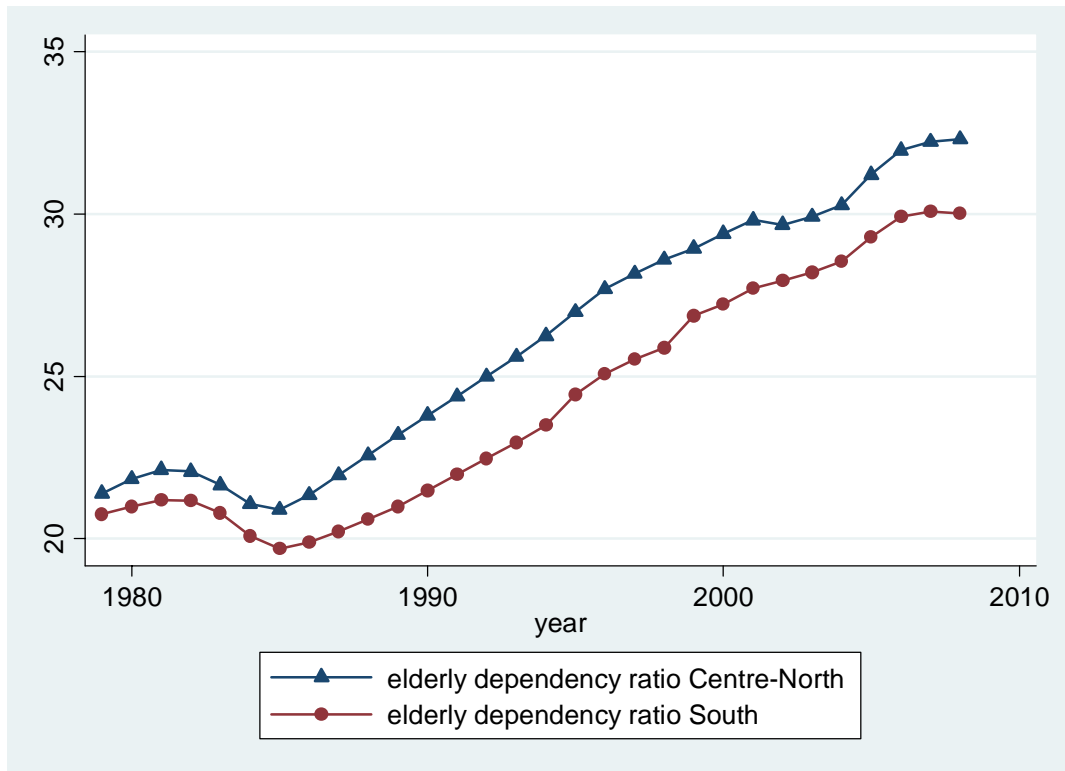
Source: Our elaboration on ISTAT data

Figure 6. *Net migration flows Centre-North and South*
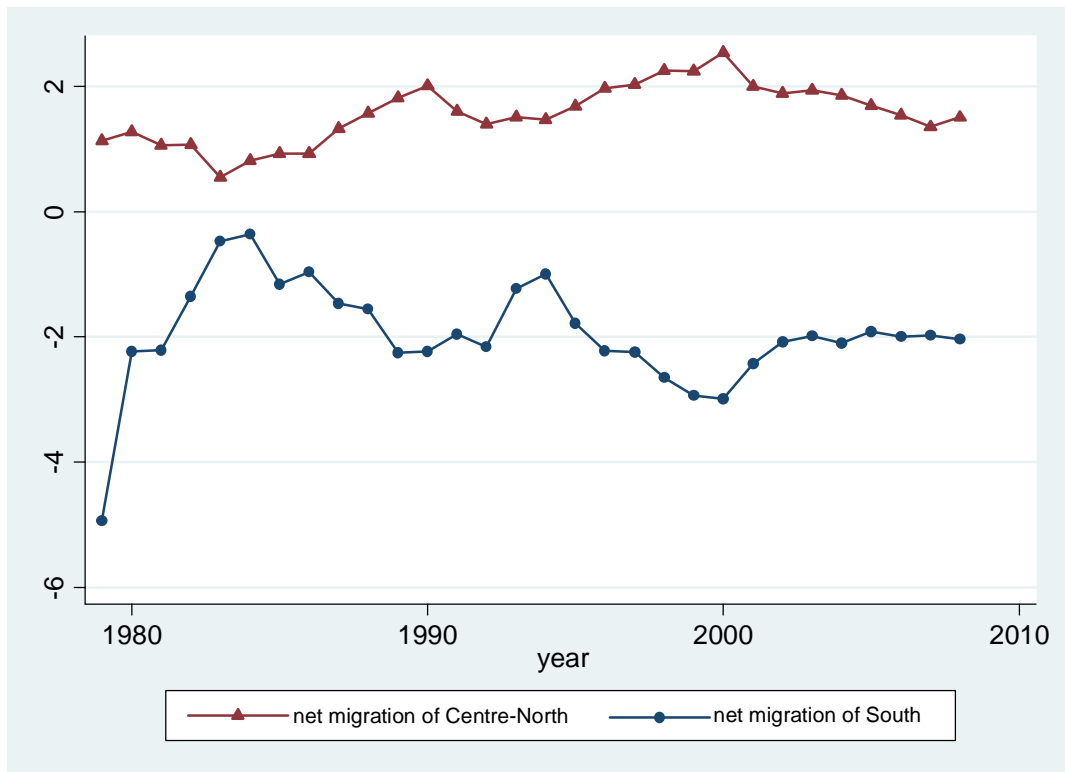
Source: Our elaboration on ISTAT data

Figure 7. *Net migration of high skilled individuals Centre-North and South*
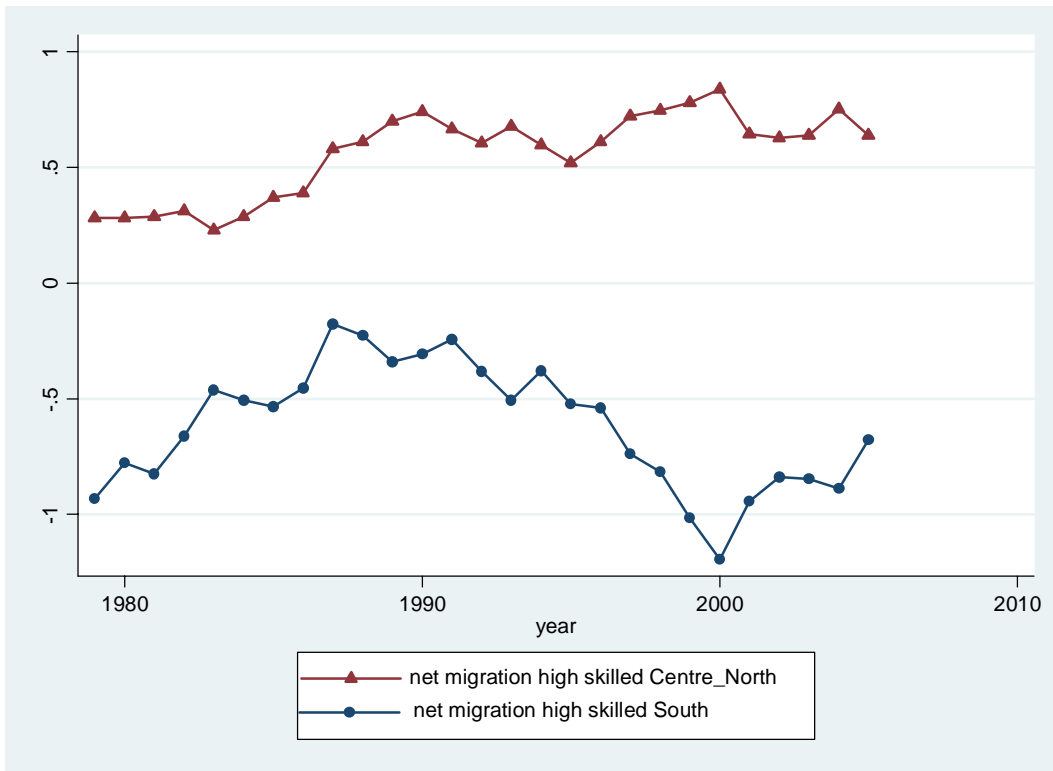
Figure 8. *Net migration of low skilled individuals Centre-North and South*
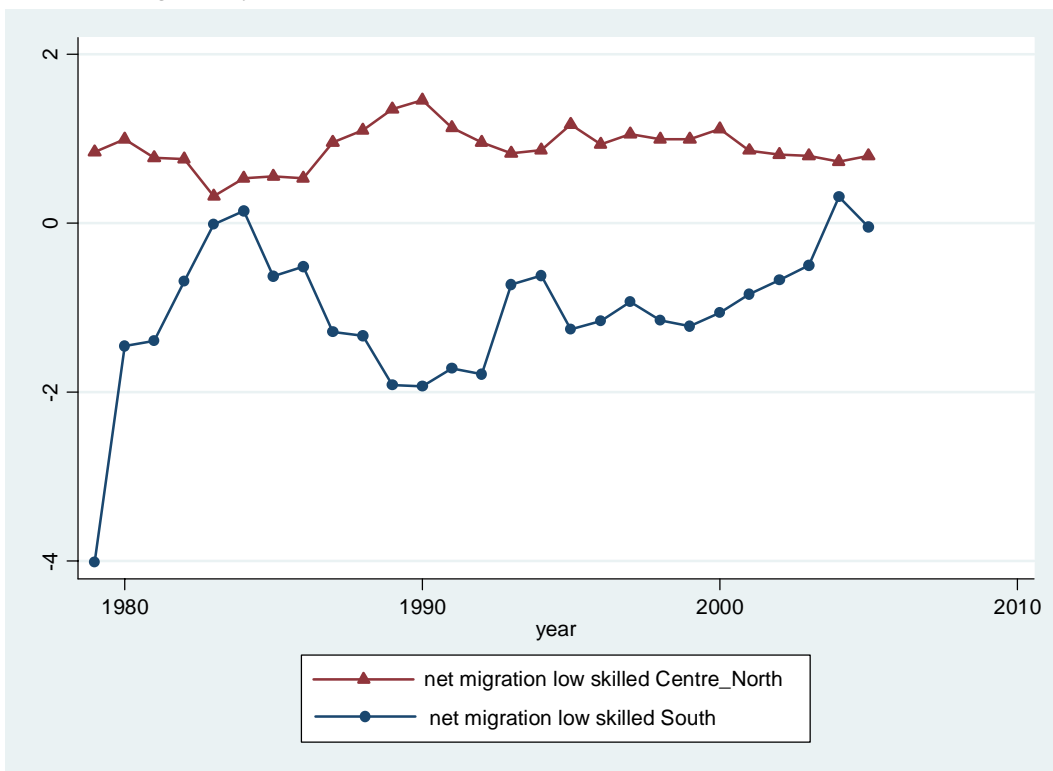
Figure 9. *Inflows of migrants and elderly dependency ratio in the regions of Centre-North*
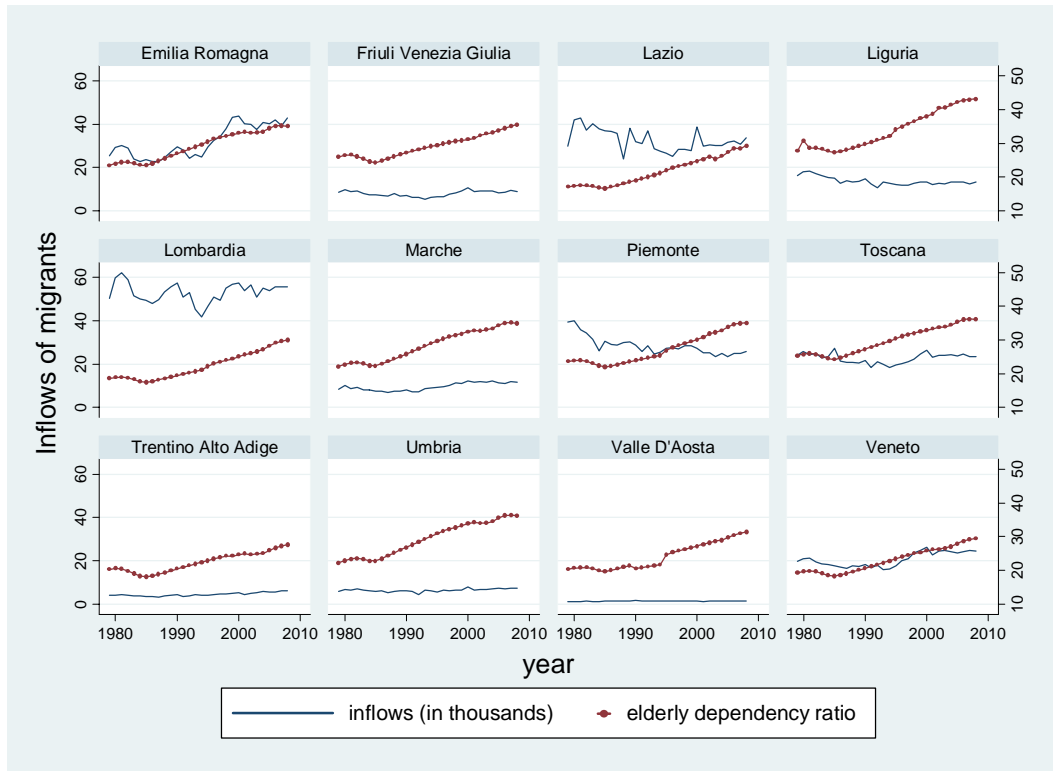
Source: Our elaboration on ISTAT data

Figure 10: *Inflows of migrants and elderly dependency ratio in the regions of South*

Source: Our elaboration on ISTAT data

Figure 11. *Activity rate in the regions of Centre-North and South*

Figure 12. *Employment rate in the regions of Centre-North and South*

TABLES

Table 1: *Indicators of social security system at the regional level -* Source: Our elaboration on ISTAT data

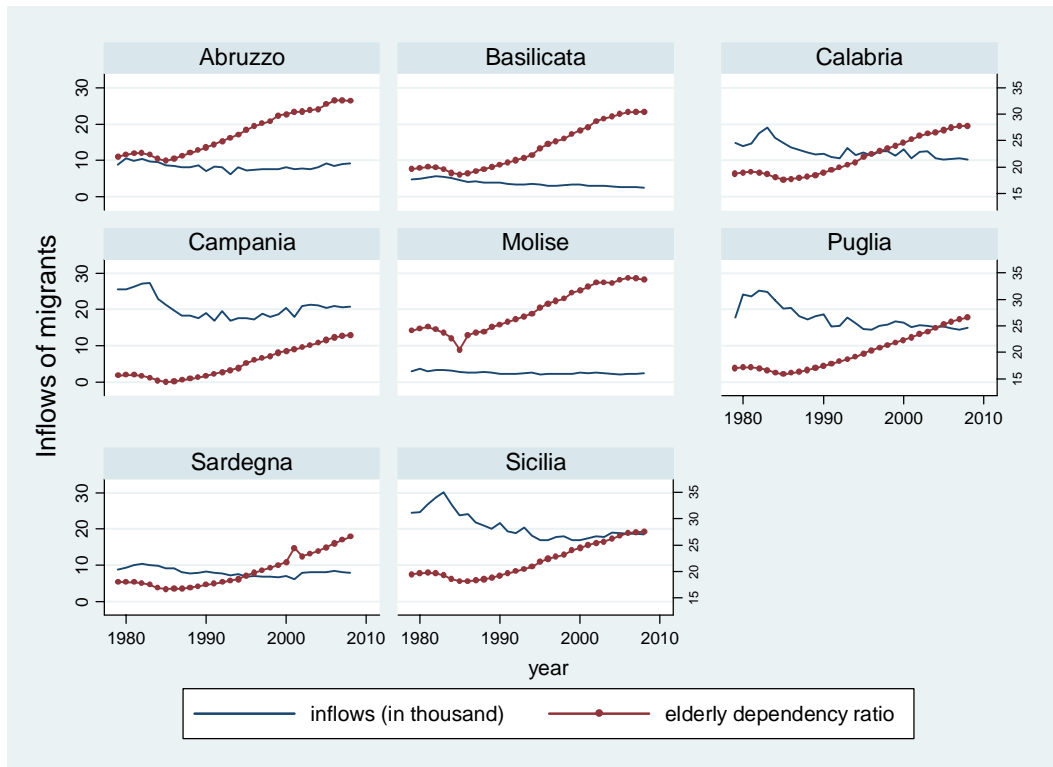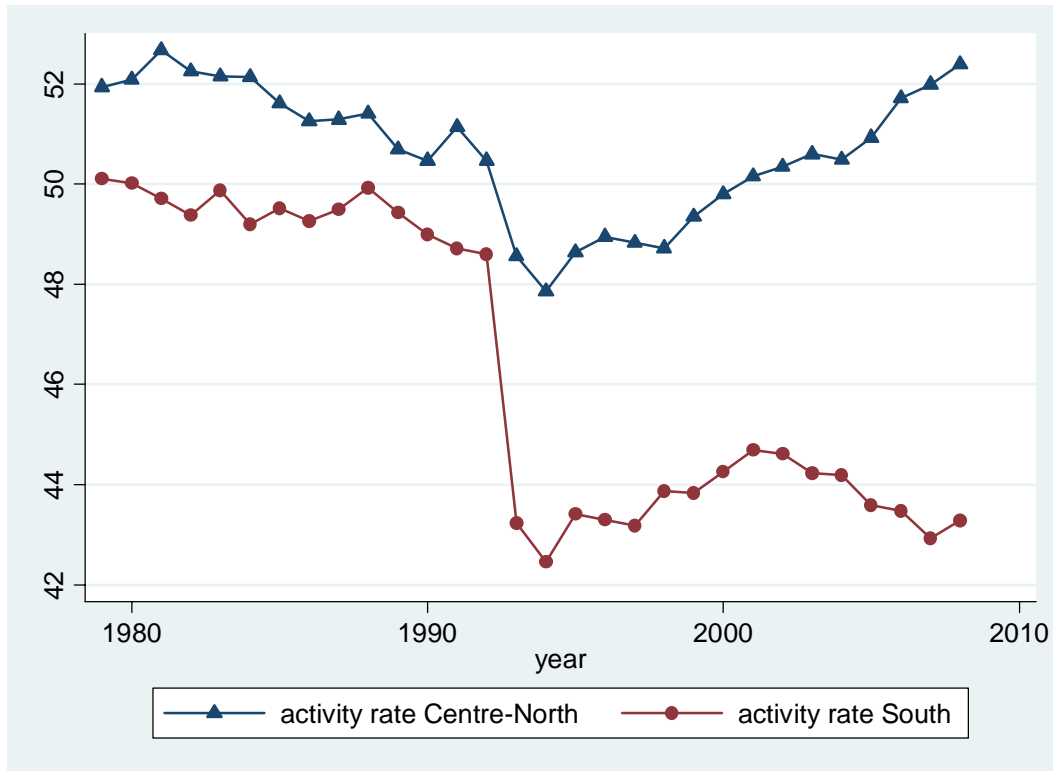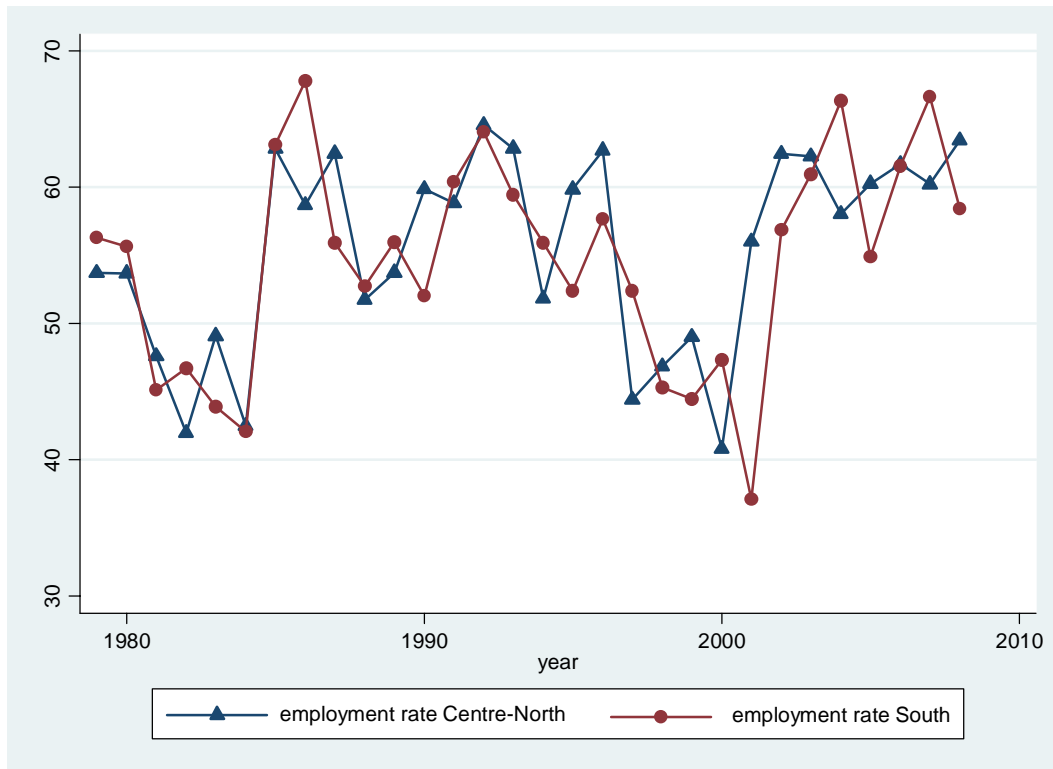| Region	1979			1989		
	Pension Expenditure/GDP	*Pension contributions/GDP*	*Pension balance/GDP*	*Pension Expenditure/GDP*	*Pension contributions/GDP*	*Pension balance/GDP*
Emilia Romagna	0.098	0.101	0.002	0.120	0.122	0.003
Friuli Venezia Giulia	0.135	0.113	-0.022	0.138	0.135	-0.003
Lazio	0.108	0.120	0.012	0.099	0.138	0.040
Liguria	0.134	0.115	-0.019	0.164	0.124	-0.040
Lombardia	0.096	0.151	0.055	0.106	0.138	0.032
Marche	0.105	0.082	-0.023	0.128	0.120	-0.008
Piemonte	0.111	0.139	0.027	0.131	0.135	0.004
Toscana	0.115	0.109	-0.006	0.132	0.123	-0.009
Trentino Alto Adige	0.091	0.086	-0.005	0.087	0.104	0.016
Umbria	0.132	0.100	-0.032	0.144	0.110	-0.034
Valle d'Aosta	0.124	0.093	-0.032	0.135	0.099	-0.036
Veneto	0.089	0.104	0.015	0.100	0.120	0.019
Centre-North (average)	**0.112**	**0.109**	**-0.002**	**0.124**	**0.122**	**-0.001**
Abruzzo	0.123	0.075	-0.048	0.122	0.103	-0.020
Basilicata	0.151	0.074	-0.078	0.165	0.108	-0.056
Calabria	0.171	0.074	-0.096	0.161	0.087	-0.074
Campania	0.134	0.085	-0.049	0.129	0.105	-0.024
Molise	0.150	0.069	-0.082	0.138	0.094	-0.044
Puglia	0.132	0.077	-0.055	0.146	0.103	-0.044
Sardegna	0.139	0.083	-0.056	0.132	0.106	-0.026
Sicilia	0.150	0.077	-0.074	0.141	0.097	-0.045
South (average)	**0.144**	**0.077**	**-0.067**	**0.142**	**0.100**	**-0.042**

Region	1999			2008		
	Pension Expenditure/GDP	*Pension contributions/GDP*	*Pension balance/GDP*	*Pension Expenditure/GDP*	*Pension contributions/GDP*	*Pension balance/GDP*
Emilia Romagna	0.127	0.109	-0.018	0.152	0.142	-0.011
Friuli Venezia Giulia	0.149	0.120	-0.030	0.172	0.143	-0.029
Lazio	0.308	0.276	-0.032	0.148	0.157	0.009
Liguria	0.187	0.096	-0.091	0.204	0.128	-0.076
Lombardia	0.118	0.113	-0.006	0.140	0.163	0.024
Marche	0.128	0.103	-0.025	0.162	0.134	-0.028
Piemonte	0.146	0.123	-0.024	0.172	0.143	-0.030
Toscana	0.143	0.109	-0.034	0.163	0.133	-0.030
Trentino Alto Adige	0.088	0.095	0.008	0.118	0.136	0.018
Umbria	0.152	0.103	-0.049	0.191	0.134	-0.057
Valle d'Aosta	0.129	0.093	-0.035	0.136	0.125	-0.011
Veneto	0.106	0.107	0.001	0.132	0.136	0.005
Centre-North (average)	*0.148*	*0.120*	*-0.028*	*0.157*	*0.139*	*-0.018*
Abruzzo	0.134	0.116	-0.018	0.180	0.139	-0.041
Basilicata	0.154	0.088	-0.067	0.191	0.133	-0.058
Calabria	0.169	0.075	-0.094	0.207	0.124	-0.083
Campania	0.149	0.080	-0.069	0.185	0.135	-0.050
Molise	0.149	0.097	-0.052	0.185	0.125	-0.059
Puglia	0.169	0.084	-0.085	0.206	0.131	-0.075
Sardegna	0.149	0.086	-0.062	0.186	0.131	-0.054
Sicilia	0.169	0.077	-0.092	0.187	0.127	-0.060
South (average)	*0.155*	*0.088*	*-0.067*	*0.191*	*0.131*	*-0.060*

Table 2. *Determinants of regional pension balance*									
	Model 1			Model 2			Model 3		
	OLS	**FE**	**RE**	**OLS**	**FE**	**RE**	**OLS**	**FE**	**RE**
edr	-.0024 [0.000]	-.0024 [0.000]	-.0024 [0.000]	-.0029 [0.000]	-.0029 [0.000]	-.0029 [0.000]	-.0028 [0.000]	-.0028 [0.000]	-.0028 [0.000]
txbth_15	.0011 [0.024]	.0009 [0.060]	.0011 [0.024]	.0016 [0.002]	.0014 [0.005]	.0016 [0.002]	.0009 [0.103]	.0007 [0.175]	.0009 [0.103]
nmig	.0024 [0.000]	.0016 [0.011]	.0024 [0.000]						
nmig_hs				.0166 [0.000]	.0148 [0.000]	.0166 [0.000]			
nmig_ls							.0014 [0.007]	.0011 [0.034]	.0014 [0.007]
txemp	.0007 [0.003]	.0004 [0.118]	.0007 [0.003]	.0004 [0.060]	.0002 [0.480]	.0004 [0.060]	.0006 [0.011]	.0002 [0.423]	.0006 [0.011]
constant	-.0169 [0.243]	.0001 [0.997]	-.0169 [0.243]	.0001 [0.994]	.0160 [0.307]	.0001 [0.994]	-.0036 [0.829]	-.0208 [0.204]	-.0036 [0.829]
R^2-with.	0.19	0.19	0.19	0.26	0.26	0.26	0.19	0.20	0.19
R^2-bet.	0.46	0.21	0.46	0.50	0.38	0.50	0.16	0.03	0.16
R^2-ov.	0.33	0.19	0.33	0.39	0.32	0.39	0.17	0.07	0.17
Hausman test		1.39 [0.85]			17.27 [0.0017]			40.00 [0.000]	
No. obs.	585	585	585	525	525	525	525	525	525