The Shift to Defined Contribution Scheme.

An Italian Case

Massimo Angrisani[a]

Giovanni Di Nella[b]

Cinzia Di Palo[b]

[a] Department of Methods and Models for Economics, Territory and Finance - Sapienza University of Rome

[b] Department of Economics and Law - University of Cassino and Southern Lazio

Outline

The Shift to Defined Contribution Scheme. An Italian Case

- Aim and scope
- The architecture of the Italian pension system
- Brief description of the case study
  - Demographic features
  - Economic features
  - Financial features
- The INARCASSA 2012 reform
  - Structural errors
- The Separation Principle approach
- Adjustment proposals
- References

Aim and scope

Many countries are facing the financial sustainability problem of their pension systems by the transition from the Defined Benefit to the Defined Contribution scheme.

However, the Defined Contribution formula alone does not guarantee the sustainability.

Many are the economic, financial and demographic factors to consider, first of all the rate of return to be paid to contributions and benefits.

This article deals with the shift to the Defined Contribution scheme in contexts of economic and demographic instability, in which the steady state does not occur substantially, with reference to one of the largest Italian statutory pension systems for professional workers.

We propose a new way to structure and manage a pension system on the basis of a general principle, we also provide a proper rule for the rate of return on pension liability and we propose a pension indexation rule differentiated for Defined Contribution pensions and Defined Benefit pensions in order to improve the intergenerational equity.

Italian multi-pillar pension system

I° Pillar — Basic Public Pension

Main features:

- **Unfunded PAYG system**
- **NDC scheme**
  (**except for professional workers**)
- Mandatory
- Financing:
  - *Employee/employer contributions*
- Covers all categories of workers, employees and self employed
- Goal: provide a basic public pension of old-age, disability, survivor

II° Pillar — Complementary Pension

Main features:

- Funded system
- Occupational scheme:
  - *Contractual Pension Funds;*
  - *Open Pension Funds*
- "Mandatory"
- Financing:
  - *Servance pay "TFR"*
  - *Employee/employer contributions*
- Goal: complementary life annuity to integrate the lower public pensions of the new retirees

III° Pillar — Supplementary Pension

Main features:

- Funded system
- Individual scheme:
  - *Open Pension Funds*
  - *Life insurance products*
- Voluntary
- Financing:
  - *Employee contributions*
- Goal: consistute an additional annuity

Basic Public Pension

The Italian mandatory pension system system is based on the **plurality of social security covers** and on the **plurality of insurance institutions**. This makes the mandatory system very complex and varied in all respects.

Different pension systems for employees and for professionals

Each of them, while operating within the same pillar, is characterized by:

- Different financing scheme,
- Different formula for the pension calculation,
- Different architecture of the contribution rates,
- Different retirement rules,
- Different financial sustainability criteria.

In turn, these differences are found within the system aimed at professionals depending on the profession type.

Basic Public Pension

Mandatory pension system for employees

- NDC system, totally unfunded
- The financial position is not in equilibrium
- Not self-contained - Relevant public transfers cover the gap between contributions and benefits

The shift from the Defined Benefit to the Defined Contribution scheme realized in 1995 – Law 335/1995 - would have to ensure financial sustainability.

This did not take place nor could it in contexts of PAYG scheme with economic and demographic instability.

Basic Public Pension

Mandatory pension system for professionals

- By virtue of the plurality of insurance institutions, it is entrusted to 18 social security institutions different for professional category.
- Different systems:

Fully Funded	**PAYG with funded component**	**PAYG with funded component**
Defined Contribution	**Defined Benefit**	**DB – DC** according to a pro-rata rule

The pension system for professionals as a whole is not in deficit and holds an invested asset amounting to € 64 billion, see ADEPP (2014).

Brief description of the case study

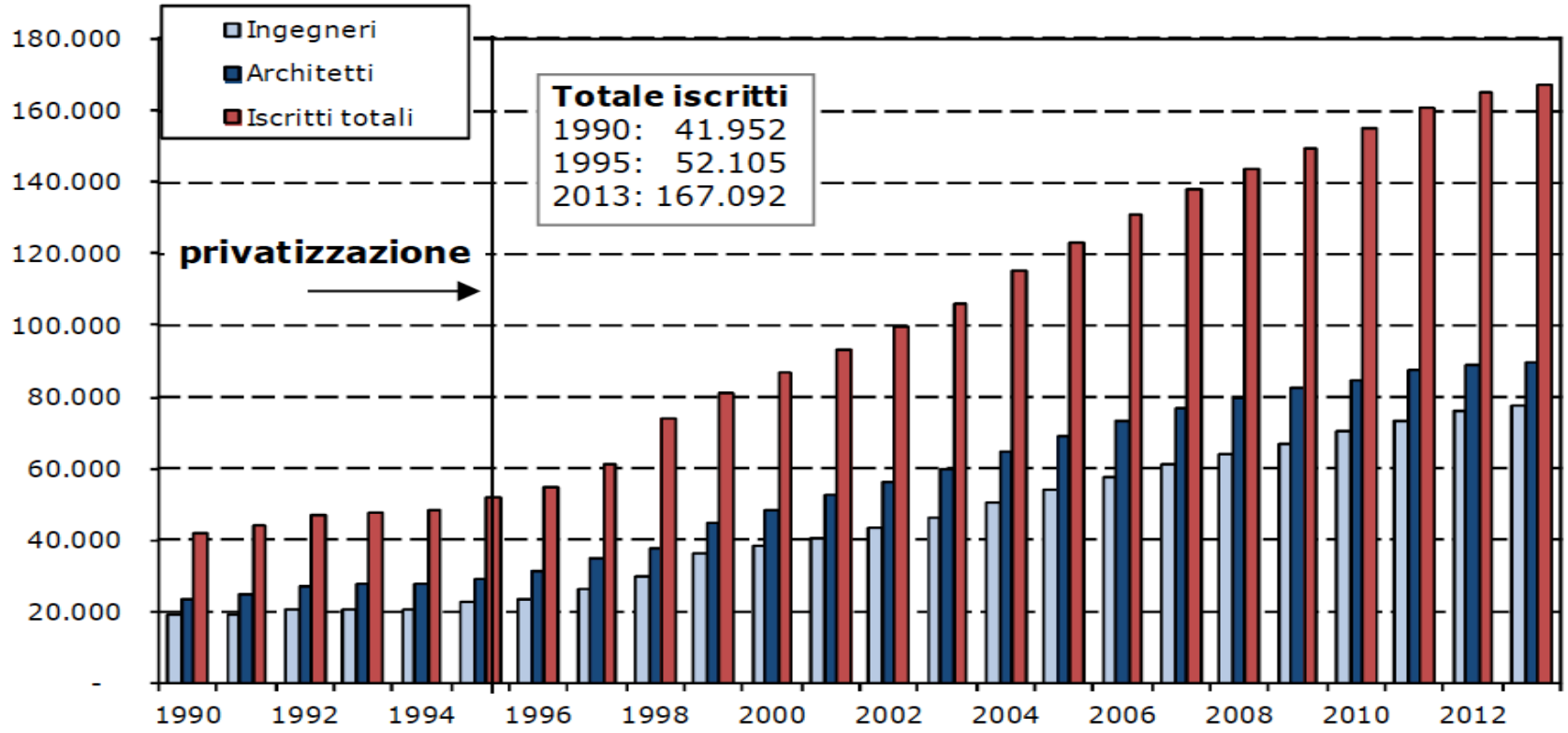
INARCASSA is the social security institution for engineers and architects and is one of the largest Italian social security institutions for professionals.

After several partial reforms within the Defined Benefit scheme it was structurally **reformed in 2012** with the **shift to the Defined Contribution scheme**.

Currently, INARCASSA is a **PAYG** scheme with a funded component "de facto" - not structural - and pension formulas **DB** and **DC** according to a pro-rata rule.

Demographic features

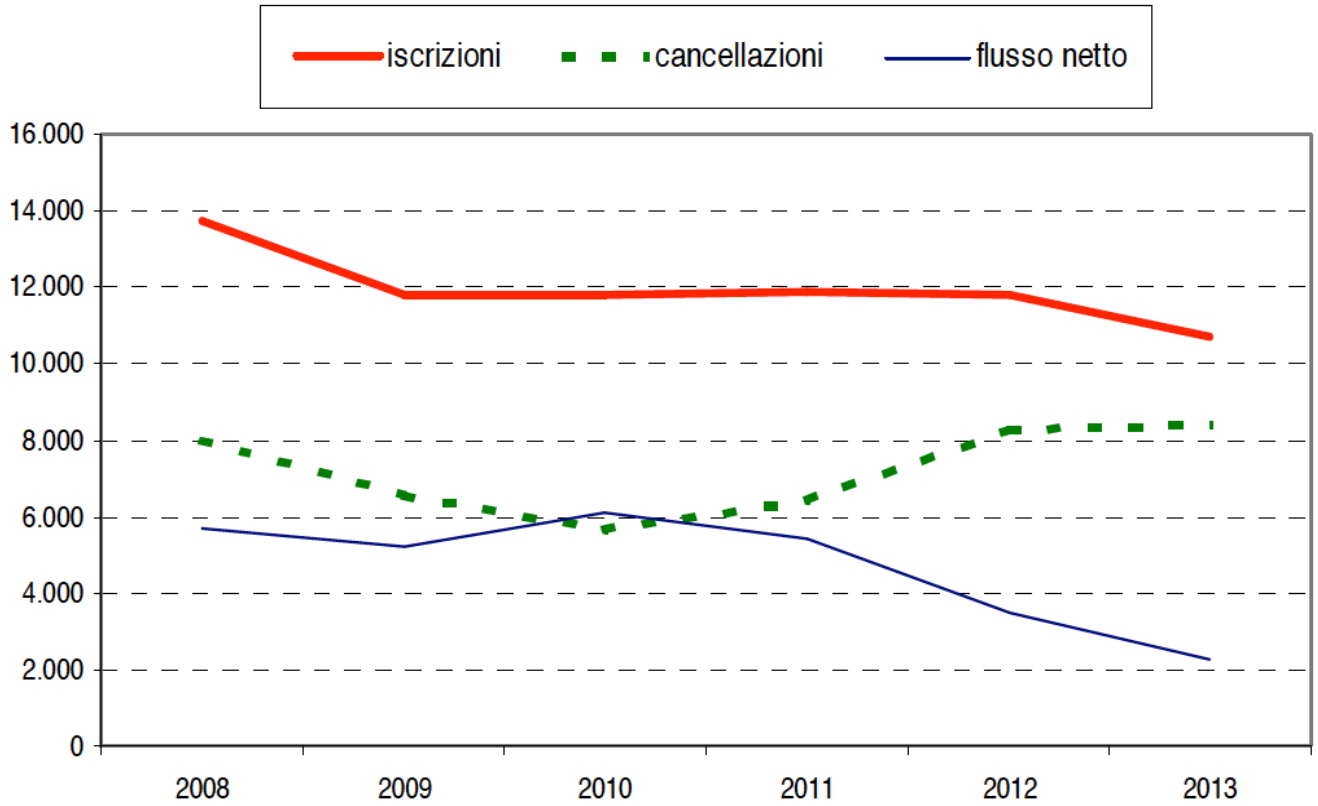
Figure 1 – Members (contributors) of the INARCASSA pension system



Source: INARCASSA 2015 Budget plan

Demographic features

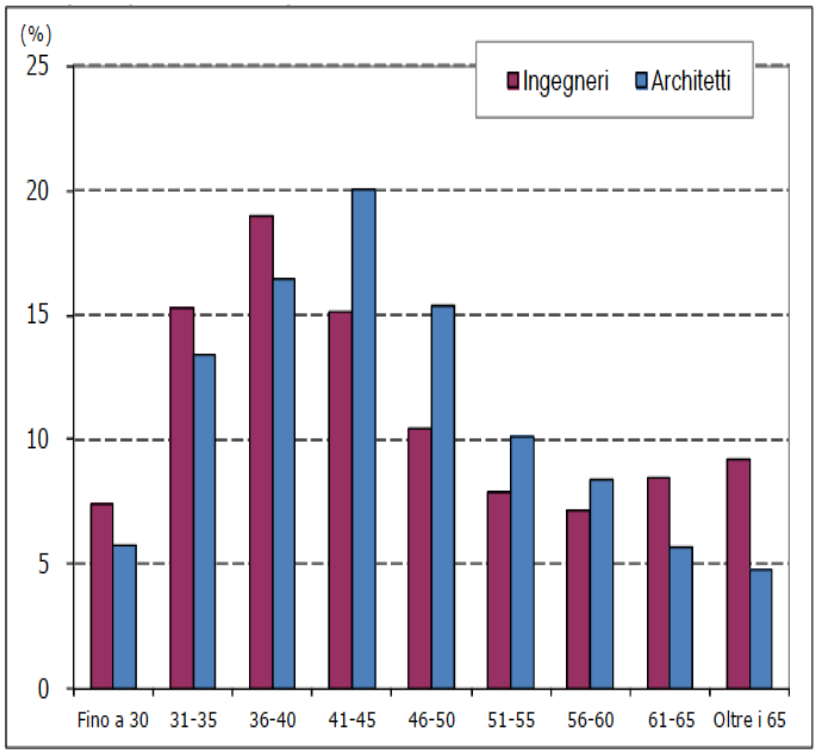
Figure 2 - Enrollments and unsubscriptions to the INARCASSA pension system

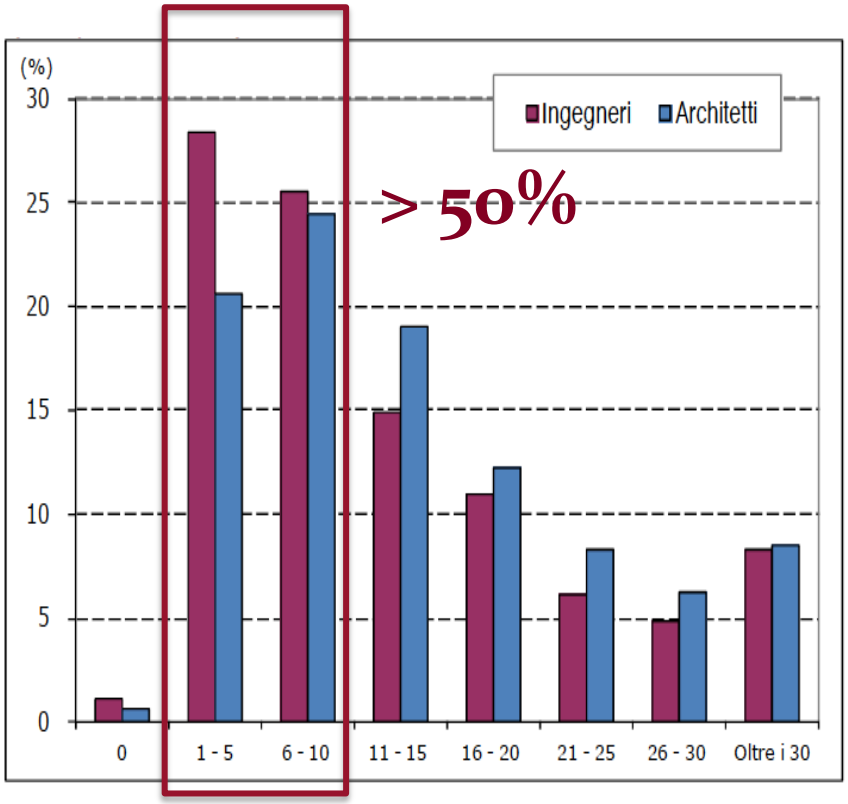


Source: INARCASSA 2015 Budget plan

Demographic features

Figure 3 - Distribution of the INARCASSA members by age and seniority (2013)

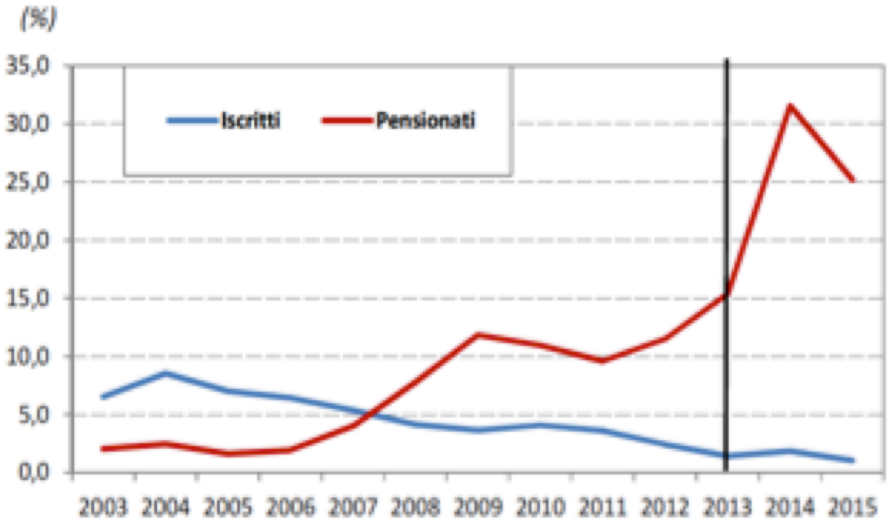




Source: Statistics on members and retirees, income and turnover - INARCASSA (2014)

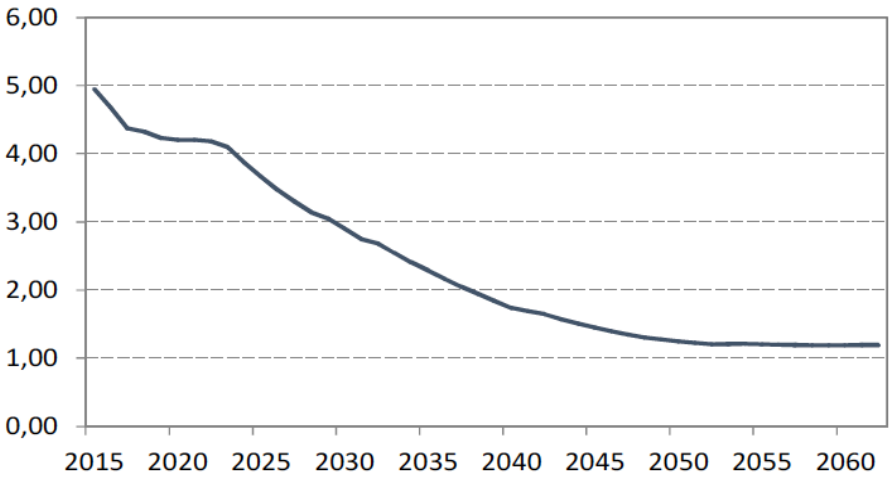
Demographic features

Figure 4 – Members and retirees (percentage changes)



Source: INARCASSA 2015 Budget plan

Figure 5 – Dynamics of the members/ retirees ratio



Source: INARCASSA 2012 Actuarial balance sheet

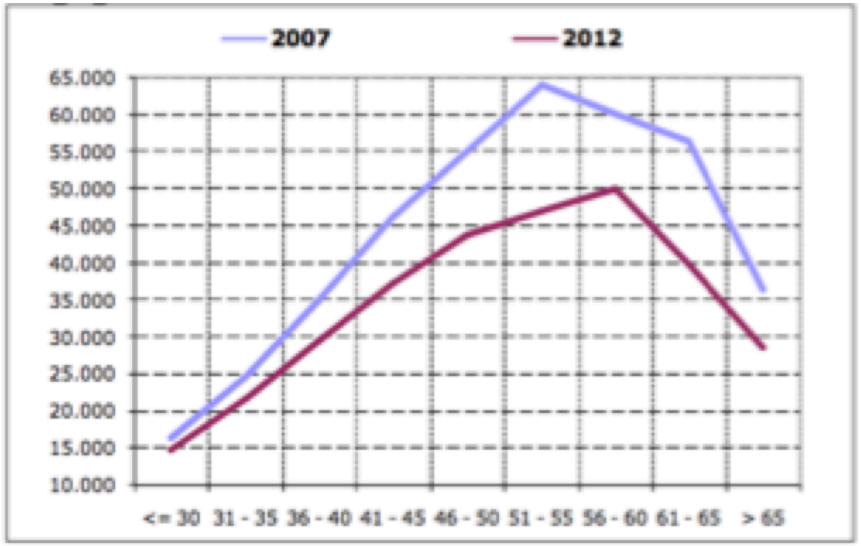
Demographic features

The explosion of the enrollments that occurred between 1994-2011 it is not followed by the same trend in 2012-2015, from a demographic point of view this implies very large cohorts followed by smaller cohorts and denotes a demographic instability that we define "**demographic wave**", see Angrisani et al (2001).

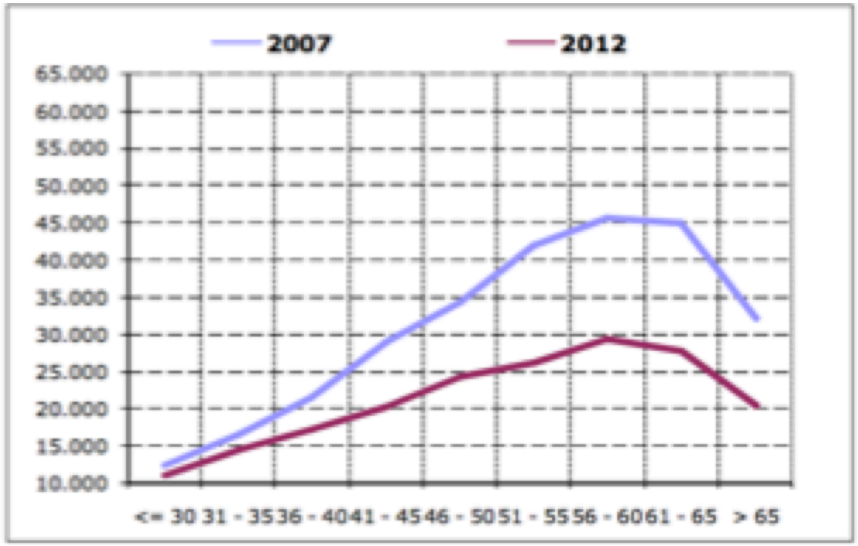
Economic features

Figure 6 - Age distribution of the average professional income

Engineers



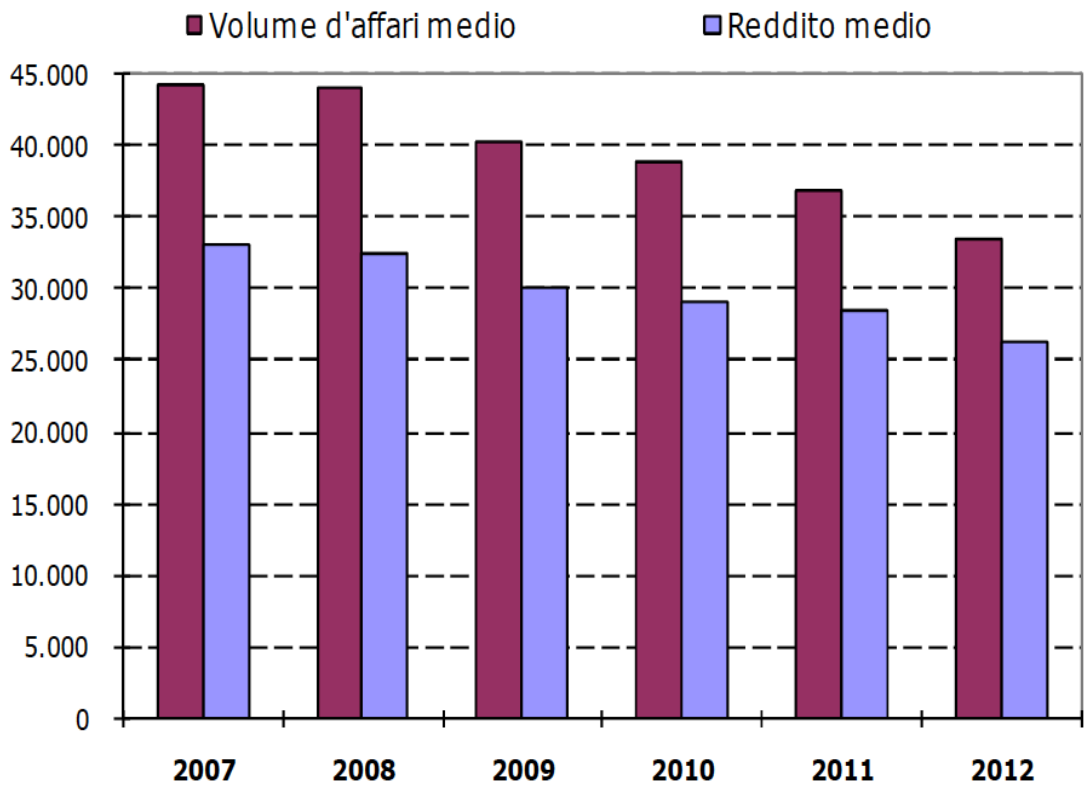
Architects



Source: INARCASSA 2013 Balance sheet

Economic features

Figure 7 - Average turnover and average income of the INARCASSA members



Source: Statistics on members and retirees, income and turnover - INARCASSA (2014)

Economic features

In addition to the economic instability just shown.....

"... about 27% of our members experiences economic conditions next to the poverty threshold."

Source: INARCASSA 2013 Balance sheet

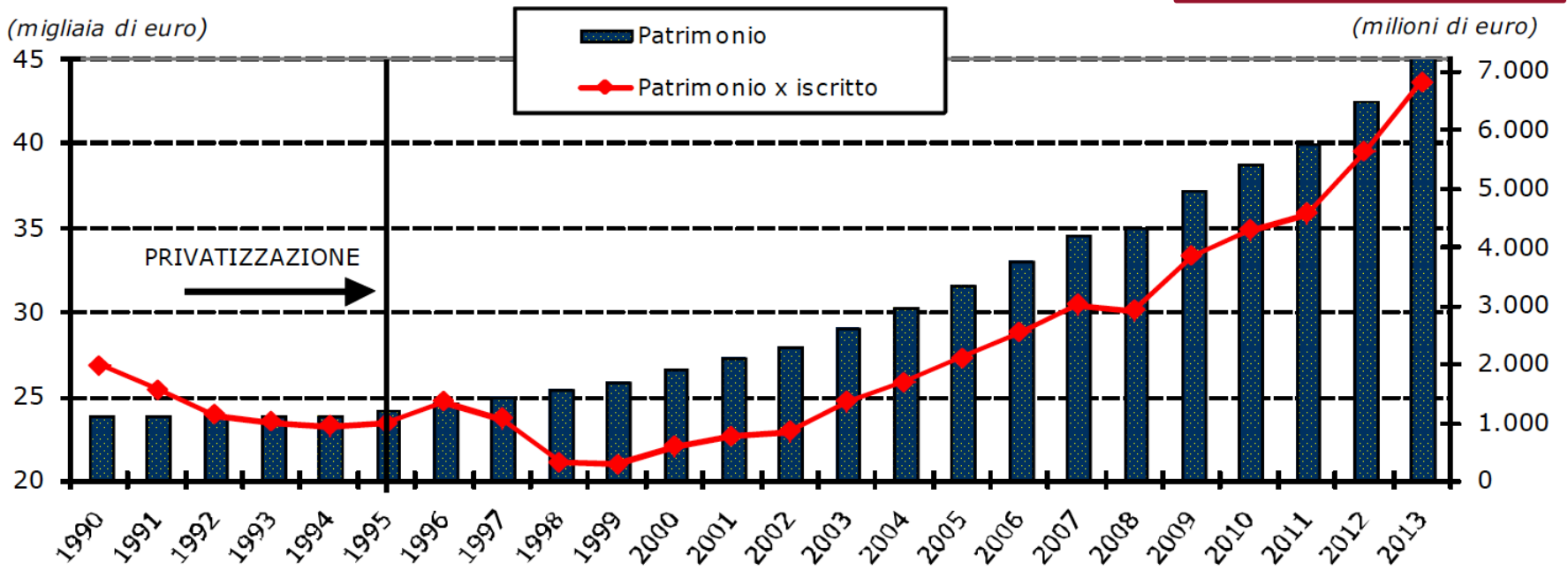
In other words there is a significant economically weak structural component of members close to the poverty threshold with low incomes and low productivity, principally young professionals and/or professionals with discontinuous careers.

Such a portion of the system represents what we define "**economic wave**".

Financial features

Figure 8 - Dynamics of the INARCASSA invested assets

Estimated at € 8.6 billion in 2015



Source: INARCASSA 2015 Budget plan

The INARCASSA 2012 reform

Main intervention

All the social security systems for professionals which adopt the DC scheme are required to recognize the rate of return on the contributions, the five-year average change in the Italian nominal GDP, established for the pension system for employees because operating in the first mandatory pillar.

INARCASSA established a different **rate of return** equal to the **five-year average change in GDP produced by the members** with a **guaranteed minimum equal to 1.5%**. This rate of return can be increased in a discretional way depending on the return on invested assets.

However, this choice must be contextualized within the **economic and demographic instability of the INARCASSA professionals**.

Structural errors

Financing scheme

The first regards the financing scheme which does not properly works with respect to the economic and demographic unstable part of the system, namely the economic and demographic waves.

Such an economic and demographic instability is far away from the steady state and needs to be managed in accordance with logic rules different from the stable part of the system which is manageble according to a PAYG scheme.

Structural errors

Rate of return

The second regards the rate of return recognized on the contributions paid which does ignore the consequences on the GDP of the economic wave and does not take into account the financial rate of return on the invested assets.

Each participant contributes to determine the specific professional Gross Domestic Product (INARCASSA GDP), but if more than one quarter of the participants experiences low and unstable income profiles such a GDP can be affected by this economic weakness.

Theoretical basis for adjustment proposals

The Reform implemented would have to properly consider the economic and/or demographic wave that disrupts and weakens the demographic, economic and financial stability of the whole system and would have to manage such an unstable part of the system according to the following **logical-mathematical approach**, see Angrisani and Di Palo (2014; forthcoming).

The Separation Principle approach

- Allows the pension system to control the instability stemming from the demographic/economic wave by means of a general principle referred to as the Separation Principle with the goal of the sustainability jointly with the respect of the intergenerational equity.

- Basically states that it is necessary "to fund" the system component that cannot be managed according to the PAYG scheme.

- With specific regard to the problem of the demographic/economic wave, this principle implies that the group of individuals who constitute the demographic/economic wave "has to be fully funded".

The Separation Principle approach

Following the Separation Principle the pension system has to technically manage its participants in two subsystems:

Pivot pension system

The first subsystem continues to receive the same number of new entrants with stable wage dynamics. Hence, it remains in a state of economic and demographic stability and is the natural continuation of the pre-existing stable pension system.

Auxiliary pension system

The second subsystem receives the individuals of the demographic/economic wave, namely the individuals who have features of instability in the demographic/economic profile. This subsystem has to follow the fully funded scheme.

The two subsystems are separated only technically and integrated in relation to the financial management; both together constitute a unique pension system with respect to the pension rules and benefits.

The Separation Principle approach

As asserted in the Separation Theorem, the rate of return to be recognized on the pension liability has to follow this rule:

$$r_L(t) = rD_c(t) + \overline{\sigma}_1\left(1 - D_c(t)\right) \qquad [1]$$

where:

t is the time;

$r_L(t)$ is the rate of return on the pension liability to be recognised to both the Pivot and the Auxiliary Pension Systems;

r is the financial rate of return on the fund;

$D_c(t)$ is the degree of funding of the pension liability of the Total Pension System, defined as the ratio between the fund, $F(t)$, and the pension liability, $L(t)$, i.e. $D_c(t) = \frac{F(t)}{L(t)}$;

$\overline{\sigma}_1$ is the wage growth rate of the Pivot Pension System, whose productivity, by assumptions, is not modified by the individuals constituting the wave.

The Separation Principle approach

- The Separation Theorem proves that the rule [1] allows the system to keep constant the level of the unfunded pension liability with respect to wages (see the definition in Angrisani (2006; 2008)) of the Pivot Pension System)

This indicator denoted by $\beta(t)$ is one of the most useful state indicators of a pension system.

It is defined as

$$\beta(t) = \frac{L(t) - F(t)}{W(t)} \qquad [2]$$

where $W(t)$ is the instantaneous wages flow of the pension system. Therefore, stabilizing the value of $\beta(t)$ means keeping equal the rate of change of the unfunded pension liability - at the numerator of $\beta(t)$ - and the rate of change of wages flow - at the denominator of $\beta(t)$.

Adjustment proposals

In the light of the Separation Theorem the management of the INARCASSA pension system has to be based on the approach presented:

- the portion of the system with stable income and stable productivity profile has to be managed into the *Pivot Pension System*,
- whereas the portion with unstable income or unstable productivity profile has to be managed into the *Auxiliary Pension System*.

Adjustment proposals

The rate of return to be recognized to the INARACASSA pension liability has to follow the rule estabilished by the Separation Theorem.

The application of this rule also implies the redistribution on the pension liability of the financial returns of the INARCASSA assets.

Adjustment proposals

Intergenerational equity

The INARCASSA pension system has to manage the previously in force and generous Defined Benefit component.

In a context in which pension benefits are indexed by the Consumer Price Index independently from the calculation formula, we propose to pursue the intergenerational equity even at the stage of retirement by defining a different indexation rule:

- the Defined Contribution pensions, which are lower and they will be principally enjoyed by "young" professionals, have to be indexed by the rate of return established by the Separation Theorem, which includes the inflation rate,
- the Defined Benefit pensions, which are higher and principally enjoyed by "old" professionals, have to be indexed only by the Consumer Price Index.

Further adjustment proposals

In addition to the above mentioned adjustment proposals there are some other adjustments that can be done in order to allow a better pension treatment principally for the young professionals.

These further proposals are presented in the full paper, they are not adjustements of structural errors but they are result of political choises.

References

- Aaron, H. (1966): The social insurance paradox, *Canadian Journal of Economics* **32(3)**, 371–374.
- ADEPP (2014): Quarto rapporto sulla previdenza privata italiana (Fourth report on the Italian pension system for professionals).
- Angrisani M. et al. (2001): Pensioni: necessità di una riforma (ch.3), Ed. Ideazione.
- Angrisani, M. (2006): Funded and unfunded systems: two ends of the same stick, *Proceedings of the 28th International Congress of Actuaries (ICA 2006),* Paris.
- Angrisani, M. (2008): The logical sustainability of the pension system, *Pure Mathematics and Application (PU.M.A.)* **19**, 67-81.
- Angrisani, M. and Di Palo, C. (2012): An extension of Aaron's sustainable rate of return to partially funded pension systems, *International Journal of Sustainable Economy* **4**, 213-233.
- Angrisani, M. and Di Palo, C. (2014): Managing the Baby Boom Demographic Wave in Defined Contribution Pension Systems, *Politica Economica* **30(1)**, 51-72.
- Angrisani, M. and Di Palo, C. (forthcoming): Controlling a demographic wave in Defined Contribution pension systems, *Pure Mathematics and Application (P.U.M.A.),* 2015.
- Angrisani, M. et al. (2015): The Effective Rate of Return for Defined Contribution Pension Systems in a Stochastic Framework, *Abstracts of the Management International Conference (MIC 2015), 28-30 May 2015, Portorož - Slovenia*.
- COVIP (2013): Relazione per l'anno 2013 (COVIP 2013 Annual report)
- INARCASSA (2011): Bilancio tecnico 2011 (INARCASSA 2011 Actuarial balance sheet).
- INARCASSA (2012): Bilancio tecnico 2012 (INARCASSA 2012 Actuarial balance sheet).
- INARCASSA (2013): Bilancio consuntivo 2013 (INARCASSA 2013 Balance sheet).
- INARCASSA (2014): Inarcassa in cifre 2014 (Statistics on members and retirees, income and turnover 2014).
- INARCASSA (2015): Bilancio di previsione 2015 (INARCASSA 2015 Budget plan).

Thank you for your attention

massimo.angrisani@uniroma1.it

giovannidinella@libero.it

c.dipalo@unicas.it