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DESIGNING A PENSION SYSTEM

Abstract

Designing a pension system is both a complex endeavor and a long lasting legacy. Complexity stems from the many trade-offs that conceiving a pension system entail and from how these initial decisions affect the social and economic behavioral responses of workers and retirees. Policy-makers planning a pension system have to evaluate its internal economic consistency, but also these feedbacks. Economic and demographic models that allow a quantitative evaluation of these costs and benefits are required. More than ever at the initial stage of design, since pension systems are persistent. Yet, pension systems are not monolith, but living entities that change over time. Some of these modifications are produced by individuals' reactions to incentives built in the system, and need to be foreseen during the initial planning. Other changes are induced by reform measures and constitute the policy responses to unpredicted exogenous shocks – such as population aging. Re-designing the pension system to cope with new demands, while being limited by existing constraints, is a difficult task. Recent reforms of the Italian pension system are discussed in detail to highlight the policy trade-offs and the economic motivations behind the decision of the reform policies.

In 1889, when Otto von Bismarck decided to introduce a pension system in Germany, he probably did not realize that pensions were going to become the most widely spread welfare program in the entire world, as well as one of the most important channel of government spending. Indeed, the seed of this welfare program existed already in the Poor Law, and other partial schemes had previously been introduced in few Anglo-Saxon countries. Yet, the German system paved the way to the introduction of generous, inclusive pension systems. These schemes were designed to cover the entire population – not just small, privileged groups of workers. In the western world, all countries followed the German example between the end of the XIXth century and the aftermath of World War II.

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In this paper, I discuss the impact of public policy decisions on the future socio-economic scenario, with particular emphasis on the design and introduction of pension systems. Public policies typically emerge as responses to current social or economic needs that may become permanent. Moreover, forward looking policymakers may decide to implement policies that respond to future issues or even that prevent them from occurring. Public policies are thus current remedies to current or expected socio-economic issues. To design these policies, policy-makers need to use analytical instruments, which allow them to assess the severity of the problems, as well as quantitative models that enable them to quantify and target the policy measures. However, the task of policy-makers is even more complex, since in the real world policies do not live in isolation. Quite on the contrary, they contribute to shape the future by modifying individual and collective socio-economic behavior. For instance, the introduction of public education systems has increased the level of human capital, thereby stimulating economic growth. The establishment of public pension systems has had large impacts on retirement and saving decisions. Assessing the relevance of these feedback effects at the designing stage of the public policy decision is of paramount importance and requires analytical and quantitative modelling. In the remaining of the paper, I will discuss these aspects in relation to public pension systems.

Designing a pension system is both a complex endeavor and a long lasting legacy. It is complex because it affects almost all individuals in all age groups – either as contributors, during their working lives, or as beneficiaries, during retirement. The original design of the system and the initial decisions on the several trade-offs that conceiving a pension system entail affect the social and economic behavior of all individuals. Their decision of how long to work for, or how much to save for the future, depends also on the features of the pension system. Hence, policy-makers planning a pension system have to evaluate its internal economic consistency, but also the effect that it will induce on the affected individuals, as well as the feedbacks from these individuals to the working of the system. This initial design thus requires a quantitative evaluation of the costs and benefits of the planning decisions, which incorporates economic models able to forecast how individuals will react to the new scenarios induced by the system. Furthermore, pension systems are very persistent – and thus their initial design represent a long lasting legacy.

Historically, the demand for a pension system that transfers resources to elderly individuals has come during the urbanization and industrialization process. These schemes have multiple goals: to reduce poverty among the elderly; to force individuals to save to finance their old age consumption; and to ensure them against the longevity risk, i.e., against the possibility of outlive their financial assets. A large (public) economic literature has discussed the motivations for government intervention in the economy to provide the instruments to reach these goals (see session 1).

Policymakers designing a pension system face some fundamental trade-offs. Their early decisions on these issues will characterize the scheme for several decades, since the initial set-up has proved hard to modify. Determining how pensions are financed and how benefits are calculated has crucial implications for the nature of the connection among the subsequent generations of individuals – workers and retirees – that pension systems typically create. In a Pay-as-you-go (PAYG) pension system, the contributions paid by employers and employees are immediately used to finance the pension transfers to current retirees. This mechanism thus creates a tight link across generations, which resembles the within-family vertical transfer of resources from adult children to old parents that is common in rural areas. Funded systems instead channel employers' and employees' contributions to a pension funds, which will be used upon retirement to finance the pension benefits. Hence, this latter mechanism does not entail any intergenerational link.

Despite its relevance, however, the initial choice of how to finance the pension system was not based on philosophical ground: whether or not to connect subsequent generations of individuals. Economic and political reasons were paramount in these early decisions. As discussed in session 2, in fact, PAYG and funded systems provide different returns on the contributions paid during the working life of an individual – and hence the pension generosity differs too. Also the initial political considerations diverge. In a PAYG system, resources coming from the workers contributions are immediately available to make a transfer to the elderly. Whereas in funded system, these resources are channeled to (private) pension funds – thereby being out of the politicians' disposal. These economic and political incentives dictate the policy-makers' early decisions.

Despite being persistent, pension systems are not monolith, but living entities that change over time. Some of these modifications are endogenous. They are produced by individuals' reactions to the existence of the system. For instance, the availability of a pension benefit induces workers to leave the labor market and to retire early. These individual decisions increase pension spending. The initial planning of the system is expected to anticipate the effects of these endogenous reactions and to foresee mechanisms that may work as automatic stabilizers. Other modifications are induced by reform measures that constitute policy responses to exogenous shocks. This is the case of the many pension reforms that were implemented to counterbalance the demographic process of population aging. Some of the reforms are structural and represent a fundamental break with respect to the initial design. Faced with new and unexpected challenges, policy-makers are pushed to re-design the pension system. This is a difficult task. Policy-makers have to cope with new demands, but are constrained in their choice of the policy instruments by the initial set-up and thus by the existing expectations of the individuals. On the other hand, developments in economic and demographic models provide better quantitative tools to face the challenges. Sessions 3 and 4 discuss these instances in more details.

1. Why to have a pension system?

In western societies, public pension systems have been introduced between the end of the XIXth century and the aftermath of World War II. In many countries, the initial pension scheme covered only specific types of workers, mostly public employees and the army. The expansion of the coverage to include all public and private workers arrived with the economic development of the country.

To understand why pension systems were introduced in the first place, it is crucial to discuss which role they play. First, and foremost, they represent a form of forced savings. In fact, individuals are forced to transfer resources from their working years into their old age, since pension contributions are paid from labor income and pension benefits are received upon retirement. Second, pension systems provide insurance against the mortality risk. Retired individuals could use their private savings to finance their old age consumption. Yet, since the date of death is uncertain, individuals would face two possible risks. They could be outlived by their savings, thereby ending up consuming less than they could have. Or they could outlive their savings, with the consequence of living the last years of their life in poverty. By providing a real annuity, pension systems guarantee a monetary transfer to the retired individuals for as long as they are alive.

Could these goals be reached by individuals' own actions, without having to recur to any form of government intervention? Several authors (Caucutt, Cooley, Guner 2013; Galasso, Profeta 2018) suggested that, in rural societies, the care of the elderly was secured within the family by the younger generations. The massive migration from rural to urban areas, which took place in different historical periods in different countries, censored this family link and created a demand for new instruments of welfare. The extent to which the response to these new needs was accommodated by the governments depended also on the financial development of a country: more developed credit markets reduced the need for pension systems (Pinotti 2009; Perotti, Schwienbacher 2009).

On a similar vein, the early modernization theory (Lipset 1959) identified the industrialization as the key phenomenon, which created a new demand for public policies, socio-economic equality and security. In authoritarian countries, industrialization and urbanization may lead to social unrest, which can be counterbalanced with the concession of welfare programs, such as pension systems (Boix 2003; Acemoglu, Robinson 2006). In democratic countries, instead, the growing demand of welfare by low income individuals led directly to the introduction of redistributive policies.

Economic theory has developed a normative analysis to justify government intervention in the economy and, more specifically, in the provision of old age security. Public economic theory has advanced several reasons to intervene (Barr, Diamond 2010). The underling idea is that in some occasions, markets do not operate effi-

ciently, and the intervention of a benevolent government can increase the well-being of the citizens. These market failures occur in several cases, such as public goods, externalities, asymmetric information, natural monopolies. Additionally, government intervention may be justify by equity considerations – to diminish income inequality in society or to reduce the share of the population below the poverty line – or by a paternalistic view of the state (Gruber 2013; Rosen, Gayer 2014).

These arguments have been used to support public provision of old age security. According to a paternalistic view, individuals are not sufficiently provident to save for their old age. Hence, the government forces them to save, through mandatory pension schemes that require contributions to be paid during the individuals' working life. Government intervention through pension schemes may also be justified because of market failures that emerge due to asymmetric information on the individual mortality risk. Even if individuals were forward looking enough to save for their old age consumption, upon retirement, they would still need to convert their savings into an annuity, in order to avoid to be outlived by their assets or to outlive them. An annuity consists of an initial payment made by an individual in exchange for a constant stream of monthly transfers (i.e., a pension) until the individual dies. However, if individuals have private information about their mortality risk, a private market for annuity may fail to emerge. To see this, consider the initial price that a private financial institution should charge to an individual in exchange for the constant stream of monthly payments until death. Clearly, this price will depend on the expected mortality of the individual. Private financial institutions would recur to average mortality tables to price this risk. Yet, these institutions do not face the average individual. In fact, if individuals have private information about their health status, and hence about the mortality risk, only individuals in very good health will have an incentive to purchase the annuity. Facing a selected sample of clients, whose expected mortality is not observable, private financial institutions will increase the price of the annuity. This will provoke a further selection of the pool of interested purchasers of the annuity, since only individuals in extreme good health will remain. In the end, this process leads financial firms to set such a high annuity price that all individuals will be driven out of the market. Unlike a private financial institution, the government can set up a pension scheme and mandate all individuals to contribute (and thus to save) in exchange for a future pension benefit (an annuity). To determine the price of the annuity – in other words, the conversion rate of the contributions into a pension – the government can use the average mortality tables, since all individuals are (forced to be) present in the annuity market.

2. How to design a pension system

Once the social (and political) willingness to introduce a pension system has emerged, the main task is to design the scheme. Several crucial choices lie

ahead: how to finance the pension benefits, how to calculate them, when to allow retirement.

2.1 PAYG or fully funded

Perhaps the most fundamentally philosophical question is whether to adopt a Pay-as-you-go (PAYG) or a fully funded pension system. Technically, this difference pertains to the financing of the system. Philosophically, it requires a decision on whether to introduce a system that bounds together subsequent generations or to adopt a scheme that uses the financial markets to keep the different generations isolated from one another.

In a PAYG system, workers pay social security contributions, typically levied on their labor income, to the social security administration. In most cases, the cost of paying contributions is shared between employers and employees. The total amount of contribution collected in a given year (or month) from all covered workers is then immediately used to pay pension benefits to current retirees. Hence, in a PAYG pension system, current workers finance the pension benefits of current retirees. This flow of funds from (young and middle-aged) workers to (old-age) retirees is intermediated by the social security administration. No pension fund exists in which to accumulate these resources. As shown in figure 1, current workers will have to rely on the contributions of future generations of workers to finance their old-age pensions. This PAYG system thus creates a social contract among subsequent generations of individuals, which binds future (yet unborn) generations to contribute to the future pensions of current young generations.

In a fully funded pension system, workers are still mandated to pay social security contributions. However, these contributions – again possibly shared between employers and employees – are conveyed either into a general fund, i.e., for all workers, or into individual funds. The contributions accumulated in these funds will accrue an interest, since these resources are invested in the capital market by a fund manager. Upon retirement, these resources are converted into a pension. Hence, in a fully funded system, no link among subsequent generations of individuals emerges and the working of the system relies on the financial markets (as shown in figure 2).

How to decide between a PAYG and a fully funded pension system in a country that does not yet feature any pension scheme? Economic principles suggest several possible criteria. This decision could be taken by comparing the returns that these two different systems can provide on the contributions made by the workers or by considering the different effects that the pension systems have on the individual savings and on the accumulation of physical capital or by evaluating the different economic and demographic risks that characterize these systems.

In a PAYG pension system, the return that an individual can expect on his previous contributions depends on the economic and demographic growth of the country. Pension contributions are paid by employed individuals according to their labor earnings. Hence, if the employed population and the average wage grow over time, current individuals will have their future pension financed by larger and richer generations of workers. In a fully funded system, instead, the returns on contributions depend on the financial investments. For a PAYG system, risks come from economic downturns that may reduce the average wages and from unfavorable demographic dynamics, such as population aging. For a fully funded system, risks come from financial markets' crashes.

The designer of a pension system has to be forward looking. In some countries, pension systems have been around for more than a century and still look in good shape. In the initial decision between PAYG or fully funded, economic principles suggest to consider returns and risks associated with these two alternative. To put ourselves in the designer's shoes, consider the world after World War II, when several pension systems were established. Expected economic and demographic growth was high, whereas stock markets had just experienced large crashes. Population aging was nowhere in the picture. In fact, after WWII there was a surge in fertility and the reduction in mortality at old age had still to materialize. In this economic and demographic scenario, countries (UK, Switzerland) thus established a PAYG system. Yet, some of the countries that introduced a pension system at the end of the XXIth century or at the beginning of the XXth century took different decisions. Germany in 1889, France in 1910, Italy in 1919, and the US in 1935 began with a fully funded system. However, they all reverted to a PAYG system when financial market crashes (US) or post-World War II hyperinflation (France, Germany and Italy) slashed the fund's asset value.

To be fair, political considerations are also extremely important in the initial design – and in the following reforms – of a pension system. Another fundamental economic and political difference regarding the initial introduction of the scheme emerges between PAYG and fully funded systems. In a fully funded system, the establishment of a scheme consists of imposing mandatory contributions on current workers. Payment of pension benefits to retirees comes later, once enough contributions are accumulated into the pension fund. In a PAYG system, instead, contributions by current workers can immediately be used to finance pension benefits to current retirees. Hence, the introduction of a PAYG system can be exploited to provide resources to the elderly hit by a negative economic shock – as it happens in the US after the Great Depression and in France, Germany and Italy after WWII.

2.2 Pension benefit calculation

A second decision in the design of a pension system is how to link individual contributions to individual benefits. Three main schemes exist: Defined Ben-

efits (DB), Defined Contributions (DC) and Notional Defined Contributions (NDC). In a defined benefits plan (DB), the worker's pension benefit is based on the wage history and, possibly, on the number of years of contribution. In a defined contribution plan (DC), which is mostly associated with a fully funded system, contributions levied on individual earnings are conveyed into a fund. These contributions are used to purchase assets that are accumulated in the fund, together with the returns from these assets. At retirement, the accumulated assets are converted in an annuity – the pension. In a notional defined contribution plan (NDC), contributions levied on individual earnings are notionally accounted *as if* they were transfer into a fund. However, an NDC system is PAYG – hence, these contributions are *not* used to purchase assets, but to pay pensions to current retirees. A notional interest is provided on these accounts, which corresponds to the growth rate of the economy. Upon retirement, the credits accumulated on the notional account are converted in an annuity.

Also in this case, the decision on a seemingly technical aspect – which benefit calculation to use –has important consequences for the intergenerational social contract. By introducing a defined benefit system, the initial designer of a pension system bounds future generations to finance pensions that depend on individuals' wages. If the promised pension benefits turn out to be too generous, it will be a task for the future generations to find the resources to keep these promises. To see this, consider the public DB pension system that was in place in Italy before the 1992 reform. Pension benefits were calculated as the product between a base wage, corresponding to the last wage before retirement, the number of years of contributions and a fixed rate equal to 2%. Hence, an individual with 40 years of contributions would receive a pension equal to 80% of his last wage. Since wages typically increase with age and contributions are proportional on labor earnings, the contributions paid by this individual over his working-life were based on lower wages than the last wage. Hence, pensions were typically too generous. In other words, pensions paid a return on contributions that was higher than the return associated to a PAYG system (see session 2.1). In a defined benefit plan, the risk (of having to finance pensions, which are too generous) rests with the future workers (or tax-payers) if the system is a public PAYG or with the companies if the system is funded by a private companies for their workers, as in the UK or the US.

With a defined contribution (funded) scheme or notionally defined (PAYG) system, the risk is beard by the worker. In fact, contributions on the workers' labor earning are collected during his working life and accumulated in an actual fund (in a BC funded scheme) or accounted for in a notional fund (in an NDC PAYG scheme). The pension benefits obtained upon retirement thus depend on the capital accrued in the (actual or notional) fund, which is then transformed into an annuity using a conversion coefficient. With a DC or NDC system, if a worker has not contributed enough, or the interests accrued on the fund are

not sufficiently high, to provide him an adequate pension benefits, no government or private company is obliged to intervene.

The common choice of many designers of pension systems has been to adopt defined benefit pension plans – thereby placing the risk onto future generations. While this seems a sensible political decision for public PAYG pension systems, albeit not necessarily an economically sound one, the choice of a DB plan represented a flowed initial design for funded pension plans of private companies. In the former case, current governments were promising and awarding generous pensions – thereby placing the fiscal burden on future generations. But in the latter case, private companies took upon themselves the future load of financing these generous pensions. Perhaps because they did not foresee the amount of future liabilities that they were actually underwriting. Over time, this initial choice was largely reversed. As discussed in session 3, several countries (Germany, Italy, Sweden to name a few) reformed their public pension systems to move from defined benefit to NDC (or point systems). Analogously, private companies modified their private pension plans from BD to BC, often to avoid going bankrupt due to their pension liabilities.

2.3 Retirement age

A third crucial decision in the design of a pension system is when to allow individuals to retire from the labor market and to draw a pension benefit. Several economic trade-off emerge in this policy decision. And several external factors may modify the economic and demographic parameters that led to the initial decision.

In 1889, when Germany introduced the first pension system, the retirement age was set equal to 70 years. An incredible high threshold, given that the average longevity at birth was around 60 years. The system was thus designed to allow only few workers to ever enjoy a pension. The scheme was in fact intended to provide an insurance against old age poverty to the few individuals, who managed to reach old age. Subsequent systems had different goals. The most recognized current aim is to finance old age consumption to individuals, who have contributed to the system during their working life. Hence, the retirement age determines when the working life ends and the old age begins. From an economic view point, there is a clear trade-off. Shorter working lives, with individuals allowed to retire early, lead to fewer generations of workers and more generations of retirees. In a PAYG pension system, this means that less resources are collected through contributions on labor income. However, more pensions are paid out already at young age. But this

requires to increase contributions or to run public deficits. Thus, current (and future) generations of workers need to be highly taxed to favor the current generations of early retirees. Since this (Ponzi) scheme cannot be sustained forever, some future generations will have to experience a cut in their pension

benefits (with respect to the previous generations' benefits), or an increase in the retirement age, despite having paid high contributions.

In the early xx century societies, the initial design of pension systems was characterized by a relatively high retirement age, particularly if compared to the average life longevity of the time, since workers in urban areas and peasants in rural areas used to work until very old age. Over time, this initial choice largely changed both because of modifications in the individual behavior and because of major reforms in the pension systems. Figure 3 presents a chart describing the interactions between policy choice, individual decisions and external shocks. The major reforms of the Italian pension system are discussed in the next session.

3. How to monitor and reform a pension system

Pension system are not monoliths, but living entities that change over time. Variations in individual behavior, such as labor and retirement decisions, automatically modify these pension schemes. Other automatic modifications are induced by longevity gains, which increase the average number of years during which pensions are paid, and thus raise also total pension spending. Pension reforms are instead implemented by policy-makers to respond to external challenges, such as new supranational tight budget constraints, demographic dynamics featuring higher longevity and lower fertility, and labor market reforms.

The most important recent phenomenon that represents an external challenge to the initial design of pension systems and required a policy response by policy-makers is population aging. Population aging is driven by two demographic trends: a large reduction in mortality rate at old age and a contemporaneous drop in fertility rate. This double dynamics reduce the total population and, most importantly for the working of a PAYG pension system, increase the old age dependency ratio, i.e., the ratio of elderly individuals (aged 65+) to working age individuals (18-64 years old). Figure 4 provides some evidence on the expected increase in the old age dependency ratios in OECD countries.

What is the automatic and immediate impact of the aging process on a PAYG pension system, and how do policy-makers react? For a given initial design of a pension system – for instance, a DB PAYG pension system with retirement age at 65 years – aging increases the number of retirees and reduces the share of workers. This is a mechanical effect, since the size of the cohorts of individuals older than 65 increases, while the size of the young cohorts shrinks. This effect is visible at Figure 5 for the case of Italy in 2000 and in 2050. In absence of a policy reform, aging would thus induce an increase in total pension spending and a reduction in total contributions – thereby leading to a budget deficit of the pension system.

The policy measures to react to this exogenous demographic shock are mainly of three types: (i) to increase the contribution rate to finance pension benefits

of unmodified generosity; (ii) to reduce the generosity of the pension benefits, in order to reduce the total amount of pension spending to be financed, and (iii) to increase the retirement age, so as to increase the working life – and thus the number of years during which individuals contribute to the system, and to reduce the retirement time – and thus the number of years during which individuals receive a pension. Or a combination of these three policies.

Which reform pattern to undertake has a large bearing on the distribution of the reform costs among the different generations. An immediate drop in pension generosity reduces the well-being of the current generation of retirees. An increase in the contribution rates allows the current pensions generosity to remain constant – thereby leaving current retirees unaffected – but increases the tax burden on current (and future) generation of workers. Increasing retirement age leaves the current retirees unaffected, but imposes a cost on all other generations.

Economic principles suggest that to reduce the reform costs, individuals should be given enough time to adjust to these changes. This rational thus seems to suggest that elderly individuals' pension rights should be grandfathered, since these people have less time to react. Several reforms have indeed followed this route, by featuring long transition periods that allowed elderly workers to escape from any reform cost (see Galasso, 2006). Yet, this mechanism has two drawbacks. It reduces the immediate effectiveness of the reform measures – for instance, the targeted cut in pension spending – and it concentrates the costs only on young and future generations. A large literature on the political economics of pension reforms (see Galasso, 2017, for a review) has emphasized that the negotiation on how to share the cost of reforming across generations is largely a political decision. Interestingly, aging modified also the political force – and thus the bargaining power – of the different generations. An older electorate means that more political power is held by elderly individuals, who care the most about pensions. Because of aging, the pivotal individuals in the political process will thus become older. Reforming the system to take care of the needs of young generations will thus become more difficult.

4. Evidence based policies: a recent example

In the last 25 years, Italy has experience a long sequence of reforms of its PAYG pension system, all aimed at guaranteeing its financial sustainability in a demographic scenario of strong population aging (and low economic growth). Most reforms have increased retirement age and tightened the eligibility requirements for early retirement pensions that are based on the number of years of contributions. Often, the rights of the elderly workers have been grandfathered, thanks to long transition periods.

The 1992 Amato reform has gradually increased the retirement age from 55 to 60 for females and from 60 to 65 for males, with a minimum required contribution of 20 years. In 1995, the Dini reform has introduced a notional defined contribution (NDC) system, which replaced the previous defined benefit (DB) scheme, but only for those individuals who entered the labor market after 1995. In this NDC scheme, retirement age was flexible – between 57 and 65 – and pension benefit generosity was adjusted accordingly. In 2004, the Maroni reform abolished this flexibility. For workers not covered by the 1995 Dini reform, retirement age for an old age pension increased from 57 to 60 for females and to 65 for males. In 2007, a new reform modified early retirement eligibility: the sum of the worker's age and of the number of years of contributions had to be at least 95 and the worker at least 57 years old. In 2009, the Berlusconi government introduced an automatic mechanism that, every three years, increased retirement age in accordance to the increase in the expected longevity (at age 60). This mechanism led to a one-year immediate increase in retirement age. In 2011, the Fornero-Monti reform was implemented as a response to the financial crisis. Retirement age immediately increased to 66 years for males and was set to increase for females too, until the two retirement age would converge in 2018 at 66 years and 7 months. Eligibility for early retirement pensions was also tightened: workers had to be at least 62 years old and have at least 42 years of contributions (41 for females).

All these reform measures had a strong impact on the effective retirement age and on the employment rate of the elderly workers. The increase in the retirement age is a common phenomenon for many countries (see figure 6). But in Italy the employment rate of male workers aged 55-64 has quickly increased from 39% in 2000 to almost 60% in 2015. This large change led to strong pressure for more flexibility at retirement. This demand of flexibility comes from firms, unions, workers and political parties. Large companies may need to increase their productivity through restructuring that includes dismissing elderly workers. Workers may need (or wish) to retire sooner than allowed, due to health or family reasons.

How to respond to this social and political pressure for more flexibility at retirement? Three main options were available: (i) to reduce the retirement age without modifying (or with little change to) the pension benefits; (ii) to reduce the retirement age with a full (or almost full) actuarially fair reduction of the pension benefits; (iii) not to modify the statutory retirement age, but to design a market based scheme that allows individual to leave their job, but still have a monthly flow of resources.

What are the pros and cons of these three options? Policy-makers need to evaluate the adequacy of the policy response to the initial demand of flexibility, but also its impact on the short-run and long-run financial sustainability of the pension system, as well as its effect on the equilibrium among the subsequent generations of workers.

The first option was initially proposed in 2013 by a parliamentary group. This proposal weakened the eligibility requirements for the early retirement pension, by reducing the number of years of contributions needed to obtain a pension to 35 and the retirement age to 62 years and 7 months. Pension benefits would be reduced by (at most) 2% per year – thereby not being actuarially fair. This advantageous early exit from the labor market would be only offered to individuals whom pension benefits were 1.5 times higher than the social pension. This meant that the proposed policy would possibly affect almost half of the pensions. No penalty on pension benefits or retirement age would apply to retiring individuals, who had more than 41 years of contributions. The estimated impact of this proposal on public pension spending was sizable: €36 billion in three years and €150 billion in ten years.

The second reform option was formulated by the Italian social security administration (INPS) in 2015. Workers aged at least 63 years and 7 months (an age limit linked to the increase in the average longevity) and with at least 20 years of contributions could access early retirement pensions, but only if their pension benefits were 3 times higher than the social pension. Pension benefits were diminished by 3.1-3.5% per year – hence, almost an actuarially fair reduction. The requirement on the pension benefits restricted the pool of possible beneficiaries to less than 15% of total retirees. Due to this limitation and to the larger reduction imposed on the pension benefits, the estimated cost of this reform measure was equal to €39 billion in ten years – and was thus much lower than in the previous case. Moreover, the INPS policy proposal included also additional measures to finance, at least partially, this increase in pension spending. The main measure consisted in the reduction, by 3.1-3.5% per year, also of the early retirement pensions paid out according to the current legislation – thus to male (female) individuals with 42 (41) years and 10 months of contributions. This restrictive policy measure would have reduced pension spending by €16 billion in ten years, thereby limiting the overall increase in pension spending induced by the entire reform package to €23 billion in ten years.

Faced with these two costly options and a tight budget constraint, in 2016, the policy-maker explored an alternative route to respond to the demand of flexibility by designing a mix of policy measures: a market-based-early-retirement-option (APE volontario), a social-based-early-retirement-option (APE sociale) and a private-fund-based-early-retirement-option (RITA).

The social-based-early-retirement-option (APE social) gives a social transfer equal to their future pension (with a ceiling of €1500 per month) to workers aged at least 63 years (linked to the increase in the average longevity) and with at least 30 years of contributions, if these workers have health issues or are in economic need. This includes long-term unemployed, workers with a level of handicap above 74% or supporting not self-sufficient (close) relatives and workers in arduous or hazardous jobs. Moreover, individuals in one of these

conditions, who started to work and to contribute before turning 18 years old, can retire early with 41 years of contributions.

The market-based-early-retirement-option (APE volontario) is instead a fixed-interest rate monthly loan of a duration ranging between six months and three years and seven months, which the individual repays in twenty years, beginning upon retirement, with withdraws from their pension benefits. To be eligible for this loan, workers have to be at least 63 years (linked to the increase in the average longevity), to be within 3 years and 7 months from the normal retirement age, to have at least 20 years of contributions, and to have a pension benefit above a certain threshold. Together with the loan, individuals buy a life insurance against the risk of death prior to the repayment of the loan. This market-based mechanism is subsidized with a fiscal credit equal to 50% of the total cost of the insurance premium and of the interests. This subsidy reduces the private cost of the market-based instrument, which becomes comparable to an actuarially fair reduction – namely, around 4.5% per year.

The private-fund-based-early-retirement-option (RITA) uses the same eligibility requirements as the market-based-early-retirement-option (APE volontario) and allows workers with a private pension fund to use it – partially or entirely – to finance a monthly payment until retirement. A fiscal incentive is also introduced, which reduces the tax rate on the pension income withdrawn.

The estimated impact of this entire package – consisting of a market-based-early-retirement-option (APE volontario), a social-based-early-retirement-option (APE sociale), a private-fund-based-early-retirement-option (RITA) and few additional measures – was equal to €8.4 billion in ten years.

The decision by the policymaker to adopt this package of policy measures, as opposed to the two other options described above, was hence driven by two crucial elements: a positive evaluation of the social demand for more flexibility at retirement, but also a contemporaneous attempt to keep pension spending under control. Since all three policy options represented a response to this social need, the precise quantitative appraisal of the costs and benefits of three policies was pivotal for the final decision.

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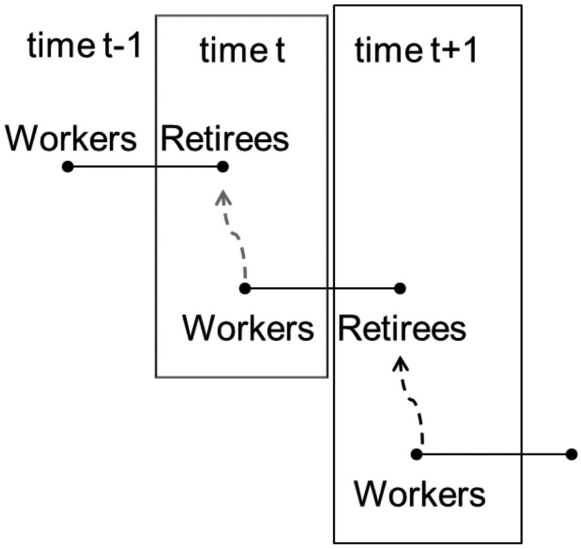

Figure 1: PAYG Pension System Flow of Resources

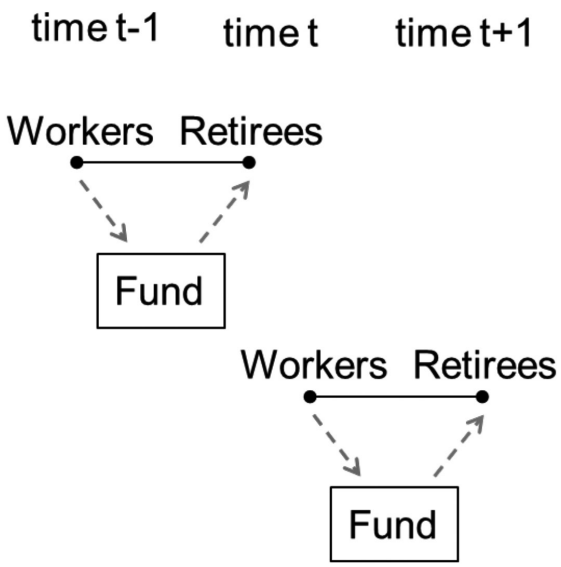

Figure 2: Fully funded pension system flow of resources

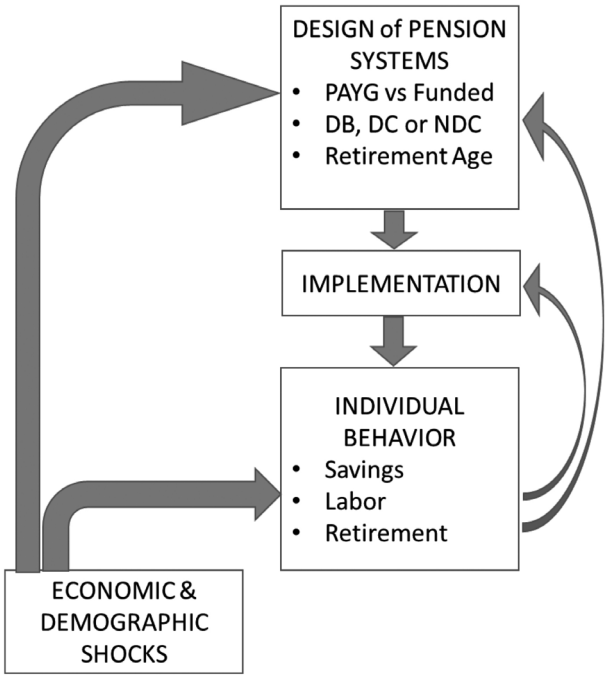

Figure 3: Decision chart

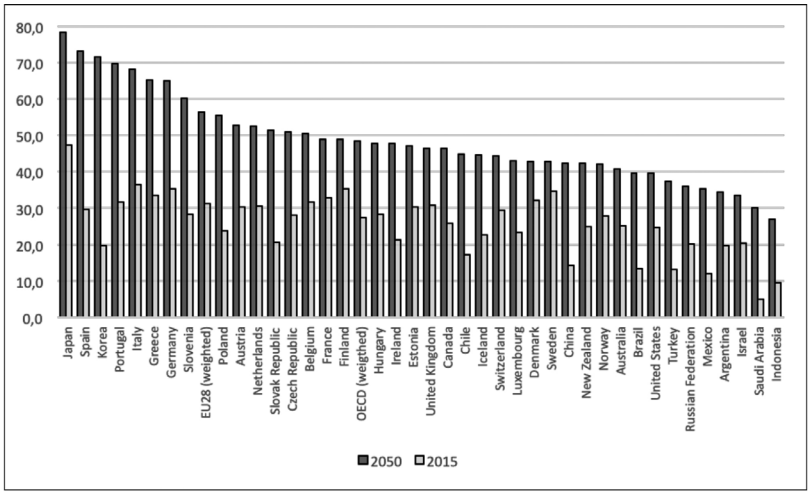

Figure 4: Old age dependency ratio, 2015 and 2050
Source: OECD Pensions at glance (2017)

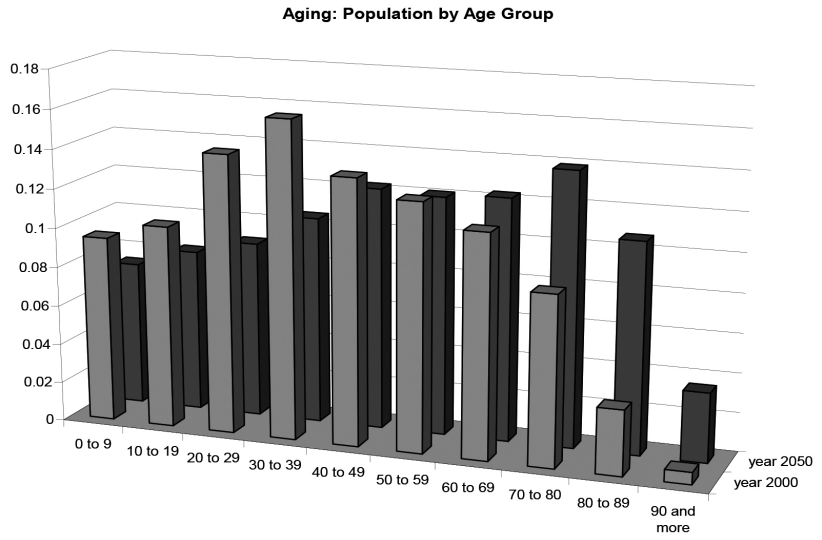

Figure 5: Population pyramid in Italy, 2000 and 2050

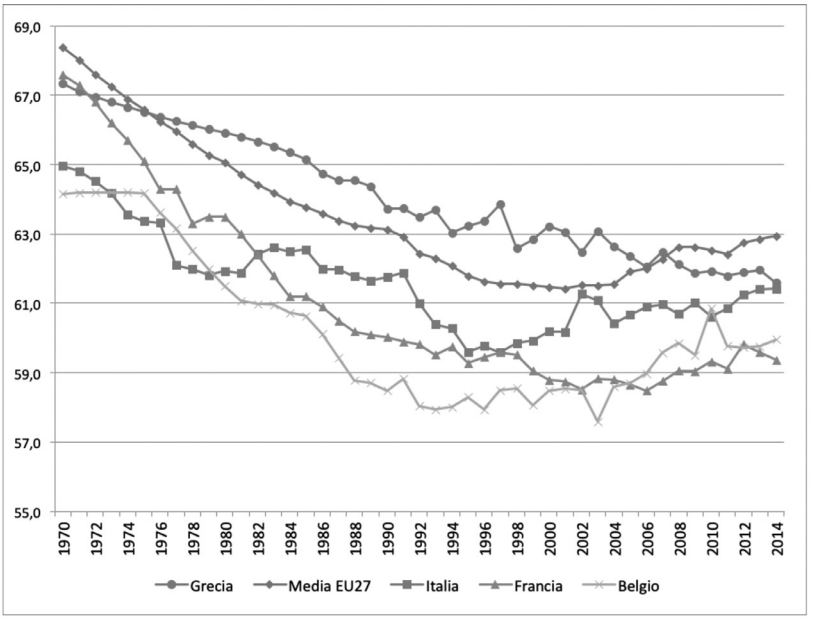

Figure 6: Effective retirement age, males 1970-2014
Source: OECD Pensions at glance (2017)