

# Pensions, Economic Growth and Welfare in Advanced Economies

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# 01

## Introduction

# Introduction

- In this presentation we analyse the **effects on welfare** of pay-as-you-go (PAYG) and funded pension systems.
- The debate on the choice between alternative systems focuses on **their effects on welfare determinants**, such as:
  - savings and capital accumulation,
  - labour supply and demand,
  - economic growth, and
  - inequality
- We discuss the **potential benefits of mixed systems in which a PAYG system with notional accounts** is complemented by a **funded pensions system**

## Introduction: main messages

- The redistribution of income among individuals makes the **PAYG system an important part of any mixed system**
- The design of the pension system should efficiently **balance incentives and distortions with equality and insurance** against individual idiosyncratic risks
- **Funded systems usually generate positive effects** on the savings rate, capital accumulation, productivity and the labour supply, that should be taken into account to **improve PAYG systems with notional accounts**
- **Income distribution among older people** does not clearly depend on the relative importance of PAYG over funded systems: **other factors are even more important**
- There are **significant differences among advanced economies** in their social preferences on replacement rates in PAYG systems and contributions to funded systems.
- There is no guarantee that, regardless of social preferences, imposing a **target of pension expenditure on GDP** maximizes social welfare

# Introduction

Other things equal, welfare increases with the average pension and decreases with inequality

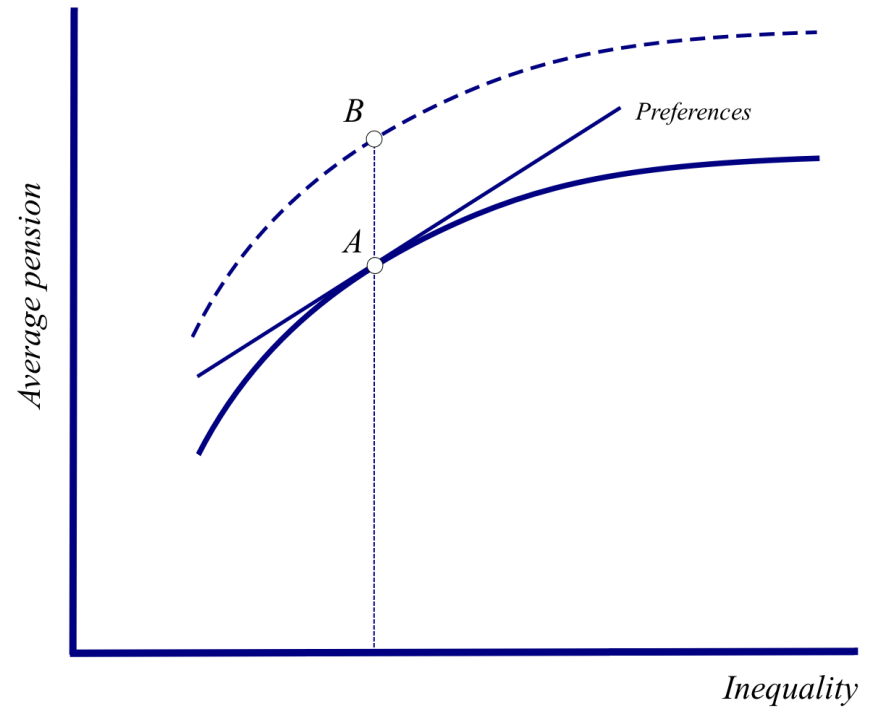
Higher levels of **contributiveness can lead to higher average pensions at the expense of greater inequality** in the incomes of pensioners, with diminishing returns

The optimal choice is given by *A*, the tangent point of preferences with the possibility frontier

An increase in **efficiency** of the economy, in general, and in the pension system, in particular, shifts the frontier making possible higher pension with the same inequality (*B*)

The experience of most advanced countries suggests that social preferences end up with a **combination of different pension systems** (PAYG and funded, public and private)

## Pension systems and welfare



Devesa and Doménech (2017)

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# 02

**Pension systems, savings,  
employment and economic growth**

## The interaction between pension system and economic growth

- In general, **the interaction between economic activity and pension systems is bi-directional**:
  - From economic growth to pensions
  - From pensions systems to economic activity
- In a dynamically efficient steady-state equilibrium, we have that the internal rates of returns are given by:

$$r = \rho + \sigma g > n + g$$

Funded system      PAYG system

where  $n$  is the rate of growth of population,  $g$  labour productivity growth,  $\rho$  the intertemporal discount rate and  $\sigma$  the coefficient of relative risk aversion

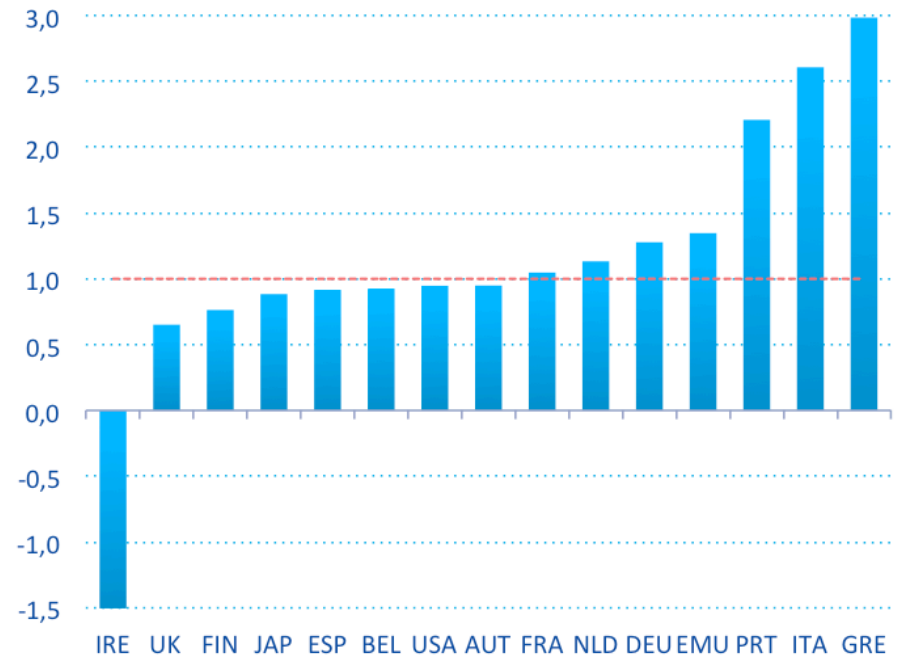


## Economic growth and internal rates of returns of pension systems

The general view is that the internal rate of return of a funded system is greater than in a PAYG system

For example, in the case of the average interest rate of public debt, the spread with respect to GDP growth has been around 1%

Average interest rate of public debt minus GDP growth, 2002-2015



[Doménech and González-Páramo \(2017\)](#) based on AMECO

## The effects of pension systems on savings

- With some exceptions (e.g., [Orszag and Stiglitz, 2001](#)), one of the benefits usually granted to the funded system over the PAYG system is the **increase in the savings rate** (see, for example, [Feldstein, 1974](#), or [Lindbeck and Persson, 2003](#)).
- In a closed economy, **higher saving rates** will increase productive capital, GDP per worker and productivity growth.
- However, the **empirical evidence have not found clear results on the effects of the pension system on national saving**, ...

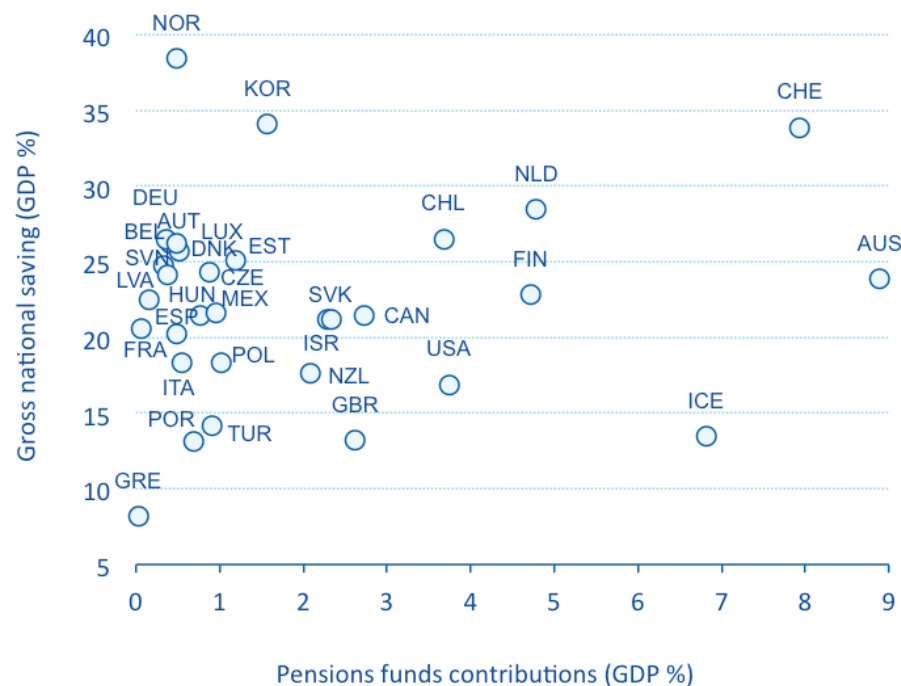
... individuals may be **replacing some forms of savings with others**, as pointed out by [Feldstein and Liebman \(2002\)](#)

# The effects of pension systems on savings

There is no correlation between contributions to funded schemes, as a percentage of GDP, and national savings rates in OECD countries

Other determinants of the saving rates are possibly more relevant

**Contributions to funded schemes and national savings rates in the OECD, as a percentage of GDP**



Averages between 2007 and 2015.  
Own elaboration using data from OECD, AMECO and the World Bank.

## Pension systems and employment

- The choice of the pension system can also influence the **labour supply**.
- PAYG system requires **taxes that may have distorting effects on economic activity ...**  
... depending on **how agents internalise the relationship between social security contributions and future pensions** (see [Disney, 2004](#), or [Melguizo and González-Páramo, 2012](#)).
- **Tax distortions** can affect both the number of **workers employed** (known as the extensive margin of the labour market) and the **number of hours worked** per adult (intensive margin)
- [Prescott \(2004\)](#): differences in the tax burden may explain **differences in hours worked** per adult between the **US and several European countries**
- Rogerson ([2006](#) and [2008](#)) has shown that taxation, along with technology, can account for these differences in the intensive margin between the US and Europe

## Pension systems and employment

- Ohanian, Raffo and Rogerson (2008) changes in taxes on labour income account for a significant part of the trend differences in the hours worked in a sample of **21 OECD countries from 1956 to 2004**
- However, Pissarides (2007) and Rogerson (2007) have noted the differential effects in USA and continental Europe with respect the **Scandinavian countries**
- **Effects of taxes on employment or unemployment:** as Doménech and García (2008) and Feldstein and Liebman (2002) argue, empirical results **depends on whether workers internalise or not** the public goods and services received in return for the taxes they pay
- **Notional accounts** increase the contributiveness and the transparency of the system, **reducing the distorting effects of social contributions as a tax wedge** (Lindbeck and Persson, 2003, or Buyse, Heylen and Van de Kerckhove, 2013).

## Pension systems and macroeconomic performance

- Given the **different effects of taxes** on consumption and savings decisions and on the demand and supply of labour, other macroeconomic aggregates (GDP, current account balance, etc.) also end up being affected
- Boscá, Doménech and Ferri (2013) show that the **ratio of social security contributions to implicit tax rates on consumption** generate a bias towards current account deficits and negatively affect GDP, employment and capital accumulation
- Some countries, such as **Denmark**, have tried to avoid the distortionary effects of social security contributions, by opting to finance public pensions mainly through other taxes
- **In summary, the choice of a PAYG pension system over a funded system can give rise to different effects on national saving, investment, labour supply and demand and, ultimately, on economic growth**
- **Empirical evidence varies over countries depending on different features of the pension system, such as efficiency, fairness and redistribution**

# 03

**The balance between fairness and  
efficiency in pension systems**

## Pension systems and fairness

- **Efficiency** can be defined as the set of features that make contributions to the pension system attractive and do not discourages participation (Alonso and Pazos, 2001)
- At the same time, workers who contribute must perceive the system as being **fair and equitable**, achieving higher contributiveness and replacement rates (Devesa et al, 2012)
- According to the European Commission (2015a) there are **three definitions of fairness**:
  1. **Intergenerational fairness**, adjusting key variables and retirement so that the old age dependency ratio is kept reasonably constant as population ages.
  2. **Social fairness**: better balance between retirement and working years.
  3. **Actuarial fairness**: a closer relationship between the present value of the pensions received during retirement and the contributions paid while the pensioner was working.



## Pension systems and intergenerational fairness

- In many countries, the PAYG system guarantees a **similar effort by each generation**, which does not necessarily translate into an **equal replacement ratio**, since the dependency ratio may vary => **Fairness in benefits vs fairness in effort**
- Assume the equilibrium of the PAYG, such that

$$I = G \Rightarrow \tau wL = p^m P \Rightarrow \frac{p^m}{w} = \tau \frac{L}{P}$$

where  $p^m$  is the average pension,  $P$  the number of pensions,  $L$  the number of social security contributors, and  $\tau$  social security revenues over aggregate wage incomes ( $wL$ )

- In a **defined contribution** system, the tax rate is exogenous and constant (equal effort across generations) and the benefit ratio ( $p^m/w$ ) adjust for changes in the dependency ratio
- In a **defined benefit system**, the tax rate is endogenous, adjusting to any change in wages and in the dependency ratio and ensuring a exogenous path for  $p^m$

## Intergenerational fairness, adequacy and sustainability

- The challenge is to achieve **intergenerational fairness without jeopardising the sustainability and adequacy** of pensions
- Welfare and economic growth in a PAYG system are also affected by **sustainability risks**
- Assume that

$$\frac{p^m}{w} \geq \tau \frac{L}{P}$$

Growth and welfare may be affected by **uncertainties** on the components of this equation

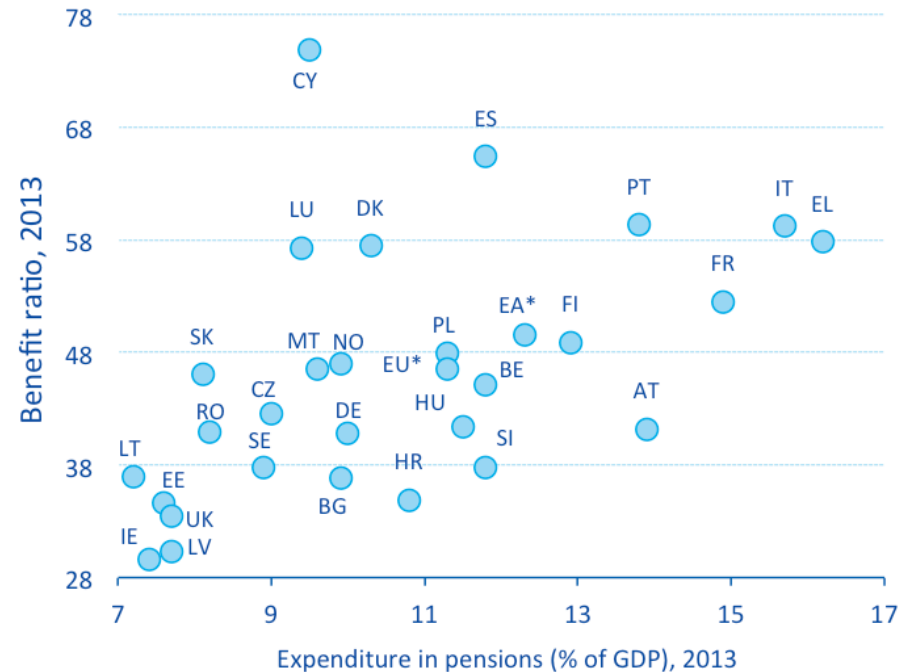
- Current and expected deficits may increase **risk premia and tighten financial conditions**, affects adversely to investment, job creation and growth.
- Expectations of future deficits as a result of the increase in the **dependency ratio**
- The decline in the benefit rate ( $p^m/w$ ) or an increase in the tax burden ( $\tau$ ) to restore the sustainability results in **welfare losses of current workers or future taxpayers**.

## Intergenerational fairness, adequacy and sustainability

There is a huge heterogeneity among European countries in the benefit rate and the tax burden (approximated by spending on pensions over GDP)

The positive correlation between these two variables shows that there is no such thing as a free lunch: a higher benefit entails a higher tax burden

Benefit rate ( $p^m/w$ ) and pension expenditure as a percentage of GDP in the European Union, 2013



Source: own elaboration from data from the [European Commission Ageing Report \(2015b\)](#)

## Intergenerational fairness, adequacy and sustainability

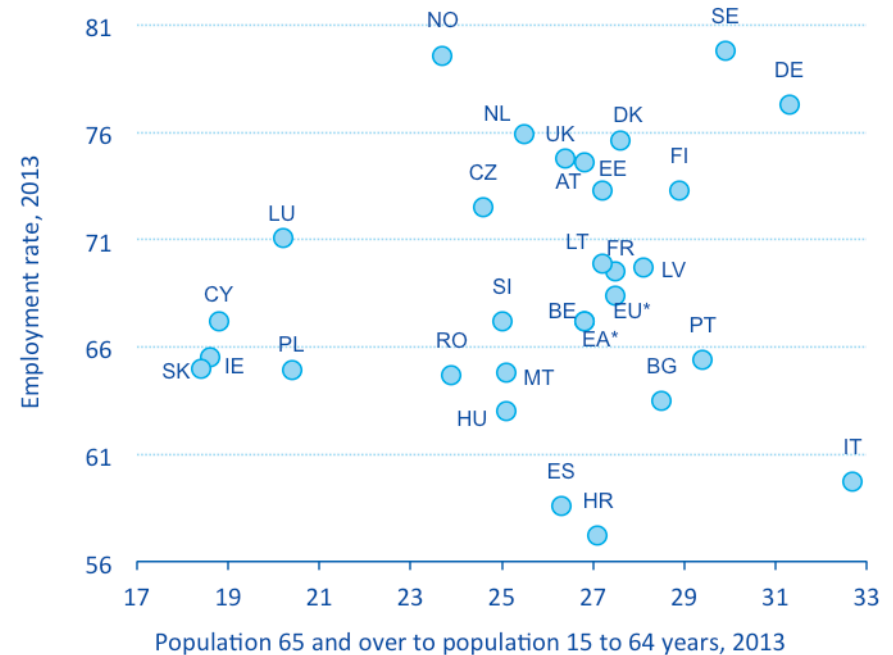
Increasing the employment rate (higher efficiency in the labour market) helps to balance expenditures with revenues

With similar dependency ratios, we find countries (e.g., Italy and Spain vs the Nordic countries and Germany) with very different employment rates

Reforms that improve labour and product markets regulations (Blanchard and Giavazzi, 2002, or Layard, Nickell and Jackman, 2005, Doménech, García and Ulloa (2016)) increase employment rates

Some countries with higher employment rates opted for less distortionary taxation (Denmark) or notional accounts (Sweden).

Employment rate ( $L/WAP$ ) and dependency ratio ( $L^{65+}/WAP$ ) in the European Union, 2013



Source: own elaboration using data from Eurostat

# 04

**Redistribution, efficiency and  
contributiveness**

## Redistribution, efficiency and contributiveness

- Although greater **efficiency and contributiveness** of the pension system has positive effects on economic growth, this does not necessarily increase **social welfare**
- In **the absence of imperfections and disturbances**, a purely contributory system would be theoretically efficient and would not generate inequality
- However, in practice, **shocks can have permanent effects on** the income of workers, with significant distributional consequences.
- As funded systems are proportional to the savings accumulated, they tend to **perpetuate the effects of these shocks**
- The **PAYG system is a good solution to risks in individual decisions** that can affect insurance for old age and to the inequality of opportunity ([Diamond, 2004](#))
- The average income of pensioners is only an incomplete indicator of aggregate welfare, if we do not consider other important aspects, such as the **inequality**

## Redistribution, efficiency and contributiveness

- As shown by **Jones and Klenow (2016)** for a sample of 152 countries, some countries with **lower income** per capita achieve similar levels of welfare, due to **lower inequality**
- One of the **challenges for the pension system** is to achieve the right balance between **efficiency and contributiveness**, on the one hand, and **redistribution**, on the other, to maximise social welfare levels.
- The contributory part of the PAYG system should be financed by social security contributions, in a clear, simple and transparent way, making these contributions a deferred salary, as **notional account systems** try to achieve
- Non-contributory benefits that reduce inequality (e.g., minimum pension complement) should be financed by taxes.
- Some countries even **finance part of the contributory pensions with general taxes** to promote employment and economic activity. In **Denmark** social security contributions barely accounted in 2013 for 0.2% of GDP, while spending on pensions reached 10.3% of GDP.

## Redistribution and contributiveness

- How can we determine the **degree of redistribution and contributiveness**?
  - If all pensions were equal, regardless of the contributions made during workers' life, **contributiveness would be zero and redistribution would be maximum**
  - **Contributiveness would be maximum** if pensions were directly proportional to the social contributions made and if non-contributory benefits are absent
- **Measuring the degree of redistribution**: the OECD (2013) has proposed a **progressivity index (PI)** for the mandatory pillar (public or private) of the pension systems of its member countries, based on the proposal made by Musgrave and Thin (1948)

$$PI = 100 - 100 \frac{Gini^P}{Gini^W}$$

where  $Gini^P$  and  $Gini^W$  are the Gini coefficients of public pensions in the mandatory pillar and of national income respectively

- If  $Gini^P = Gini^W$  then  $PI = 0$ . If pensions are all equal,  $Gini^P = 0$  and  $PI = 100$ .



# Redistribution of the pension system

In almost all the countries inequality of pensions is lower than that of national income

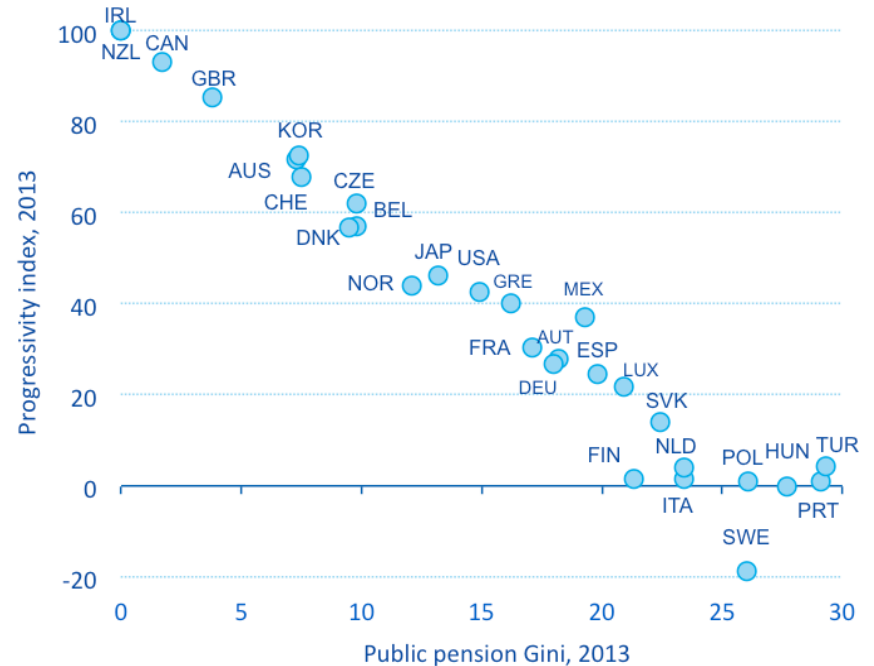
There is a clear negative relationship between inequality in the distribution of pensions and the progressivity index.

At one extreme, Ireland and New Zealand, where public mandatory pensions are equal for all pensioners

Countries with different replacement rates have similar Gini coefficients for public pensions

The presence of a compulsory contributory part does not correlate pensions inequality ( e.g., Denmark vs Sweden)

Gini coefficient of public pensions and the progressivity index in the OECD in 2013.



Source: own elaboration using data from [OECD \(2013\)](#)

## Redistribution of the pension system

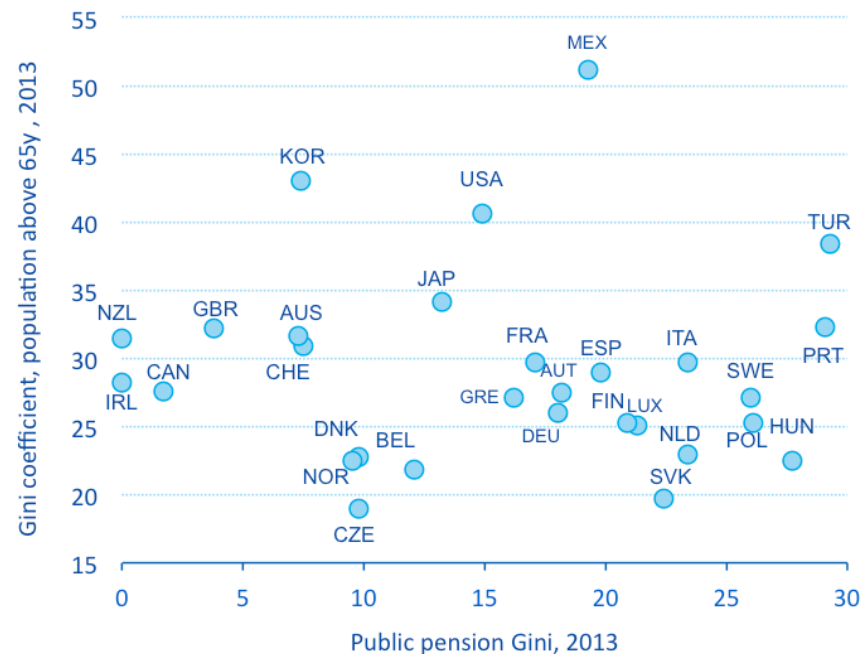
Is it better to be in a position closer to Ireland and New Zealand or, conversely, to Portugal or Sweden? No normative conclusions can be drawn from the *PI*

The *PI* does not take into account the pensions provided by the private system

It is not possible to compute how much of the total income inequality is explained by the inequality of pensions, only its correlation

Countries that were at the extreme ends of the *PI* ended up having a similar inequality when all sources of income, transfers and taxes are taken into account

Gini coefficients for public pensions and disposable income for the population aged over 65 after taxes and transfers, OECD 2013



Source: own elaboration using data from from the [OECD Income Distribution and Poverty Database](#)

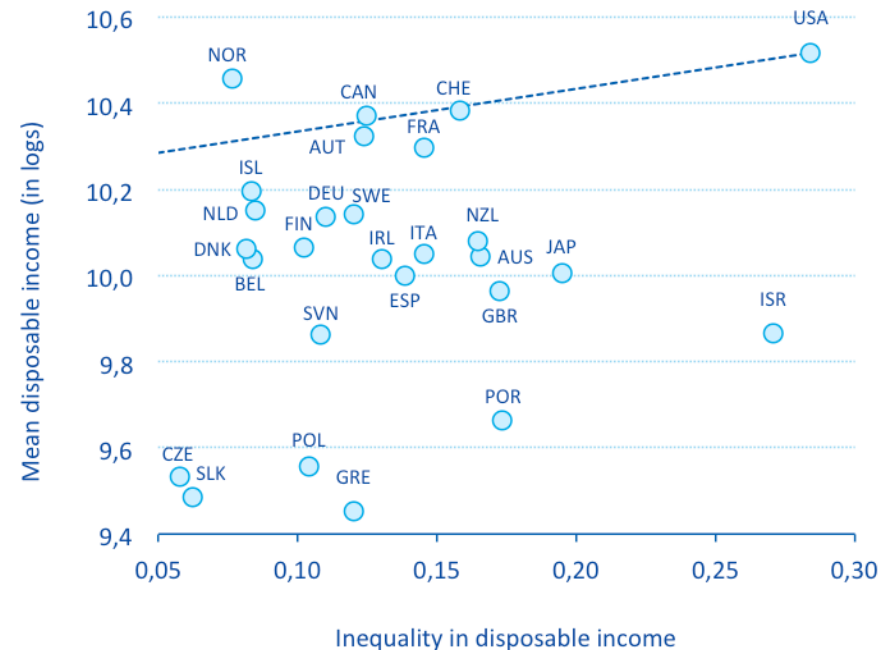
## Redistribution, average pensions and welfare

The line with the positive slope represents the iso-welfare curve that crosses the point for the US, with the combinations of inequality and income (in logarithms) that keep social welfare constant

The iso-welfare line has been obtained using the approach proposed by Jones and Klenow (2016), under the assumption that life expectancy and leisure remain constant

Under these assumptions, social welfare in the US is similar to that of Switzerland, Canada or Austria: the reduction of inequality compensates the lower average disposable income (20 percent lower than in the US)

### Mean disposable income and its inequality after taxes and transfers, for the population aged over 65, in the OECD 2013.



The straight line with a positive slope represents the combinations of income and inequality that keep social welfare constant according to the approach proposed by [Jones and Klenow \(2016\)](#).

Source: own elaboration using data from the [OECD Income Distribution and Poverty Database](#)

## Redistribution, average pensions and welfare

- It seems reasonable to think that **neither extreme equality** (at the expense of a lower contributiveness) **nor extreme contributiveness** (at the price of greater inequality) **are optimal**
- Le Garrec (2012) shows that **greater progressivity in the pension system leads to less inequality but at the cost of lower growth**, as a result of disincentives and distortions that we have analysed in the sections above
- At the same time, **very high inequality also ends up hurting long-term economic growth**, as argued by Andrés and Doménech (2015)
- Therefore, in this trade-off between equality and contributiveness, **an intermediate situation will surely allow higher levels of social welfare** to be achieved, but ultimately the final choice depends on **social preferences and the existing political economy constraints**
- Contributiveness and equality can be simultaneously increased improving the **efficiency of the labor market and ex-ante redistribution**

# 05

## Conclusions

## Conclusions

- We have analysed the effects of PAYG and funded pension systems on growth and welfare
- Funded systems usually generate usually positive effects on the rate of **savings, productivity and employment**, avoiding some of the distortions generated by taxes
- **Distortions and incentives should be taken into account** to the PAYG system with **notional accounts**, to increase the link between social contributions and future pensions
- The design of the pension system needs to seek an **efficient balance** between the economic and social effects of **distortions and incentives**, on the one hand, and **equality and insurance against idiosyncratic risks**, on the other
- There are theoretical arguments for expecting PAYG systems to achieve a more equitable distribution of income, in practice **equality seems to depend more on other determinants**, in particular, the **efficiency of the labour market**.
- There are significant **differences** among advanced economies in their **social preferences** regarding the combination of **replacement ratios and contributions to funded systems**

## Conclusions

- There are sufficient arguments for a well-designed **PAYG system to remain a fundamental part of the pension system**, using **notional accounts and minimum pensions** that are sufficient to reduce inequality and eliminate the risk of social exclusion
- The **changes** required to move in that direction need to be **implemented gradually**, but as quickly as possible and with maximum transparency
- As some countries already have done, PAYG systems should be **complemented with individual funded accounts with automatic enrolment**, with contributions from both workers and firms, regardless of whether the management of these accounts is public or private

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