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## **Evaluating the possible impact of pension reforms on elderly poverty in Europe**

Grech, Aaron George

London School of Economics, Central Bank of Malta

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# **Evaluating the possible impact of pension reforms on elderly poverty in Europe**

## **Abstract**

Since the 1990s reforms have changed substantially both the nature of state pension provision and the level of generosity. This article tries to assess the impact of these changes using estimates of pension wealth for a number of hypothetical cases. By focusing on all prospective pension transfers rather than just those at the point of retirement, this approach can provide additional insights, especially on the impact of changes in benefit indexation.

These estimates corroborate existing evidence that reforms have decreased generosity significantly. Moves to link benefits to contributions have made systems less progressive, raising adequacy concerns for certain groups. The reforms have, in particular, strengthened the need of ensuring better access to labour markets, of having in place adequate crediting arrangements and minimum pensions.

Keywords: Social Security; Public Pensions; Retirement; Poverty; Retirement Policies.

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## Introduction

In recent decades many European governments have radically changed their pension systems, carrying out significant reforms meant to ensure sustainability.<sup>1</sup> As reducing the impact on future spending was frequently the main aim of these changes, it is not surprising that most early studies focused on this aspect.<sup>2</sup> However, there is a growing body of evidence which suggests that these reforms may have adverse implications on future pension adequacy, particularly as they hit disproportionately entitlements of those groups less able to accommodate the effects of benefit cuts.<sup>3</sup> While the standard measure of the fiscal success of a reform – reduced spending<sup>4</sup> – is well-known, there is no similar consensus on how best to measure whether entitlements will remain adequate.<sup>5</sup> The indicator typically used by international organisations – theoretical replacement rates - focuses specifically on generosity at the point of retirement. While some reforms have tended to result in lower initial benefits,<sup>6</sup> in many occasions a more substantial cut has occurred in later transfers, as reforms to indexation of pensions in payment have made pensions lose more of their relative value over time.<sup>7</sup> The impact of these changes is not gender-neutral as women live longer than men, and increases in line with longevity.

This article, after reviewing some of the existing literature, will try to address this issue by presenting evidence on the impact of reforms on pension wealth – the value of all prospective pension transfers received during retirement – in ten European countries. In doing so, it will try to take into account of gender labour market and income differences, as the effect of reforms on full career entitlements tends to be weaker than the impact on those with incomplete careers and on low incomes.

## **1. A review of studies assessing the impact of reforms on pension adequacy**

European Commission (2006) notes that while declining pension generosity can contribute positively to fiscal sustainability, this decrease may raise concerns about the adequacy of public pensions that could translate into future pressures for higher public spending.<sup>8</sup> This reflects the underlying thinking of the agreement reached in 2001 between EU Member States on common objectives on adequate and sustainable pensions. As part of the open method of co-ordination (OMC) - a voluntary process for political cooperation, progress is measured by monitoring agreed indicators. Member States prepare national reports, which are assessed by the Commission and Council and reflected in joint reports.<sup>9</sup> In 2012 this culminated in the Commission preparing a white paper on pension reform.<sup>10</sup> The main indicator through which pension adequacy is monitored is the change in the projected theoretical net replacement ratio over the next 40 years.<sup>11</sup> The latter is defined as the level of pension income the first year after retirement as a percentage of individual earnings at the moment of take-up of pensions for an assumed hypothetical worker, who in the so-called 'base case' has a given earnings and career profile (male earning average wage constant over his fulltime 40 years career, retiring at 65).<sup>12</sup>

### *TABLE 1*

Table 1 presents estimates for some selected countries and the EU average presented in the EU's 2012 pension adequacy report. These suggest that at present, on average across the EU the net replacement rate for the base case is 79%. While the Commission has never commented on adequate levels for replacement rates, the ILO and the World Bank suggest that the minimum threshold should be between 40% and 45%.<sup>13</sup> Though by 2050, the EU

projections suggest a cut of slightly more than a seventh in the net replacement rate; this would remain well above these benchmarks. However as Blondell & Scarpetta (1999), one of the first studies of cross-country theoretical replacement rates, points out there is no such thing as a single replacement rate in any national pension scheme. This heterogeneity is quite evident from table 1, which includes some other estimates prepared by the Commission on outcomes assuming different characteristics.

Pension systems offer different outcomes depending on pre-retirement income and the contributory record. For instance, in the UK current replacement rates for those on high incomes are just above two-thirds those for someone on average income, while they are nearly equivalent in Italy. The generosity for those on low incomes tends to be higher than that for the average person – particularly in Eastern European countries at present. Yet this may be deceptive as these estimates assume a full career, which is highly unlikely for those on low incomes. A ten-year career break reduces the average net replacement rate for someone on average earnings by about a fifth across the EU. In some countries, like Slovakia, even a three year break to take care of children results in a significant loss. The projections in table 1, moreover, suggest that career breaks will result in even higher penalties by 2050. Even if people were to retire later, on average, the net replacement rate would still be lower than it is at present.

The literature studying the impact of pension reforms on adequacy appears to be divided into three main strands and tends to use replacement rates as the main indicator. The first strand attempts to evaluate the impact of changes in the pension system on a population with set characteristics, while the second focuses on the impact of the same pension rules but on different population groups. The third approach tries to look at the impact of different pension rules on different population groups. Within these categories, researchers have adopted three focuses, namely studying reforms in just one country, carrying out cross-

country analysis and hypothetical reform simulations. Table 2 groups some existing studies along these dimensions.

*TABLE 2*

The most common studies are those which evaluate the impact of different pension rules on a population assuming the same characteristics. This is the approach taken by international institutions – e.g. OECD (2011), Martin & Whitehouse (2008), Holzmann & Guven (2009) and European Commission (2012c). It is also very common in single-country studies, for instance Orban & Palotai (2005) for Hungary and Coevering et al. (2006) for the UK. All of these studies develop estimates of the level of replacement rates for hypothetical individuals pre- and post-reform,<sup>14</sup> and assume that the relative income and labour market behaviour of the individuals does not change over time. While these studies report significant declines in replacement rates, most shy away from trying to assess the possible implications of this trend. There are exceptions, such as Zaidi et al. (2006) which attempt to infer from the change in replacement rates the possible impact on poverty among the elderly, arguing that the anticipated decline in generosity will increase at-risk-of-poverty rates.

This approach is however problematic as outcomes tend to differ greatly according to the characteristics of the underlying population, particularly gender.<sup>15</sup> Fultz (2006) notes that these differences can mean similar reforms have different impacts on poverty. In this light, Fultz & Steinhilber (2003) find that reforms have tended to bring greater losses of pension protection for women compared to men. Sefton et al. (2011) also note the negative impact of weak labour market participation on the pension outcomes of women. Bottazzi et al. (2006) find that pension reforms in Italy hit disproportionately younger cohorts of workers. Bridgen & Meyer (2008), looking at a group of ‘risk biographies’ in the UK – such as people with

child care responsibilities, intermittent employment and self-employment – find that despite facing the same pension system these individuals face savings rates significantly above those currently paid by most employees in order to guarantee an adequate income during retirement. There have also been a number of interesting simulation exercises such as Atkinson et al. (2002) which argue that introducing a European Minimum Pension in the five biggest EU countries would, even if the pension were set at the same level in each country in terms of purchasing power parity, impact poverty differently. Similarly, Kotlikoff et al. (2006) find that the impact of the same policy – a 30% cut in US pension benefits – differs greatly looking at 14 stylized households, with those on low incomes facing the biggest fall in living standards.

The final strand of pension reform evaluations attempts to evaluate how changes in both pension rules and the underlying population could affect poverty, income distribution and government spending. Fonseca & Sopraseuth (2006), Frommert & Heien (2006), Flood et al. (2008), Goodman et al. (2007) and Dekkers et al. (2009) suggest that reforms have led to a significant reduction in the redistributive effects of state pension systems and increased risks for those with interrupted careers and unskilled workers. All of this is happening in a context of a significant reduction in future generosity of state pensions for the average person. In fact, European Commission (2012), on the basis of official projections made by Member States, suggests that the average benefit ratio – the average pension to output per worker - is set to decline by a fifth by 2060.

Soede et al. (2004), using a static model<sup>16</sup> to study the distributive consequences of population ageing in six European countries up to 2025, find that while increasing labour participation helps improve the situation a policy focusing on financial sustainability is likely to lead to a substantial increase in poverty among the elderly. Ferraresi & Monticone (2009) adopting a similar approach but extending the analysis to another four countries and to cover

the period up to 2050 also find similar results, noting that contribution rates faced by future working age generations will have to rise substantially. Dusek & Kopecsni (2008), looking at the pension reforms undertaken since the 1990s in Hungary and Slovakia find that reforms affected different cohorts and education groups in quite peculiar ways. Reforms in Hungary favour future working age individuals, while those in Slovakia cut the entitlements of women, particularly those with low education, while raising the generosity of the system for young men with university education.

## **2. Using pension wealth to measure impacts of pension reform**

The studies summarized above appear to be in broad agreement that pension reforms enacted since the 1990s in Europe have significantly reduced generosity, particularly for certain population groups, notably women. However for the most part, these studies focus on generosity at retirement, and fail to consider that reforms will also impact differently the relative value of pensions throughout retirement. In fact, the estimates presented in table 1 suggest that while at present, on average, pension generosity for someone with a full career on the average wage declines by about one twelfth of its initial relative value after ten years, by 2050 the decline will increase to more than a tenth. Only a handful of countries, amongst them Germany and the UK, have in place indexation rules that come close to maintaining the relative value of pensions unchanged.

In this light, here we focus on the impact of reforms on pension wealth.<sup>17</sup> The latter is a measure of the lifetime value of state pension benefits; computed as the discounted stream of future pension payments during retirement weighted by the probability that the individual is still alive at a particular age.<sup>18</sup> In simpler terms, this measure involves computing the annual pension benefits over the expected lifetime of the individual – taking into account the

way legislation specifies the annual benefit will be increased over time.<sup>19</sup> This stream is then discounted so that these transfers can be expressed as a multiple of median disposable income at the time of retirement.<sup>20</sup> OECD (2009) suggests that pension wealth can be thought as the lump sum that is needed to buy an annuity giving the same flow of pension payments over the expected retirement.

Consider the case of a country where pension benefits start high, but start declining thereafter. Looking at replacement rates, this country appears to have a generous system, but older pensioners would not be experiencing this. Pension wealth by looking at overall generosity accounts for this and so can be used to assess whether annual pension transfers remain enough that individuals, on average, have an annual income that keeps them out of relative poverty throughout retirement. Of course, the potential impact of this becomes even more important with higher longevity. Pension benefits which kept individuals above the poverty threshold close to retirement may stop to do so by the time the individual reaches very advanced ages. Countries which keep all parameters unchanged, but which modify the way the benefit changes post-retirement, are still reducing generosity even if it does not show up in their replacement rate projections. Returning to table 1, while at present, over the first decade in retirement the replacement rate for the base case in Sweden falls by just 1 percentage point, in 2050 it will not only be lower at the start than it is today, but over time it will fall by 7 percentage points. On average, across the EU, the drop in replacement rates a decade into retirement will be larger than that in initial generosity.

There are two ways in which pension wealth is calculated – the empirical and the institutional approaches. The empirical method, which involves using data from income and wealth surveys, is retrospective in that it reflects current entitlements and past pension system rules.<sup>21</sup> By contrast, the institutional approach calculates prospective pension entitlements by applying the pension system's parameters for a number of stylized individuals and then

grosses up results.<sup>22</sup> This is the approach taken here to calculate pension wealth using the OECD's APEX cross-country pension entitlement model.<sup>23</sup> APEX is a static simulation model which applies parameters of pre-reform and post-reform pension systems to hypothetical individuals whose characteristics are set by the researcher.

The build-up of pension entitlements depends crucially on the institutional set-up of pensions in a country. For instance, in countries with notional defined contribution systems (such as Italy or Sweden), the accumulated pension wealth depends on the number of years during which contributions are made, the income on which contributions are paid and the notional return on contributions.<sup>24</sup> This accumulated notional fund is then divided by expected life expectancy at retirement to calculate the initial benefit, which then is modified over time according to the post-retirement indexation regime. In countries with a defined benefit system (such as Austria and France) expected life expectancy does not play a direct role in determining the size of pension payments. The latter, instead, are a factor of qualifying earnings and the length of the qualifying period. Changes in longevity may however have an indirect effect, as they can lead to changes in the generosity of parameters. Moreover similar to what happens with defined contribution schemes, the rules determining how benefits are updated over retirement determines the extent of pension wealth. Returning again to table 1, for those retiring in 2050 ten years after retirement the replacement rate will have fallen by eight percentage points both in France (a defined benefit system) and in Poland (a notional defined contribution system).

The pension rules used for this article date to 2009, while the pre-reform pension systems are those of the early 1990s.<sup>25</sup> We estimate pension wealth indicators for ten countries, namely Austria, Finland, France, Germany, Hungary, Italy, Poland, Slovakia, Sweden and the UK. These countries not only cover 70% of the EU's population, but also have very different pension systems and enacted very different reforms. For example, Italy,

Poland and Sweden moved from having a defined benefit system to having a national defined contribution system.<sup>26</sup> By contrast, France and Germany retained their defined benefit system but introduced sustainability factors to limit the impact of ageing. The main features of these reforms are summarised in Table 3.

Table3

For the purposes of this study we look at pension wealth arising just from state pensions (including minimum and basic pensions, and earnings-related publicly administered schemes, but not compulsory private schemes).<sup>27</sup> We assume that there is full take-up of minimum pensions and that no private retirement saving is taking place – which raises some issues for countries with means-testing and significant private pension saving (e.g. the UK) as take-up of benefits and the level of savings may affect state entitlements. Another limitation of our analysis is that it does not take into account the impact of household formation, as we model individuals. This may affect outcomes in countries where state pension entitlements depend on the income of the individual's partner. However this issue is difficult to resolve unless one has access to a cross-country dynamic microsimulation model, and even then it would be very difficult to extricate the direct impact of reforms from all the underlying change.

On the other hand, this study tries to adopt more realistic labour market assumptions when constructing hypothetical individuals. Official assessments (e.g. World Bank (2007), European Commission (2010), and OECD (2011)) focus on the pension entitlements of male average earners with a full labour market career. However this over-represents the poverty alleviation efficacy of pension systems, as it implies that all individuals benefit from the maximum possible generosity. As discussed previously, there is a growing body of evidence

which suggests that the impact of reforms may be stronger for those with incomplete careers, those on low incomes and women. In fact, most of the 1990s pension reforms sought to strengthen the link between contributory records and eventual pension entitlements, partly as policymakers wanted to introduce financial disincentives for early retirement. While data on contribution records are not readily available on a harmonized basis, available information (see European Commission (2012c)) suggests that assuming the same labour participation across countries is unrealistic and also creates significant problems on a gender level within the same country.

To remedy for data unavailability, we adopt an alternative measure of career length based on Labour Force Survey data on participation by age. Essentially we set the probability of the average person to be in employment at a particular age as equal to the activity rate at that age (e.g. if 33% of women aged 57 are engaged in labour market activity, we deem the probability of the average woman to be in employment at that age as 33%). These probabilities are then summed up to arrive at the number of full years between age 20 and pension age in which the individual is active. The advantage of this approach is that the Labour Force Survey is harmonized, and the European Commission prepares projections of activity rates by age. The latter (see European Commission (2012)) can be used to forecast how the length of contributory records might change (see table 4). While still subject to significant caveats,<sup>28</sup> these estimates should be closer to actual career lengths than the full career assumption. The projections suggest that the average effective age of retirement for the overall population should rise in most countries. The increase among women reflects both a cohort effect – reflecting the catch-up in gender employment rates – and a policy effect –

gender pension age equalisation. The change among men mostly reflects tightening of early retirement and disability schemes.

#### TABLE4

Career length is not the sole determinant of pension entitlements. The level of individual earnings also plays an important role. Rather than looking at just average earners, we look at hypothetical individuals for each gender working full-time but earning a wage equivalent to the lower deciles of the wage distribution in each country,<sup>29</sup> together with an individual on minimum pension provision. We focus on those earning less than the average wage, as these individuals are more likely to depend on state pensions. Looking at different cases is important as many pension systems are non-linear, exhibiting progressive features. We assume that our individuals, when employed, experience the average growth in wages, and remain always in the same relative position in the wage distribution over time – e.g. someone who starts a career on average earnings always is on the average earnings level prevalent in the year when employed. Average earnings are assumed to grow in each country by 2% in real terms, while inflation is assumed at 2.5%. Thus pension benefits would need to grow by 4.5% annually to retain their relative value vis-à-vis average earnings over time.

### **3. The possible impact of pension reforms on poverty alleviation**

One of the failings of the OMC pension adequacy indicator is that the projected change in replacement rates is gender neutral despite the considerable disparity in gender elderly poverty rates across the EU (in 2011, 13% among men and 18% among women). Another issue is that there is little, if any, correlation between the OMC replacement rate estimates

and elderly poverty. For instance, Italian women are supposed to have a net replacement rate which is one and a half times that of German women, and yet the poverty rate among Italian women is a fifth higher. Replacement rates, as indicated by table 1, fall significantly with career breaks and moreover a high replacement rate on a low level of previous income will not necessarily imply high poverty alleviation. To understand better the capacity of pension benefits to reduce poverty, it makes sense to develop some form of benchmark linked to the poverty threshold. Note here that the underlying philosophy behind this benchmark is that underpinning the previously quoted ILO and World Bank quantitative replacement rate thresholds – i.e. the ability to guarantee a means to a decent standard of living after retirement and maintain subsistence levels of consumption. This is a restricted normative interpretation of pension adequacy, compared to the broader conceptions frequently found in the literature (e.g. Draxler & Mortensen (2009), Abatemarco (2009)).

As explained previously, pension wealth defines the total pension transfers over a person's retirement as a multiple of the median disposable income. This sum can be compared to the sum required for individuals to have an income equivalent to median disposable income in each year of retirement. For example, if an individual at the point of retirement has pension wealth equivalent to 10 times median disposable income, and life expectancy is 20 years, then pension wealth on average enables the individual to have an income that is half the median disposable income.<sup>30</sup> Since the poverty threshold adopted by the EU Commission is set at 60% of median disposable income, this would mean that our individual would not be out of poverty throughout retirement. In table 5 we present our estimates of the percentage of median disposable income that pension wealth can finance, on average, in retirement in 2005 and 2050 under the assumed actual career lengths and with full careers.

## TABLE 5

Our estimates, like many other studies, suggest that reforms have tended to reduce the strength of the poverty alleviation function of state pension systems. Though cuts have tended to be stronger for higher wages, and minimum pension provision has improved, men on lower incomes are now much less likely to have an income above the 60% relative poverty threshold, on average, throughout retirement. While entitlements are expected to rise, on the back of projected higher labour participation, state pension transfers will remain inadequate for most low-income women. In particular, some reforms, mostly in Eastern Europe, raise issues about the future adequacy of pension systems for women and those on lower incomes as the degree of progressiveness has been reduced considerably. In these cases, unless women have access to other income sources, such as the pension entitlements of their partners, they face a seriously increased risk-of-poverty. While the generosity of minimum pensions appears to have either been safeguarded by pension reforms, or improved in some cases such as the UK, Germany and France, these transfers generally remain inadequate to maintain individuals out of poverty. At the point of retirement, minimum pensions in some countries, like Poland and France, are currently higher than the poverty threshold, but due to price indexation their value falls rapidly during retirement, especially for women who can retire at age 60 in both countries.

The “actual careers” estimates confirm that the interaction between the labour market and the social protection system needs to be considered by researchers and policymakers alike. A system may look very generous on paper, but not be so in reality if only few individuals qualify for full benefits. This tends to be particularly pertinent for women. The “full-career estimates” of the strength of the poverty alleviation function are far higher than those resulting when adopting more realistic labour market assumptions. For instance, the

current pension wealth of those at the bottom decile of the wage distribution in France allows them an average income in retirement equivalent to 51% of median disposable income, rather than the 63% if they had full-careers, while for women the drop is from 59% to 39%. Overall, “actual-careers” results are more in line with data on the actual risk-of-poverty and gender gaps in poverty risks. For example, under the “full-careers” assumption, Italian women are among the best provided for across Europe, failing to explain their high relative poverty rate. The “actual-careers” estimates appear to be much more representative of effective pension generosity.

Reforms, generally speaking, reduce the strength of the poverty alleviation function and result in a greater degree of convergence across countries. Labour market trends can act as a countervailing force that offsets part of the effect of pension reforms. If participation rates rise as projected by the European Commission, effective generosity is set to improve in some countries, like France and Germany. However, in countries with the strongest cutbacks, such as Poland and Slovakia, not even the expected improvement in employment rates would sustain adequacy. In these countries, the combination of the substantial reduction in progressiveness and the tightening of the link between contributions and eventual benefits have increased the importance of ensuring that those at the bottom of the wage distribution are able to have access to the labour market. Moreover, these reforms have increased the need for ensuring appropriate recognition for those who spend time out of the labour market to care for children or elderly dependents, as otherwise the new pension systems would reproduce their working-age income disadvantage.

The estimates presented here assume that all the hypothetical individuals show the same ‘average’ labour market behaviour and will be able to lengthen their working lives to the extent expected by European Commission (2012). This is a strong assumption, particularly for individuals in the bottom deciles of the wage distribution, who typically have more interrupted careers. Another important consideration, given the fact that these estimates do not cover private schemes, is whether cuts in state pension generosity will be accommodated by higher private saving. While there has been a clear push from the part of European governments in this regard, in many countries the required boost in savings rates to remedy fully for the cuts in state generosity appears quite steep. Grech (2013) suggests that in Italy, Poland and Slovakia, low-income individuals would need to save some 13% of their income to maintain the same pension provision of the pre-reform systems.

## **Conclusion**

This article has sought to complement the existing literature that tries to assess the impact of pension reforms on generosity, by using an indicator which as yet has not been put much to use – namely pension wealth. The benefit of this indicator is that it captures total pension transfers throughout retirement, rather than just those at the point of retirement. In this way it not only captures the impact of reforms on the initial value of pension benefits, but is able to capture the impact of changes in the period for which a benefit is received and also the fact that state pension benefits lose a significant part of their relative value over time due to indexation below wage growth. In order to verify whether pension reforms may have hit harder those on lower incomes and with incomplete careers, estimates of pension wealth were carried out for a range of hypothetical individuals with different income levels and with labour market behaviour more representative of actual and projected contributory records.

Our results confirm the finding that reforms carried out since the 1990s have reduced state pension generosity substantially unless careers lengthen considerably more than expected. They also suggest that focusing on pension entitlements for those with full careers can be misleading. For instance, in Slovakia the poverty threshold achievable by pension transfers to low-income individuals could nearly halve when considering more realistic career lengths. The “full-careers” assumption, by contrast, implies a drop of a fifth. The analysis in this article, therefore, suggests that pensioner poverty may re-emerge as an important issue in countries where at present its low level does not attract much political attention. Moreover moves to link benefits with contributions may have serious gender equality implications, which policymakers may not have fully considered and which may warrant improved minimum pension schemes and crediting arrangements. That said, our estimates show that rising labour participation can help undo cuts in system generosity, and suggests the need for governments to ensure improved access to labour markets.

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## Tables

*Table 1: OMC theoretical net replacement rates in 2010 and 2050 in square brackets (%) – selected countries*

	<b>Base case</b>	<b>Base Case 10 years in retirement</b>	<b>3 years childcare break</b>	<b>10 years career break</b>	<b>Retire later</b>	<b>High income</b>	<b>Low income</b>
Austria	85[89]	75[80]	83[88]	70[71]	88[98]	77[72]	84[84]
Finland	69[62]	60[55]	65[61]	54[51]	75[69]	63[52]	72[63]
France	78[59]	65[51]	76[61]	57[42]	81[65]	63[48]	79[59]
Germany	59[64]	59[61]	62[73]	44[48]	70[71]	51[50]	54[60]
Hungary	100[75]	107[59]	66[71]	48[55]	112[87]	88[56]	83[75]
Italy	90[69]	84[61]	86[76]	71[55]	89[76]	87[56]	90[71]
Poland	76[43]	58[35]	68[32]	63[34]	78[49]	61[32]	87[48]
Slovakia	75[65]	70[54]	52[54]	56[48]	86[73]	56[51]	78[65]
Sweden	60[53]	59[46]	60[52]	58[41]	66[63]	58[48]	83[53]
UK	77[75]	72[69]	77[77]	63[64]	80[78]	54[50]	87[90]
EU	79[67]	72[60]	75[69]	62[46]	84[74]	67[51]	81[70]

**Note:** Replacement rates are worked out net of income taxes and employee contributions basis, but include employer contributions. They represent the situation of people retiring under the legislation enacted by 2010. They also include income from private pensions if coverage is significant. The EU estimate is calculated as a weighted average by country population for all EU countries.

**Source:** European Commission (2012c).

Table 2: A taxonomy of studies on reforms' effects on pension adequacy

<p><b>Same system, different populations</b></p> <p><i>Cross country studies</i>          Atkinson et al. (2002)          Fultz (2006)          Sefton et al. (2011)</p> <p><i>Country-specific studies</i>          Bottazzi et al. (2006)          Bridgen &amp; Meyer (2008)          Fultz &amp; Steinhilber (2003)</p> <p><i>Simulation studies</i>          Kotlikoff et al. (2006)</p>	<p><b>Same population, different systems</b></p> <p><i>Cross country studies</i>          European Commission (2012)          Holzmann &amp; Guven (2009)          Martin &amp; Whitehouse (2008)          OECD (2011)          Zaidi et al. (2006)</p> <p><i>Country-specific studies</i>          Orban &amp; Palotai (2005)          Van de Coevering et al. (2006)</p> <p><i>Simulation studies</i>          Falkingham &amp; Johnson (1995)</p>
<p><b>Different systems, different populations</b></p> <p><i>Cross country studies</i>          Dusek &amp; Kopecsni (2008)          Dekkers et al. (2009)          European Commission (2012)          Ferraresi &amp; Monticone (2009)          Soede et al. (2004)</p> <p><i>Country-specific studies</i>          Fonseca &amp; Sopraseuth (2006)          Flood et al. (2008)          Frommert &amp; Heien (2006)          Goodman et al. (2007)</p>	

Table 3: Reforms to pension systems between 1990 and 2009, selected countries

Country	Pension eligibility age	Adjusted retirement incentives	Change in benefit formula or qualifying conditions	Link to life expectancy and/or financial sustainability	Defined contribution (DC) scheme	Indexation
Austria	Gender pension age equalised.	Benefit reduction for early retirement introduced.	Best 15 years to 40 years. Reduction in accrual rate.	Introduction of sustainability factor		Less generous indexation for higher pensions.
Finland		Increased accrual rate for working after 63.	10 last years to lifetime average. Basic pension income-tested.	Life expectancy multiplier.		Less generous valorisation and indexation.
France		Changes in adjustment to benefits for early/late retirement.	Minimum contribution period increased. Earnings measure from best 10 to best 25 years. Targeted minimum income of 85% of minimum wage.	Minimum contribution period to increase further with changes in life expectancy.		Valorisation now effectively to prices in all schemes.
Germany	To increase to 67.	Benefit reduction for early retirement.		Valorisation and indexation cut back as system dependency ratio worsens.	Voluntary DC pensions with tax privileges.	
Hungary	Increase in age from 55 (women) and 60 (men) to 62.	Accrual rates linear rather than higher for earlier years.	Minimum pension to be abolished.	Through annuity calculation in DC scheme.	DC scheme: mandatory for new entrants, voluntary for existing workers.	Indexation down to 50% wage growth.
Italy	Normal pension age increased by 5 years.	Adjustment to early-retirement benefits through notional annuity calculation.	From Defined Benefit (DB) to notional accounts.	Through notional annuity calculation		Less generous indexation of higher pensions.
Poland	Withdrawal of early retirement for certain groups.		Abolition of basic pension. From DB to notional accounts. From best consecutive 10 in final 20 to lifetime average.	Through notional annuity calculation in public scheme and annuity calculation in DC.	DC scheme mandatory for new entrants and workers under 30.	
Slovakia	Increase to 62.		From DB to points system. From best 5 in final 10 to lifetime average earnings.		DC scheme mandatory for new entrants and voluntary for existing workers.	Indexation down to 50% wage growth.
Sweden			From DB to notional accounts. Best 15 years to lifetime average.	Through calculation of notional and DC annuity. Additional sustainability adjustment in notional accounts.	DC scheme mandatory for nearly all workers.	Wage indexation decreased by 1.6 percentage points.
UK	Women's pension age and eligibility for minimum pension from 60 to 65. Pension age to rise to 68.	Increment for deferring pensions increased.	Qualifying years for basic pension lowered. Increase in basic pension. Increased progressivity of earnings-related pension.		Employers required to provide access to DC pension.	Basic pension and minimum pension wage indexed.

*Table 4: Assumed contribution years of those retiring in 2005 and 2050 in square brackets*

	<b>Male</b>	<b>Female</b>
Austria	35[36]	29[35]
Finland	36[39]	34[38]
France	35[35]	30[33]
Germany	37[41]	31[41]
Hungary	31[32]	23[29]
Italy	35[37]	23[28]
Poland	33[35]	27[28]
Slovakia	36[35]	30[31]
Sweden	38[42]	36[39]
UK	38[41]	30[37]

Source: Own estimates based on 2005 labour participation data from Eurostat's Labour Force Survey and European Commission (2012) projections.

Table 5: The percentage of median disposable income that pension wealth can finance, on average, in retirement in 2005 and 2050 under the assumed actual career lengths and full careers in square brackets (%)

Men										
	Bottom decile		Second decile		Third decile		Fourth decile		Minimum pension	
	2005	2050	2005	2050	2005	2050	2005	2050	2005	2050
Austria	82[83]	63[74]	92[93]	70[83]	99[101]	75[89]	105[108]	80[94]	42	41
Finland	58[71]	59[65]	62[76]	62[70]	66[82]	66[74]	69[87]	70[80]	37	36
France	51[63]	61[62]	58[69]	61[62]	64[76]	61[63]	70[83]	62[69]	43	45
Germany	47[52]	49[50]	55[66]	57[57]	63[75]	62[63]	69[83]	63[68]	43	49
Hungary	55[64]	51[66]	60[70]	56[72]	72[83]	67[86]	86[99]	80[103]	30	36
Italy	85[87]	56[69]	90[96]	60[76]	97[103]	68[81]	105[110]	78[87]	36	36
Poland	52[63]	37[38]	59[73]	45[50]	68[83]	54[59]	73[90]	62[68]	47	37
Slovakia	74[81]	46[61]	89[97]	47[73]	100[109]	53[82]	110[120]	59[91]	49	46
Sweden	63[63]	56[57]	66[70]	61[63]	70[75]	64[66]	74[80]	67[69]	37	35
UK	41[42]	57[59]	43[46]	58[60]	46[50]	59[61]	49[53]	60[63]	41	52
Average	56[62]	53[57]	62[71]	57[63]	69[78]	62[67]	74[85]	66[73]	41	44
Women										
	Bottom decile		Second decile		Third decile		Fourth decile		Minimum pension	
	2005	2050	2005	2050	2005	2050	2005	2050	2005	2050
Austria	48[60]	48[61]	53[67]	50[68]	67[72]	56[72]	72[78]	62[79]	42	41
Finland	53[64]	55[61]	55[68]	57[63]	56[72]	57[65]	57[75]	60[69]	37	36
France	39[59]	60[60]	40[64]	60[60]	40[70]	61[61]	41[74]	62[62]	43	45
Germany	44[46]	49[50]	47[48]	50[50]	47[60]	52[52]	47[67]	55[58]	43	49
Hungary	59[63]	48[68]	60[67]	52[73]	67[76]	56[82]	76[87]	66[93]	30	36
Italy	57[71]	41[64]	62[77]	46[69]	65[82]	47[73]	69[87]	50[78]	36	36
Poland	52[66]	37[37]	48[62]	37[37]	54[70]	34[38]	58[76]	35[44]	47	37
Slovakia	59[66]	41[50]	70[79]	41[60]	78[87]	41[66]	85[96]	41[72]	49	46
Sweden	46[49]	44[44]	51[58]	50[54]	55[65]	54[58]	61[69]	56[62]	37	35
UK	41[41]	56[60]	41[41]	56[60]	41[41]	56[60]	41[44]	57[61]	41	52
Average	47[55]	49[55]	48[58]	51[57]	50[65]	52[59]	52[70]	54[63]	41	44

Note: These indicators calculate the percentage of median disposable income that pension wealth at point of retirement would be able to finance on average throughout retirement. For those on minimum provision there is no difference between entitlements assuming actual and full careers.

Source: Own estimates using APEX.

## Endnotes

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<sup>1</sup> For an overview of these reforms, see European Commission (2010), OECD (2007) and Zaidi & Grech (2007).

<sup>2</sup> E.g. Disney (2000).

<sup>3</sup> The 1990s policy shift has been criticized by many (see Barr (2000), de Deken (2002), Muller (2002), and Orzsag & Stiglitz (1999)). Empirical evidence backs up these criticisms. For instance, Forster & Mira D'Ercole (2005) conclude that changes in the generosity of public transfers played the largest role in shaping changes in poverty risks among the elderly within OECD countries during the second half of the 1990s.

<sup>4</sup> A standard example is Schneider (2009), where the author argues that the margin of success of a reform depends on the size of the decline in expected spending on public pensions by 2050..

<sup>5</sup> This lack of consensus can have repercussions. Eckardt (2005) argues that as long as no reliable indicators exist, which allow one to evaluate the effect of structural changes on future welfare, the policy-making process will continue to focus on cutting spending.

<sup>6</sup> This is particularly true for systemic pension reforms, such as those in Sweden and Poland – which result in annual pension benefits being linked directly to contributions and changing automatically with demographic developments.

<sup>7</sup> Benefit indexation rules determine how the value of a benefit changes after it is awarded. For instance, a benefit could be increased in line with inflation over time. Sutherland et al. (2009) shows the potential impact of uprating on benefit generosity in the context of the UK benefit system.

<sup>8</sup> Similar arguments have been made. For instance, Howse (2004) argues that even if one agrees with the notion that pension spending is approaching the limits of political acceptability and economic efficiency, this does not mean that the policy task is simply that of ensuring that these limits are not transgressed.

<sup>9</sup> E.g. European Commission (2010).

<sup>10</sup> European Commission (2012b).

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<sup>11</sup> See European Commission (2012c).

<sup>12</sup> European Commission (2010).

<sup>13</sup> See Holzmann & Hinz (2005) and Humblet & Silva (2002).

<sup>14</sup> Another approach (see for instance Goodin et al. (1999)) is to compute replacement rates using income survey data. However, this gives only retrospective rates and assumptions on labour participation and the impact of new pension rules would be needed to carry out assessments of recent reforms.

<sup>15</sup> The substantial gender and income pension inequality is well-covered in the literature (e.g. Bardasi & Jenkins (2002), Evans et al. (2000), Falkingham & Rake (2001), Frericks et al. (2006), Ginn & Arber (2001), and Meyer & Pfau-Effinger (2006)).

<sup>16</sup> As Soede et al. (2004) point out, there are two possible approaches for exploring future poverty risks. The first, dynamic microsimulation involves a year-to-year estimation of income for each person in a survey based on their projected characteristics and tax/benefit systems. The second, static microsimulation implies the transformation of incomes according to projected average future income developments, diversified for each socio-economic group, with the sizes of the groups adjusted by reweighting in line with demographic projections.

<sup>17</sup> The concept of pension wealth was introduced in applied policy studies in Feldstein (1974).

<sup>18</sup> Eurostat's mortality tables are used for each country.

<sup>19</sup> Mathematically the estimation of pension wealth involves multiplying the initial pension benefit by an annuity factor. The latter is meant to capture the number of years the benefit will be received and also the relative reduction (if any) of the benefit in relation to average earnings. For example, if the initial benefit is worth 30% of average earnings, is uprated in line with average earnings and the benefit is received for 20 years, then pension wealth at retirement would be equivalent to 6 times average earnings. If however the benefit loses value over time, then the initial 30% is not multiplied by 20, but rather by a factor that captures this loss.

<sup>20</sup> A discount rate of 2% has been used here. Using a higher rate would reduce the net present value of pension transfers paid towards the end of an individual's life.

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<sup>21</sup> For a thorough discussion see Brugiavini et al. (2005). There are variants of this approach which try to incorporate future entitlements by projecting the impact of future rules.

<sup>22</sup> See Whitehouse (2003).

<sup>23</sup> The APEX (Analysis of Pension Entitlements across countries) model codes detailed eligibility and benefit rules for mandatory pension schemes based on available public information that has been verified by country contacts. It is used in the OECD's biennial 'Pensions at a Glance' publication, in the World Bank's 'Pensions Panorama' and in European Commission reports..

<sup>24</sup> In the case of Sweden this is equal to wage growth, while in Italy it is GDP growth.

<sup>25</sup> The reforms do not consider pension reforms effected after 2009. These changes, such as those carried out in Hungary in the wake of the financial crisis, could result in much lower generosity than envisaged here.

<sup>26</sup> In a defined benefit system, pension benefits are determined as a ratio of a set salary – the final salary, the average lifetime salary or an intermediate figure - on which contributions were paid. Under a (notional) defined contribution system, pension entitlements depend on accumulated contributions (and credits) and on the (notional) interest accorded them. This accumulated sum is divided by the expected lifetime at retirement to calculate an annuity.

<sup>27</sup> See European Commission (2010) for details of the pension systems modelled in APEX. The absence of estimates for projected returns from compulsory private schemes can be seen as a defect of this study. However the policy reversals seen recently in many Eastern European countries which are undoing these schemes, suggests that even policymakers are unsure of their eventual return.

<sup>28</sup> We are imposing the average labour participation of a cross-section of generations on a single generation. Moreover we are assuming that all our individuals display average labour participation trends over their career. These might instead differ across the wage distribution.

<sup>29</sup> These wage data are from Eurostat's Structure of Earnings Survey and cover workers in the private sector excluding farming and fishing.

<sup>30</sup> Note that this approach assumes that an individual is able to transfer pension wealth equally throughout retirement.