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EQUALITY OF RETIREMENT BENEFITS RECEIVED BY MEN AND WOMEN IN SELECTED EUROPEAN COUNTRIES CHILDBEARING AND FUTURE BENEFITS

IRENA E. KOTOWSKA, JOANNA STACHURA AND PAWEŁ STRZELECKI

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Irena E. Kotowska, Joanna Stachura and Pawel Strzelecki*

Abstract

This research report seeks to answer the question of whether old-age benefit rules for women could be altered with the aim not only of ensuring better benefits for older women but also of stimulating fertility. To address this question, a micro-simulation model has been developed. The input data for the model has been drawn from labour force survey data on employment patterns by age, gender, education, numbers of children, variations in the timing of caring for children and wage profiles for five countries: Italy, Latvia, Lithuania, Poland and Germany. Future retirement benefits are simulated under three variants: variant I uses country-specific labour market data and old-age pension systems; variant II makes use of German labour market data and country-specific old-age pension systems; and finally, variant III refers to country-specific labour market data and the Polish defined-contribution system. Each simulation variant entails four scenarios, which refer to the number of children and the timing of childcare.

The simulations show that the effects of differences in old-age systems for retirement benefits are relatively small and that what really matters is the labour market structure, which reflects the impact of children on employment patterns. Therefore, the report concludes that policies aimed at reducing the negative consequences children have on the labour market participation of mothers are recommended for increasing their old-age pensions. This approach would also help to diminish work–family tensions, which in turn could facilitate positive decisions about having children.

* Irena E. Kotowska is a professor at the Institute of Statistics and Demography (ISD), Warsaw School of Economics, and a head of the Demographic Centre in the ISD. Joanna Stachura is a graduate of the Warsaw School of Economics, working as an economist at the Department of Economic Analyses and Forecasts, Ministry of Labour and Social Policy. Pawel Strzelecki is a graduate of the Warsaw School of Economics, working as an assistant at the ISD and an economist in the National Bank of Poland.

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1. Introduction

Population ageing is a natural and obvious effect of the changes in population reproduction taking place under modernisation processes. Its main determinants are a decline in fertility and an increase in life expectancy, while factors such as baby boom and bust and migration additionally affect its intensity. It is a global process, but its advancement is diversified among countries, regions and continents. What raises concerns is rapid population ageing and sharp declines in fertility (e.g. in post-socialist European countries and China).

The most advanced population ageing is observed and predicted for the European population. Exceptional changes in fertility began in the 1960s, along with continuous improvements in mortality, which led to the so-called 'new demographics' of Europe characterised by fertility remaining well below the replacement level and high values of life expectancy. These trends have resulted not only in the rapid ageing of the population but also in remarkable changes in the working-age population. Population projections by the United Nations (2004) and Eurostat (2005) clearly show that population ageing – along with a shrinking of the working-age population and its ageing – is an unavoidable characteristic of the future Europe. The decline of the working-age population will take place in most European countries in the years 2005–15 and will culminate in the period 2025–35. Simultaneously, increases in women's economic activity have been accompanied by a decline in the labour force participation of significant population groups, in particular that of older male workers. These two factors – demographic and labour market changes – are intrinsic to widespread concerns about the financial viability of public pension systems, now predominantly operating on a pay-as-you-go (PAYG) basis.

Therefore, policies aimed at mitigating the causes and negative effects of population ageing are highly disputed. Reforms of social security systems (especially those of pension systems), and labour market policies aim at integrating more people into the labour market and at prolonging their stay in employment. Increasing the labour force participation of selected population groups still underrepresented in employment (young persons, women and older workers) is one of the key issues of the European employment strategy. In parallel, however, it is becoming clear that the only proper response to population ageing is a fertility increase. Among 25 of the EU member states, only 9 had a total fertility rate (TFR) above 1.5 in 2004, while 10 countries showed the lowest-low fertility rate (a TFR below 1.35). Thus, the question arises as to how to combine two goals – to promote more women in employment and more children being born.

The upward trend in women's economic activity in Europe is accompanied by the increasing incompatibility between the demands of family life and employment. In a competitive, contemporary labour market, workers are expected to be highly available and mobile. To get a job and stay in employment requires more individual effort and more time-management. The conditions for labour market participation are in essence not conducive to family life. Moreover, despite rises in their employment, women are still perceived as the main care providers.

Institutional settings do not adequately account for the dual role of women (as economic providers and carers) (e.g. Liefbroer & Corijn, 1999; Meulders & Gustafsson, 2003; Kotowska, 2005; Muszynska, 2004 and 2007) or generally for the dual role of workers as labour market participants and family members with care obligations (e.g. Leira, 2002; Kotowska, 2005).

There is a rich literature about the determinants of low fertility in Europe and possible policy measures that could encourage people to have children (see for instance McDonald, 2002; Fokkema & Esvelde, 2005; Gauthier, 2005; Hantrais, 2005; Sobotka & Testa, 2008). The complexity of reasoning given to low fertility does not allow for the recommendation of one simple measure. Still, considering the current labour force participation of women and its strongly recommended rise on the one hand, and increasing difficulties in combining work and children on the other, the question arises as to whether old-age benefit rules for women could be altered, with the aim of not only ensuring better benefits for old women but also of promoting family policy towards stimulating fertility?¹

It is difficult to prove that fertility can be directly encouraged by retirement benefits. It is worthwhile mentioning that the development of pension systems in general can be considered one of the determinants of the declining economic utility of children and therefore a contributor to declines in the demand for children up to the 1960s (see e.g. Boldrin & Jones, 2002).² Fertility developments observed since the 1960s in Europe have been linked to other factors specific to the second demographic transition (van de Kaa, 1987), e.g. to changes in norms and values, to improvements in well-being, education and social mobility and to increasingly widespread benefits from technological progress.

In the search for answers, questions arise about the interrelationships between the old-age pension systems and fertility. Why are the retirement benefits of women lower than those of men? How does fertility affect women's old-age pensions? To what extent do old-age pension systems account for the dual role of women as workers and care providers within the family? The main impacts come from the labour market, which is less or more supportive towards mothers' employment. Hence, it is important to study the effects of motherhood on women's labour force participation. Analyses of employment rates by gender and family situation generally show that living in a family and having children positively affects the employment of men while it reduces the employment incidence of women and their hours worked, especially when they are caring for children (see e.g. Franco & Jouhette, 2002; Franco & Winqvist, 2002; Kotowska et al., 2005; Jaumotte, 2003; Hantrais, 2005; Aliaga, 2005). Employment breaks and reduced working time owing to maternal obligations impinge on both old-age pension rights and future pension levels. Therefore, worries about pension income and pension rights are mentioned in some papers as being among the factors that can influence women's decisions about children (Albert & Fahey, 2004). Nevertheless, authors of this thesis do not support it with any surveys. In our view, the different labour market careers of men and women result, *inter alia*, from the different impacts of family and parenthood on labour market behaviour by gender. They determine old-age benefits according to old-age pension rules that account differently for these variations. Old-age pension rules should therefore be carefully analysed in terms of their sensitivity to gender-specific labour market careers.

¹ This research question underlies ENEPRI AIM Task 6.4.1.

² The declining utility of children (in terms of the old-age protection they can provide for parents) owing to the developing welfare state was mentioned by Leibenstein in his economic theory of fertility (Leibenstein, 1957).

We expect that findings related to the negative consequences that children have on the retirement benefits of mothers will make it possible to formulate suggestions as to how to reduce them, which is a view towards raising both women's employment and their fertility.

Since possible interrelations between fertility and old-age pensions depend strongly on the impact children have on employment, our objective in this paper is to show how bringing up children influences future retirement benefits under *different retirement systems* and *different labour market structures*, in order to identify factors decisive for that impact. In this way, we can evaluate incentives or disincentives for combining family and work careers for both women and men. Different involvement in paid work and family duties by gender and their long-term effects can also be considered from the perspective of the equal treatment of women and men.

Our report is organised as follows: section 2 presents the main factors that have an influence on inequality in old-age pensions among old women and men. The focus here is on the factors related to parenthood. Some possible solutions in terms of old-age pension systems that account for raising children are discussed. In section 3, the interrelationships between employment and the care of children are studied. Section 4 describes our approach to the analysis of the interrelationships between the labour market, fertility and old-age pensions. Assumptions underlying the simulation model are presented. In simulations of the expected retirement benefits of persons by number of children, the key determinants of labour market performance are taken into account – gender, age and education. The main question is formulated as follows: How are old-age pensions influenced by wages and employment differences observed over the entire working life between men and women with different educational levels and numbers of children. Data availability was decisive in the running of simulations and in country selection. Our results refer to Italy, Latvia, Lithuania, Poland and Germany.³ Section 5 concludes the study, in which we try to answer the question of whether there are any effective tools in existing pension systems to increase fertility.

2. Parenthood and inequality in old-age benefits among men and women

2.1 Determinants of gender inequalities in old-age benefits

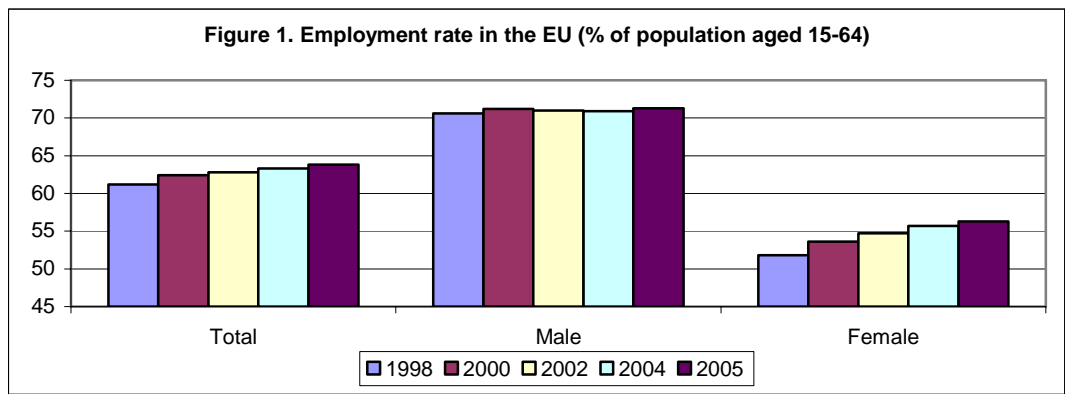
Parallel but different treatments of men and women can be observed in old-age pension systems in most countries. In some countries, women have or used to have a lower retirement age and lower contributory requirements; maternity and parental leaves are taken into account in pension formulae or contributions for this period are paid by the state budget. Better old-age benefits for women have been introduced, mainly to decrease the inequality of benefits between men and women and the risk of poverty for old women. The phenomenon of ageing societies poses the question of whether it is possible to stimulate fertility through pension systems. This kind of policy would be taken into account only as an economic incentive to encourage women to have more children. The provision of adequate pensions for women could be considered an incentive if it reduces women's fear of low future pension benefits. Furthermore, is it possible that a pension system offering higher pensions because of having more children could be an additional economic incentive?

³ These countries belong to the lowest-low fertility group. In 2005, the TFR ranged from 1.24 (Poland) to 1.34 (Germany).

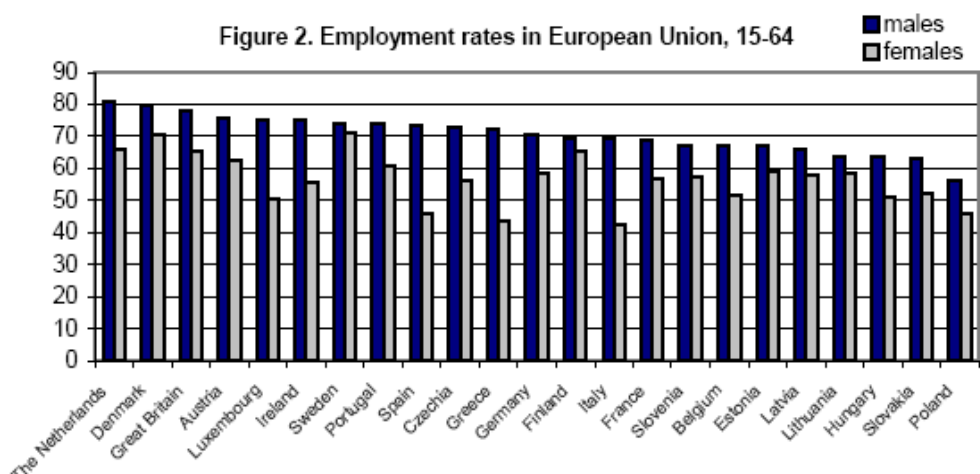
First, we can assume that there is an asymmetric interdependency between old-age pensions and career development. This means that retirement benefits are derivatives of working life while the pension system’s impact on labour behaviour is weaker.

When talking about the fertility and lower old-age benefits of women, one should first ask the question: To what extent do children reduce future benefits? Are there other determinants of the gender gap in old-age pensions?

The main reason for women’s pensions being lower than those of men is the gender pay gap. This phenomenon can be observed in most EU countries and to varying degrees among countries and among groups distinguished by education level. The pay gap is wider in higher-end occupations. The second reason is occupational segregation. Women are more concentrated in lower-end occupations. As a result of both of these factors, women pay lower social security contributions than men do. The third factor is related to employment incidence and career breaks. Despite the upward trend in the labour force participation, women’s employment rates remain much lower than those of men (Figure 1). Country-specific differences might be related to the cultural and economic context of women’s paid work (Figure 2). More details about this issue are given in section 4.



Source: Eurostat, Labour Force Survey, annual averages, 2005.



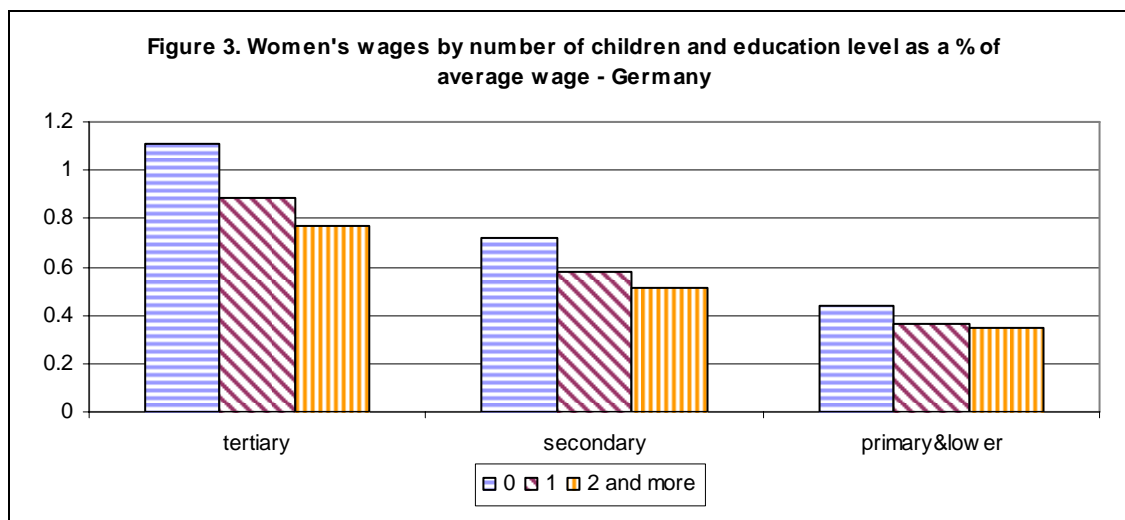
Source: Eurostat, 2003

Another important determinant of the lower old-age pensions of women is the lower retirement age, which directly influences the number of contributory years; for this reason, one of the basic recommendations under pension reforms is to equalise men’s and women’s retirement ages.

In most of the pension systems in the EU, the indexation of benefits is lower than wage growth. In some countries, it is equal only to the consumer price index. As a result of women’s longevity, they receive pensions for approximately 20 years, meaning that during this period their benefits steadily decrease as a percentage of the average wage in the economy. Consequently, the poorest groups in society are the oldest women. The lower retirement age of women exaggerates this effect.⁴ Moreover, the risk of poverty is higher among persons living alone than those living in couples. The majority of older persons living alone is made up of old women, which stems from gender differences in life expectancy and family-related behaviour. Widowed or divorced men have a higher propensity to remarry.

There are certain special requirements attached to receiving a minimum old-age pension in some country-specific pension systems, for example the requirement of full-time employment. Hence, women, who work part-time more often than men do, do not receive the minimum old-age pension because this benefit is provided for those who were employed with a complete career (in Belgium and Poland).

Most of the sources of gender inequalities in retirement benefits are more or less related to children. The different employment careers of men and women, and especially work breaks, are directly related to childcare. Leaving the labour market for a couple of years and working part-time influences the pay gap, work record and contributory years. These impacts differ depending on the number of children and education level. For instance, data from Germany and Poland show that women’s wages depend more on the education level than on the number of children; however, mothers clearly earn less than women without children (Figures 3 and 4).



⁴ One has to take into account that there are many services provided for elderly people such as free healthcare, transport and so forth, which are not included in their income.



Source: LFS data.

2.2 Childcare as recorded in old-age pension systems

Country-specific pension systems account differently for the care duties of women in relation to their labour market careers. Some of them include special provisions for mothers. Looking across retirement systems one can distinguish a few patterns, which are repeated in many countries (as considered in ENEPRI AIM Task 6.4.3). Thus, we find that retirement ages can be lower due to the number of children or that women can have parental leave taken into account in pension formulae as contributory years. Sometimes periods of childcare are counted as non-contributory years or contributions for these periods can be paid by the state budget.

In Slovenia, the Czech Republic and the Slovak Republic, the statutory retirement age for women depends on the number of children they have. Nevertheless, these countries belong to the lowest-low fertility groups, with fertility rates having been below 1.3 children per woman since the mid-1990s. A simple conclusion can therefore be drawn that a lower retirement age for women as a result of having children cannot be considered an effective measure for stimulating fertility.

In most of the countries with a defined benefit scheme, childcare periods are treated as non-contributory years that are credited in the pension formulae (Belgium, under the old Polish system, the Czech Republic and Germany, etc.). The length of the period depends on country-specific solutions. In the simulation study presented in the next section, these kinds of supplements are not taken into account. To include childcare periods in the calculation, the data on the effective length of this period needs to be available with a breakdown by age, number of children and the level of education. This data is not available and using a statutory period would be far too simplistic.

In Poland, which is an example of a country with a defined contribution system, these periods are taken into account. Contributions are paid by the state on the social allowance basis (approximately 18% of the average wage in the economy). In the old defined benefit system, childcare was treated as a non-contributory period. The non-contributory years give 0.7% of a person's base amount. This base amount depends on salary. This means that while support in the defined contribution system is equal for all women, under the old system it was higher for women with higher wages. In the new system, contributions paid during childcare pensions

from the state budget for women with average earnings do not noticeably change the level of their future pensions. Women with higher levels of education earn more than average women do and in the past, the former received a percentage of their income. Given that the most sensitive group of women in terms of ‘fertility policy’ are women with higher levels of education (at least secondary), this solution cannot be viewed as a policy measure aimed at increasing fertility. At present, it could only be considered a measure for preventing poverty among women with lower wages owing to childcare.

If policy-makers were to use as a model the pension systems of the Czech Republic, the Slovak Republic, Slovenia or Poland concerning retirement policy measures designed to increase fertility, they would not achieve their goal. In this group of countries, the lower standard retirement age owing to spells of childcare is a measure directed towards all women and has no influence on decisions about having children. In Poland, such a policy measure would neither be targeted at the group of women at which it should be, nor would it give positive results. One has to remember, however, that the defined contribution system lets women include even part-time work in a contributory period, as all contributions influence future pension benefits.

3. Employment and fertility

One of the major social and economic developments of the last three decades is the growth of paid employment among women, which brings many positive benefits. The income from their work makes a major contribution to their household welfare and to their economic independence. Job and career opportunities for women are expanding because of their growing commitment to the labour market, which is accompanied by their rising educational attainment. This overall trend is diversified by country. As Figure 2 shows, among the EU-15, Greece, Spain and Italy have employment rates of women aged 15-64 of less than 50% while Finland, Sweden, and Denmark have the highest rates of around 70%. The post-socialist countries need to be analysed separately. Until the start of the transition period, women in these countries had high levels of labour force participation by European standards. In the 1990s, the economic activity of both men and women declined remarkably. Despite that change, the employment rates of women have remained at either high levels (around 60% in Estonia, Slovenia, Latvia and Lithuania) or moderate levels (more than 50% in the Czech Republic). The lowest employment rates (around 50%) are seen in Poland, Hungary and the Slovak Republic.

Closely parallel with the increases in women’s employment, a new phase of fertility decline has been observed. It started in the Nordic European countries in the mid-1960s and gradually spread to western (1970s), southern (1980s) finally to Central and Eastern Europe (1990s). The later the onset of the fertility decline, the more rapid has been the change observed. Currently, only three European countries have fertility rates at close to the replacement level of slightly over two children per woman (Albania, Iceland and Turkey). In most European countries, fertility remains at a level far below replacement. Among the EU-25 member states, 10 countries have the lowest-low fertility rates (a TFR below 1.35). These countries are mostly in southern and Central Europe.

When comparing women’s employment and fertility in the EU, one can easily see that the lowest fertility rates coexist with the lowest rates of women’s economic activity and high differences in employment by gender. By contrast, Nordic countries show the highest fertility rates and women’s employment rates close to those of men. How can that be explained? Before discussing possible explanations, we refer to the differing levels of impact that children have on the employment of men and women.

Many analyses of family and employment show that the family has disparate degrees of impact on the labour market attachment of men and women (see e.g. Bielenski & Bosch, Wagner,

2002; Franco & Jouhette, 2002; Franco & Winqvist, 2002; Kotowska et al., 2005; Jaumotte, 2003; Hantrais, 2005; Aliaga, 2005). In general, both living in a family and having children positively affect the employment of men, but these effects diverge slightly across countries. The full-time employment rates for men are highest among those living as part of a couple and higher for men doing so with children than for those who do so without children. The impact that a family has on women's employment is more marked and negative, in terms of employment incidence and hours worked (full- and part-time), although the picture is more complicated. What really seems to matter is the presence of children – for which mothers reduce their labour market involvement.

Figure 5, taken from Aliaga (2005), demonstrates that children have visibly varying degrees of impact on the labour market attachment of men and women. Having children positively affects the employment of men in all countries. Men with children aged under 12 have an average employment rate of 91% – five points above the rate for men without children. The low incidence of part-time jobs (in the EU-25, part-time work accounts for 4% of total employment for men) does not depend on the presence of children.

By contrast, participation in employment by women aged 20–49 and the number of working hours are closely linked to the fact of having children aged under 12. In the EU-25, the employment rate for women aged 20–49 without children aged under 12 is 75% compared with 60% for women with children at that age. The employment effects of having children differ across countries. In some countries, a decline in employment of more than 30 hours per week is accompanied by increases in the incidence of employment with fewer working hours (the Netherlands, Germany, Austria, the UK, Belgium and Luxembourg) while others mainly show falls in employment rates. In the EU-25, part-time work accounts for 27% of total employment in the case of women, more often taken up by mothers with children aged under 12 (38% of total employment, compared with 20% for those without). The strongest reduction of women's employment rates can be seen in the Czech Republic, Hungary, the Slovak Republic, Germany and the UK. Slovenia and Denmark are exceptions – mothers with children aged under 12 have slightly higher employment rates than women without children aged under 12.

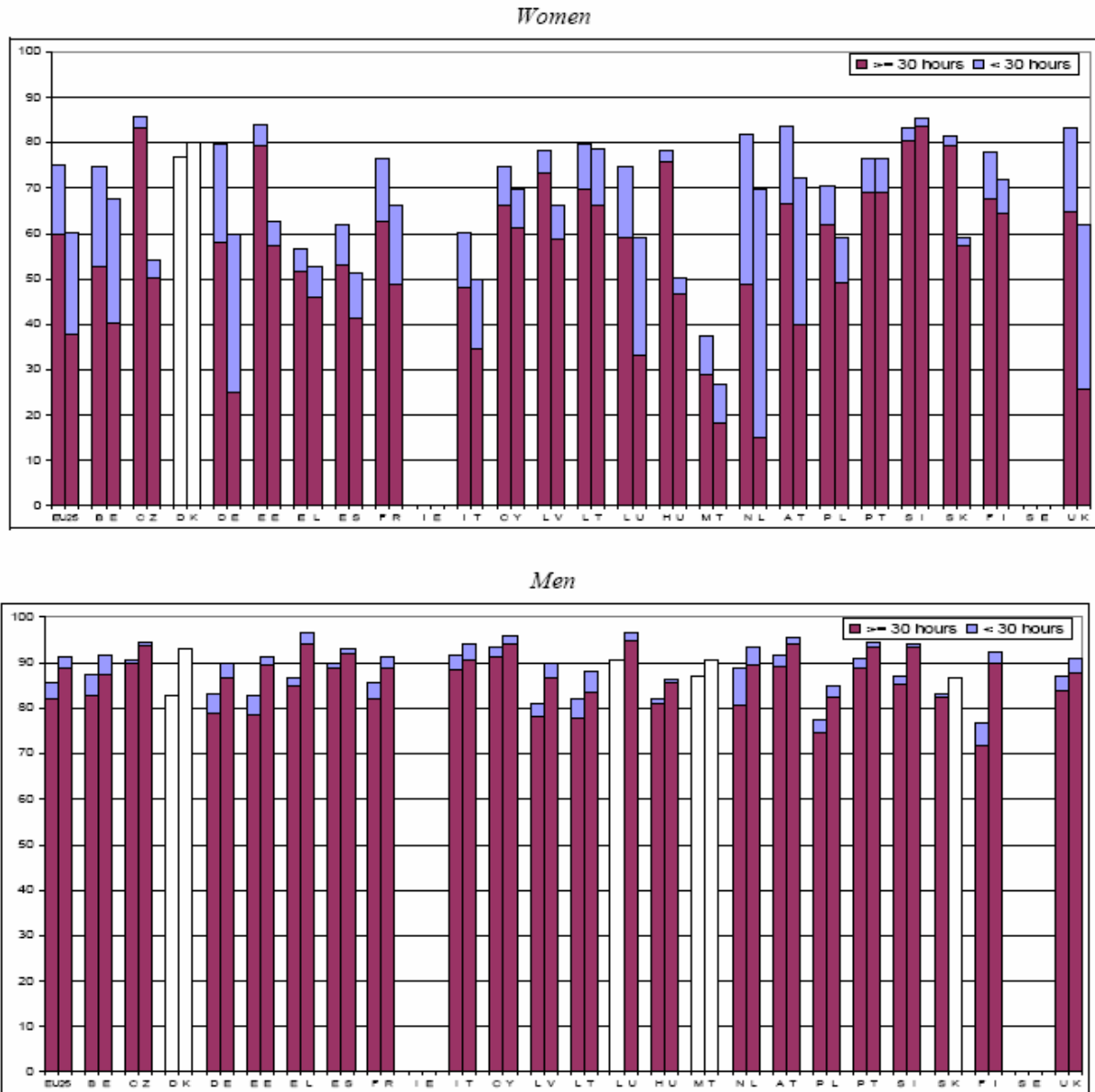
The impact children have on the labour force participation of parents might be analysed in terms of the family models defined by sharing paid and home work between partners, i.e. the family models considered in terms of interrelations between professional work and performing family duties. Information on full- or part-time employment of men and women, which reflects work organisation by couples, might be used to identify family employment patterns. The dual-earner model of both parents working full-time is the most common work–family arrangement (apart from in the Netherlands and Malta), especially in the new member states (Kotowska, 2005, based on the survey data for 13 European countries; Aliaga, 2005, based on LFS data for the EU-25). In general, the second model practised by couples is that of the male breadwinner model (especially in Malta, Italy, Greece and Spain) while the modernised male breadwinner (men working full-time, women working part-time) is less popular except in the Netherlands (where it is the most common practice), the UK, Germany and Austria (the second-most common model practised) (Figure 6).

Furthermore, family models practised by couples evolve when there are children. The percentage of couples where both parents work full-time is lower when there are children aged under 12 in most countries (exceptions are Slovenia, Portugal and Lithuania). Correspondingly, there is a larger percentage of couples practising either the modernised male breadwinner model or its older version. The former type is particularly common for couples with children in the Netherlands, the UK, Germany and Austria, while the latter type is especially common in the Czech Republic, Estonia, Hungary, Slovakia, and again in Germany and the UK.

Figure 5. Employment rates and working time for persons aged 20-49 by gender and presence of children aged under 12

Chart 1: Employment rates and amount of time worked per week for women and men aged 20-49, depending on whether they have children under 12

Left bar: without children under 12. Right bar: with children under 12.



Source: Eurostat, European Labour Force Survey, 2003

DK, IE, LU, MT, SK, SE: some data are not shown for reasons of availability or reliability.

Source: Aliaga (2005).

Figure 6. Family models of couples aged 20-49 by presence of children aged under 12

Chart 4: The three main models of organisation of work of couples aged 20-49 where at least one partner has a job, with or without children under 12 of couples in each group)



Source: Eurostat, European Labour Force Survey, 2003
 DK, IE, MT, SE: some data are not shown for reasons of availability or reliability.
 Reading: In EU-25, for 56% of couples without children where at least one partner has a job, both the man and the woman work full-time, whereas the figure is 36% for couples with children under 12.

Source: Aliaga (2005).

It has been shown that high levels of cultural incompatibility between work and family exist in Central and Eastern European countries, accompanied by a rising structural incompatibility of work and family in the 1990s. This trend has also been observed in southern countries. The lowest levels of structural incompatibility are present in countries in which the dual-earner model is supported by institutional settings; the highest levels pertain to countries in which family and work are in competition. The lowest levels of cultural and structural incompatibility have been found in Nordic countries (Muszyńska, 2004 and 2007), i.e. in countries where high rates of women's employment coexist with high rates of fertility. In contrast, Mediterranean countries as well as Poland, Hungary and Slovakia can be identified as those countries in which low rates of women's employment are accompanied by the lowest rates of fertility. Thus, one can conclude that policies aimed at reducing incompatibilities between women's employment and family may facilitate the reconciliation of work and caring for children, which can result in both higher income in old age and hopefully the birth of more children.

The reconciliation measures usually discussed seek to reduce structural incompatibility. The major dimension of relevant policy regulations tends to be defined by taking into account the dual role of women as workers and home-carers. In other words, reconciliation issues have mostly been discussed as if they are of primary importance to women. Yet, given that cultural incompatibility reduces the impact of reconciliation policies on the labour participation of mothers, one must take care not to neglect the cultural component in making policy recommendations. Policies that diminish the traditional perception of gender roles by promoting equality between men and women are intended to strengthen the reconciliation measures already implemented (for example, by encouraging fathers to use existing regulations on parental leave in order to work flexible hours or part-time when caring for small children). The promotion of equal opportunities for employment and the sharing of family responsibilities seem to be of special relevance in the countries of Central and southern Europe.

4. Simulations of old-age benefits of persons with and without children

4.1 Methodology, data and assumptions

The point of departure for our simulation analysis is an observation that despite the fact that the rules to calculate old-age benefits are usually quite complicated in the various pension systems, the benefit level is usually based on two factors:

- data on employment and wage profiles during the entire working life for an 'average person' in each group as defined by gender, age and education level; and
- rules for calculating retirement benefits based on work records and wages, which can vary by country and old-age pension system.

Therefore, our simulation model concentrates on the effects that employment and wage differences could have for expected pension benefits under different systems.

In the first step of the simulation procedure, the LFS data have been used to calculate age profiles in relation to employment rates and average wages (for 10-year age groups) during the entire working life by gender, education level and the number of children. These constitute input data for the simulation.

It has only been possible to carry out our analysis for some countries, more specifically, those for which the relevant LFS data is available. Calculations of employment rates and wages have been done for Poland (2001 and 2005), Germany (2005), Italy (2004), Latvia (2004) and Lithuania (2004).

The next step entails simulating retirement benefits for persons with different characteristics (i.e. level of education and number of children). To do that, some relatively large assumptions are required:

- a) It has been assumed that the relations between the employment rates and wages of the selected groups are constant in the future. The Achilles' heel of this approach is that it has been decided that in future, the next generations will have the same employment rates and wages in relation to the average wage in the economy.
- b) Our analysis focuses solely on earnings and does not take into account any other sources of income, including benefits connected with bringing up the children. This assumption is made in order to simplify the input data for the model. Unfortunately, we were not able to include the comparable database of all social policy regulations and their influence on the income of the groups of persons under consideration.
- c) To calculate old-age pensions, the most common pension system in each country has been used. No attempt has been made to run simulations for either public or military services.

Our analysis is aimed at studying both the influence of the number of children and the timing of childcare on old-age benefits. It has been assumed that the period of bringing up children lasts about 20 years. Its timing depends on the mother's age at childbearing, especially at the first birth.⁵ For the purpose of this analysis, four scenarios have been formulated to take into account the possible situation of the person under analysis:

- scenario 1 – the person has no child during his/her entire life;
- scenario 2 – the person is engaged in caring for one child between 25 and 44 years of age (early childbearing);
- scenario 3 – the person is engaged in caring for one child between 35 and 54 years of age (late childbearing); and
- scenario 4 – the person is engaged in caring for more than one child between 25 and 44 years of age (early childbearing, higher fertility).

The simulation results refer to the retirement benefits calculated by use of the LFS-based labour market indicators (the input data) and information about the rules applied in different old-age pension systems (the simulation model). These benefits are calculated for the 'average person' described by gender (male or female), educational attainment (tertiary, secondary, primary and lower) and the scenario number.

⁵ A general trend of birth postponement is observed in Europe; however, its onset and intensity vary considerably across countries. In 2005, the mean age of women at childbearing ranged from 25.6 years in Poland to 30.9 years in Italy. Central and Eastern European countries have lower values for this indicator compared with other European countries.

4.2 Simulation results

The simulation results could be used for three purposes. First, they could be considered projections for a particular country. They show how the number of children can influence the expected future retirement benefits for men and women with different education levels. The disparities among countries reflect the impact of overall differences resulting from the socio-economic status of men and women with and without children, as well as labour market conditions, pension systems, etc.

Second, the pension systems could be examined using the labour market data of one country to compare how and to what extent these systems differentiate the future retirement benefits of persons with a different number of children. Through this approach, one can isolate the effect of pension system rules.

Finally yet importantly, the benefits can be calculated by use of a selected old-age pension system and the input data from various countries. That exercise can shed light on the extent to which differences in the expected retirement benefits are determined by factors that are not related to the old-age pension system.

Simulation variant I: Old-age pension benefits expected under country-specific systems

Since our analysis centres on the relation between the expected old-age benefits of persons according to the number of children and timing of childbearing, the value of benefits in local currencies is not important. Therefore, the results can be presented in terms of relative values and differences. In all the simulation variants, a reference category is the old-age benefits for a man without children and a woman without children, respectively (i.e. scenario 1).

The results of comparisons between the relative retirement benefits of a person engaged in childcare (scenarios 2, 3 and 4) and a person with no children during his/her entire life (scenario 1) are given in Table 1 and can summarised as follows:

- Men tend to work more (with higher employment rates) and earn more (higher wages) if they are in a household with one or more children. This finding could stem from two different effects: the selection effect – only those persons who have a job and earn enough money decide to have a child, and the motivation effect – a man with children is forced to search for financial means to provide for the family. Such persons tend to be more engaged in job search if unemployed and more productive at work. The results show that in Poland, Germany and Lithuania, the largest increases in relative income are attributable to men with children and those with lower education levels as compared with men without children and the same education level.
- The relationship between the number of children and women's benefits is straightforward for women without tertiary education. Having one or more children generally decreases the expected pension benefits in the future. This decrease is likely to be stronger if women have two or more children, lower education levels or live in Italy or Germany. The timing of having children is also important. If women start their maternal careers later (scenario 3), the loss in expected pension benefits is liable to be lower than for women who decide to do so at the age of 25 (scenario 2). For women with tertiary education, the loss in old-age benefits caused by motherhood is quite small. In Italy and Latvia, women with tertiary education, who have one child at least by the age of 35, could even expect higher old-age pensions than women without children.

Table 1. Differences between the retirement benefits of persons with children (scenarios 2, 3 and 4) in comparison with persons without children (scenario 1) (in %)

Number and timing of children	Gender	Education	Italy	Latvia	Poland	Germany	Lithuania
			2004	2004	2005	2005	2004
Scenario 2	Male	Tertiary	1.9	19.8	7.0	3.9	5.2
Scenario 2	Male	Secondary	0.6	13.1	15.8	7.1	2.3
Scenario 2	Male	Primary & lower	1.2	8.2	28.8	10.8	7.5
Scenario 2	Female	Tertiary	17.8	-3.0	-3.5	-19.3	0.7
Scenario 2	Female	Secondary	-19.6	-5.0	-4.3	-15.8	-1.2
Scenario 2	Female	Primary & lower	-23.8	3.9	-3.9	-30.4	1.4
Scenario 3	Male	Tertiary	5.6	14.2	3.8	3.1	2.3
Scenario 3	Male	Secondary	-3.7	9.5	5.2	7.8	3.6
Scenario 3	Male	Primary & lower	4.8	15.4	20.0	6.1	3.9
Scenario 3	Female	Tertiary	20.4	2.4	-7.3	-18.2	1.4
Scenario 3	Female	Secondary	-9.3	-7.4	-3.4	-17.8	-0.6
Scenario 3	Female	Primary & lower	-15.4	-0.4	0.4	-16.4	0.6
Scenario 4	Male	Tertiary	3.0	13.3	12.3	19.4	6.0
Scenario 4	Male	Secondary	2.2	12.4	19.3	13.0	4.9
Scenario 4	Male	Primary & lower	0.4	12.2	24.0	7.9	11.0
Scenario 4	Female	Tertiary	-10.0	-2.7	-14.4	-30.1	-0.2
Scenario 4	Female	Secondary	-18.7	-7.9	-7.7	-26.7	-0.9
Scenario 4	Female	Primary & lower	-43.8	-3.8	-13.1	-39.7	1.4

Source: Authors' calculations.

Simulation variant II: Impacts of old-age pension systems on benefit levels

To demonstrate the possible impacts that different old-age pension systems have on retirement benefits, the data from the German labour market has been used to calculate benefits under diverse pension systems currently in practice in the EU member states. The following countries have been selected for the simulation: Poland (the old PAYG and new defined contribution systems), Lithuania, Latvia, Estonia, Slovakia, Slovenia, Hungary, Italy and Germany.

The simulation results present the relative differences between persons, taking into account a different number of children and variations in the timing of having children. With reference to the rules of the pension systems, the simulation results presented in Table 2 lead to the following conclusions:

- The pension systems selected for comparisons are different. The old Polish system was a typical PAYG system in which there was only a mechanism for the differentiation of benefits among persons with different tenures and earnings. In the defined contribution systems recently introduced, in many countries there is a straightforward relation between the earnings during the entire life and retirement benefits. In some countries of Western Europe, like for example Germany, reforms have also been carried out to create incentives for people to work longer (e.g. by stronger links between the work record and pensions from the defined benefit system).

Table 2. Differences between the retirement benefits of persons with children (scenarios 2, 3 and 4) in comparison with persons without children (scenario 1) under different pension systems and using German (2005) labour market data (in %)

Number of children and timing of childcare	Gender	Education	Retirement benefits under different country-specific pension systems and German labour market data of 2005									
			Poland (new defined contribution)	Poland (old PAYG)	Lithuania	Latvia	Estonia	Slovakia	Slovenia	Hungary	Italy	Germany
Scenario 2	Male	Tertiary	4.1	2.9	3.3	4.1	3.2	4.0	4.6	3.1	4.1	3.9
Scenario 2	Male	Secondary	7.4	4.8	5.4	7.4	5.2	7.2	8.3	5.6	7.4	7.1
Scenario 2	Male	Primary & lower	11.3	6.3	7.5	11.3	7.2	11.0	9.6	8.2	11.3	10.8
Scenario 2	Female	Tertiary	-20.0	-15.2	-12.9	-20.0	-15.7	-19.6	-20.9	-18.6	-20.0	-19.3
Scenario 2	Female	Secondary	-16.2	-7.1	-6.7	-16.2	-8.5	-16.0	-13.0	-14.3	-16.2	-15.8
Scenario 2	Female	Primary & lower	-31.2	-14.1	-13.0	-31.2	-16.2	-30.7	-25.7	-27.8	-31.2	-30.4
Scenario 3	Male	Tertiary	3.1	2.3	2.5	3.1	2.5	3.1	3.3	1.9	3.1	3.1
Scenario 3	Male	Secondary	7.8	5.4	5.6	7.7	5.6	7.8	9.7	6.7	7.8	7.8
Scenario 3	Male	Primary & lower	6.2	3.5	4.1	6.2	4.1	6.2	4.9	4.8	6.2	6.1
Scenario 3	Female	Tertiary	-18.2	-14.9	-11.8	-18.3	-14.7	-18.3	-21.0	-17.8	-18.2	-18.2
Scenario 3	Female	Secondary	-17.5	-8.8	-7.2	-17.5	-9.4	-17.7	-17.9	-16.6	-17.5	-17.8
Scenario 3	Female	Primary & lower	-16.3	-8.2	-6.8	-16.3	-8.6	-16.3	-16.1	-15.4	-16.3	-16.4
Scenario 4	Male	Tertiary	20.6	14.9	16.6	20.5	15.9	19.9	24.6	17.4	20.6	19.4
Scenario 4	Male	Secondary	13.6	8.9	9.9	13.6	9.5	13.3	15.9	11.1	13.6	13.0
Scenario 4	Male	Primary & lower	8.3	5.0	5.5	8.3	5.3	8.0	10.0	7.9	8.3	7.9
Scenario 4	Female	Tertiary	-31.3	-23.4	-20.3	-31.4	-24.6	-30.6	-32.1	-28.9	-31.3	-30.1
Scenario 4	Female	Secondary	-27.6	-11.7	-11.4	-27.6	-14.4	-27.1	-20.5	-23.8	-27.6	-26.7
Scenario 4	Female	Primary & lower	-40.6	-18.0	-16.9	-40.7	-21.1	-40.1	-31.8	-36.1	-40.6	-39.7

Source: Authors' calculations.

- Simulation results show that there are only small differences in retirement benefits among the majority of systems under analysis. This outcome means that the pure influence of the pension system on the future benefits is almost the same. The main reason for that is that after recent reforms, in many systems the adequacy of the benefit in relation to the earnings during the entire working life is the most important rule for calculating benefits.
- In some old-age pension systems (e.g. the old system in Poland), the differences between the benefits of persons with and without children are not as big as in defined contribution systems. This result could be interpreted as an additional indirect mechanism of redistribution in these systems. These hidden future transfers have been especially important for persons with lower education levels and for women.
- The results suggest that in modern social policy, indirect mechanisms of compensation to equalise incomes are becoming less popular, e.g. as reflected in the evolution of pension systems in many countries, forced by the population ageing process. In future, directly targeted transfers should probably become more important and not necessarily connected to the pension system.

Simulation variant III: Country-specific labour market data and a selected pension system

The last simulation exercise seeks to demonstrate the impacts of labour market-related factors on future old-age benefits. For this purpose, the new defined contribution system in Poland has been selected. Labour market data from countries studied under simulation 1 create the input for the simulation exercise. Remarks referring to the results presented in Table 3 are as follows:

- There are big differences in the labour market effects in the selected European countries. These effects are country- and period-specific. The results for Poland in 2001 and 2005 show that period-specific differences are quite small despite the fact that the labour market data come from various time points in the business cycle (the downturn of 2001 and the recovery of 2005). Country-specific differences are far more important, especially when comparing women with secondary or lower education levels. These differences could result from economic factors (disparities in wages, as well as in employment and unemployment rates caused by the demand side), social and demographic factors (distinctions in the labour supply of women and men and in the conceptualisation of women's paid work) and social policies, which create incentives for labour market participation and possibilities for combining it with caring for children.
- The most important differences among countries concern the pension gap between women with secondary or lower education levels who have children and those without children. Results suggest that in Latvia and Lithuania, that gap does not exist. Also in Poland, it is hardly to be observed for women aged 34 and older who are engaged in caring for one child. In Germany and Italy, the situation is completely different. Using the rules of the new defined-contribution system in Poland for their country-specific labour market data shows that women with non-tertiary education would usually have over lower retirement benefits by over 20% if they have one child and by 20-40% if they have two or more children. This finding directly stems from mothers reducing their labour market involvement by either leaving the labour market (the practice most commonly observed in Italy) or reducing working time (as in Germany). Both behaviours lead to lower contributions, and thus under the system rules to lower benefits.

Table 3. Differences between the retirement benefits of persons with children (scenarios 2, 3 and 4) in comparison with persons without children (scenario 1) under the defined pension system (Polish defined contribution system) and the country-specific labour market data (in %)

Number and timing of children	Gender	Education	Italy	Latvia	Poland	Poland	Germany	Lithuania
			2004	2004	2001	2005	2005	2004
Scenario 2	Male	Tertiary	1.9	19.9	7.2	7.0	4.1	10.0
Scenario 2	Male	Secondary	0.6	13.2	14.0	15.8	7.4	5.8
Scenario 2	Male	Primary & lower	1.2	8.2	24.3	28.8	11.3	25.7
Scenario 2	Female	Tertiary	17.8	-3.0	-7.7	-3.5	-20.0	2.1
Scenario 2	Female	Secondary	-19.6	-5.0	-2.5	-4.3	-16.2	-4.9
Scenario 2	Female	Primary & lower	-23.8	3.9	-9.1	-3.9	-31.2	9.1
Scenario 3	Male	Tertiary	5.6	14.2	-0.1	3.8	3.1	4.4
Scenario 3	Male	Secondary	-3.7	9.5	9.4	5.2	7.8	9.2
Scenario 3	Male	Primary & lower	4.8	15.4	19.3	20.0	6.2	13.3
Scenario 3	Female	Tertiary	20.4	2.4	-1.6	-7.3	-18.2	3.9
Scenario 3	Female	Secondary	-9.3	-7.3	-3.2	-3.4	-17.5	-2.3
Scenario 3	Female	Primary & lower	-15.4	-0.4	1.5	0.4	-16.3	4.1
Scenario 4	Male	Tertiary	3.0	13.3	9.0	12.3	20.6	11.5
Scenario 4	Male	Secondary	2.2	12.4	13.0	19.3	13.6	12.4
Scenario 4	Male	Primary & lower	0.4	8.2	22.7	24.0	8.3	37.7
Scenario 4	Female	Tertiary	-10.0	-2.7	-3.0	-14.4	-31.3	-0.7
Scenario 4	Female	Secondary	-18.7	-7.9	-8.1	-7.7	-27.6	-3.8
Scenario 4	Female	Primary & lower	-43.8	-3.8	-16.1	-13.1	-40.6	9.1

Source: Authors' calculations.

5. Concluding remarks

The aim of this study is to analyse the interrelationships between fertility and the retirement benefits of men and women, and next to consider possible changes in old-age pension systems to stimulate decisions on having children. For this purpose, a micro-simulation model has been formulated that accounts for different labour market behaviours of persons by age, gender, education, the number of children and the timing of childcare responsibilities. The input data for the simulations has been drawn from LFS data on employment patterns by age for men and women with different education levels, numbers of children, variations in the timing of caring for children and wage profiles for five countries: Italy, Latvia, Lithuania, Poland and Germany. Their future retirement benefits have been simulated under three variants: variant I uses country-specific labour market data and old-age pension systems, variant II makes use of German labour market data and country-specific old-age pension systems, and variant III refers to country-specific labour market data and the Polish defined contribution system. For each simulation variant, four scenarios have been used, which refer to the impact of having children (a person without a child, a person who cares for one child at age 25-44, a person who cares for more than one child at age 25-44 and someone who cares for one child at age 35-54).

Variant I shows ‘predictions’ of future retirement benefits in the countries considered under existing labour market structures. Variant II aims at demonstrating the isolated effects of country-specific old-age pension systems for future benefit levels, while variant III illustrates the relevance of labour market-related factors for retirement benefits. By comparing the results of variants II and III, one can conclude that what considerably affects the future retirement benefits of women is not the old-age pension system but the consequences children have on the labour market careers of mothers.

The results of variant I show the joint effects of the labour market structures and old-age pension system rules. They confirm that fathers have tended to work more and earn more than childless men. Meanwhile, having children negatively affects the future retirement benefits of women, although the impact is mitigated by education. Also, the timing of caring for children matters: women who start their maternal careers later, i.e. who postpone their decision about having a child (at age 35) will lose less in terms of future benefits than women who have children earlier (starting at age 25).

Variant II, run additionally for Estonia, Slovakia, Slovenia and Hungary, reveals that the effects of different old-age systems for retirement benefits are relatively small. In some old-age pension systems, the differences between the benefits of persons with and without children are not as large as in defined contribution systems (e.g. in Poland). One can suggest that these systems have an additional indirect mechanism of redistribution. These hidden future transfers have been especially important for persons with lower education levels and for women.

What really matters for the future retirement benefit is the labour market structure, as variant III demonstrates. Here the differences are clearly visible. When the rules of the defined contribution system in Poland are applied to Italian and German labour markets, it is clear that women with non-tertiary education are especially penalised in their retirement benefits owing to caring for children. They would expect lower retirement benefits by over 20% for having one child and by 20-40% for two or more children.

Summing up, the simulation results allow for the conclusion that it would be more effective in terms of their future retirement benefits to reduce the negative impact children have on the labour market participation of mothers. Therefore, work–family reconciliation measures aimed at keeping mothers in employment seem to be highly relevant. They would also diminish work–family tensions, which could in turn facilitate decisions about having children.

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About AIM (Adequacy & Sustainability of Old-Age Income Maintenance)

The AIM project aims at providing a strengthened conceptual and scientific basis for assessing the capacity of European pension systems to deliver adequate old age income maintenance in a context of low fertility and steadily increasing life expectancy. The main focus is on the capacity of social security systems to contribute to preventing poverty among the old and elderly and more generally to enable persons to take all appropriate measures to ensure stable or “desired” distribution of income over the full life cycle. In addition it will explore and examine the capacity of pension systems to attain broad social objectives with respect to inter- and intra generational solidarity.

Furthermore it will examine the capacity of pension systems to allow workers to change job or to move temporarily out of the labour market and to adapt career patterns without losing vesting of pensions rights. The project will also address the specific challenges with respect to providing appropriate old age income for women.

A general objective of the research project is to clearly identify and analyse the potential trade-offs between certain social policy objectives and overall stability of public debt.

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Participating institutes

- Centre for European Policy Studies, CEPS, Belgium, coordinator
- Federal Planning Bureau, FPB, Belgium
- Deutsches Institut für Wirtschaftsforschung (German Institute for Economic Research), DIW, Germany
- Elinkeinoelämän tutkimuslaitos, (Research Institute of the Finnish Economy), ETLA, Finland
- Fundación de Estudios de Economía Aplicada , FEDEA, Spain
- Social and Cultural Planning Office, SCP, Netherlands
- Istituto di Studi e Analisi Economica (Institute for Studies and Economic Analysis), ISAE, Italy
- National Institute for Economic and Social Research, NIESR, United Kingdom
- Centrum Analiz Społeczno-Ekonomicznych (Center for Social and Economic Research), CASE, Poland
- Tarsadalomkutatasi Informatikai Egyesüles (TARKI Social Research Informatics Centre), TARKI, Hungary
- Centre for Research on Pensions and Welfare Policies, CeRP, Italy
- Institute for Economic Research, IER, Slovak Republic
- Inštitut za ekonomska raziskovanja (Institute for economic research), IER, Slovenia