

## **Work Disincentives for Women in Old Age Security Systems and How to Ameliorate Them**

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### **Abstract**

This paper analyzes features of social security systems that are ostensibly designed to help women but have the perverse effect of discouraging their labor force participation and investment in their labor market careers. Some of these provisions stem from explicit differentiation between men and women—for example, an early allowable retirement age for women is quite common. Simulations show that this reduction in expected years of work decreases women's opportunities for on-the-job training, wages and pensions.

Many other social security rules do not explicitly differentiate between men and women but have different effects on the genders because of their contrasting demographic characteristics and social roles. For example, women's lower wages and employment histories means that they benefit disproportionately from safety net arrangements in social security systems—but phase-out rules and penalties on marginal work to those receiving minimum or means-tested pensions create disincentives for continued employment among low-earners, many of whom are women. Women's greater longevity means that they are likely to become widows and to gain from survivors' benefits, but when these benefits displace their own pensions—as they often do—this depresses the return to contributions and therefore their incentive to work. In each case, the net private return to women's market work is less than the social productivity of that work, due to high implicit taxes that stem from these rules.

We discuss policy options that some countries have adopted, to remove these distortionary effects on work incentives: equalizing statutory retirement ages for men and women, eliminating high phase-out rates on safety net benefits or granting higher minimum pensions for those with longer years of work, and allowing widows to keep their own pensions in addition to survivors' benefits or joint annuities that their husbands are required to purchase. These provisions will enhance women's financial independence and their contributions to the over-all economy.

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by Estelle James<sup>1</sup>

Social security systems in many countries were established at a time when strong social norms dictated that women marry, have children when young, and thereafter withdraw from the labor market. Women focused their time and efforts on home work while their husbands worked in the market and provided financial support. Marriage was a lifetime contract; divorce was rare. Social security provided a back stop for women in case spousal support failed—for example, if the family was poor or if the husband died. Social security rules reflected the prevailing norms regarding gender roles. There was no concern about their effects on women's market work because such work was rare.

During the past few decades a new set of norms have evolved. Marriage is less inevitable and more temporary, divorce more common. Women are now likely to have fewer children and more likely to work in the market place. While the timing and rate of change varies widely across countries, the direction of change is the same almost everywhere—toward less reliance on marriage and more on women's work. Women have longer periods in which to support themselves before, between and after marriages, and during marriage they are more likely to contribute substantially to the family's financial resources.

At the same time, in most countries we find a greater range of behaviors than before. Some women stay at home while others spend some or most of their adult lives in the labor market. This means that individuals have greater personal discretion, which in turn implies that they may respond to incentives from the social security system. But rules that were put in place based on yesterday's social norms may penalize women's work and job training. They create incentives that discourage market work by women, thereby making it difficult for women to raise their standard of living, gain financial independence and add to the economy's productive capacity. These perverse incentives may be particularly salient for low-earning women. In this paper we analyze features of pension systems that affect women's work and welfare, especially those that discourage female labor force participation and investment in women's labor market career.

Part I sets the stage for this discussion by summarizing data on the differences between men and women regarding labor force participation, wages, longevity, divorce and widowhood. Subsequent parts analyze several policy choices (regarding retirement age, safety nets, survivors' benefits and annuitization) that protect women who have low labor market participation but may also discourage their increased participation.

Some social security rules explicitly differentiate between the genders. Most notably, in many countries women are permitted to retire earlier than men, an arrangement that we discuss in Part II. Gender-based differences appear in about a third of the cases in our sample of low, middle and high-income countries. A common argument in favor is that women who have worked in the market have also carried a disproportionate share of the household responsibilities, so they have really been holding two jobs and should therefore be able to retire (from market work) at an earlier age. However, this practice may reduce women's opportunities for training and higher wages during the working years and pensions during the retirement years. It also deprives the economy of potential labor and human capital.

A broad range of social security rules—especially those regarding safety nets and survivors' benefits--do not differentiate between the genders explicitly but affect men and women differently because of their differing demographic characteristics and employment histories. Although women's earnings have increased dramatically, especially in high-income countries, they still have not reached equality with that of men. But women live longer than men, and therefore require more, rather than less, resources to support them over the lifetime. This means that social security rules that redistribute to low earners and shift income to very old ages potentially help women disproportionately. At the same time, these rules sometimes exclude women or discourage market work, thereby keeping them in a financially dependent state. For example, minimum pensions potentially raise women's incomes, but eligibility may require a level of contributory years that most women do not achieve. Flat benefits designed to establish a retirement income floor may be phased out as the individual's own pension rises—thereby implicitly taxing formal work by low earners, who are predominantly women. Part III discusses these safety net arrangements and how to structure them to ameliorate this tension between poverty prevention and work incentives.

Survivor's benefit programs constitute another example of arrangements that affect men and women differently. They may, simultaneously, prevent poverty among older cohorts and discourage work among younger cohorts. In some countries only widows are eligible for such benefits; widowers are excluded—a clear case of gender differentiation. But even if applied to both genders, women are more likely to become recipients, because they tend to be younger than their husbands and have longer expected lifetimes. In many countries, survivors' benefits are financed by the common social security pool and women must give up their own benefits to become eligible—a work disincentive since their prior contributions become a pure tax. More recently, some countries have imposed a requirement that husbands and wives finance a joint pension that covers the surviving spouse by taking a smaller payout themselves. In these cases, widows keep their own pension in addition to the joint pension—the work disincentive is removed. Survivors' benefits and joint pensions are discussed in Part IV.

Finally, some social security rules have a large impact on the distribution of retirement resources between men and women while probably having only a small impact on work incentives. This is true, for example, of the choice between price versus wage indexation of benefits (or no indexation at all), the choice between unisex versus gender-specific mortality tables in determining annuity amounts, and rules regarding the division of pension rights upon divorce, as discussed in Part V. Wage indexation combined with the required use of unisex tables raises the return to and therefore may modestly encourage women's work—but has the opposite effect on men. The net impact on work is likely to be modest. Similarly, splitting the pension rights and assets acquired during the marriage, upon divorce, transfers income to wives from their husbands but probably has a minor impact on over-all work propensities. The Conclusion summarizes reforms that would protect women without deterring their propensity to work, invest in human capital, and contribute to the broader economy.

In this analysis we use the term “benefits” and “pension” interchangeably, also “social security system” and “pension system” interchangeably. But we distinguish between defined benefit (DB) and defined contribution (DC) systems. Traditionally most social security systems were publicly run DB schemes but in the last three decades many

countries have added a mandatory privately-managed DC component. As we shall see, these two regimes have quite different impacts on the incentives facing women (see Box).

Any discussion of incentives implies that the individual is sufficiently informed about the rules of the game to take them into account in her work decisions. Also, she must have a sufficiently long run time horizon to think about how current work may affect future benefits. To some extent, this conflicts with the underlying rationale for mandatory social security arrangements--that some workers are myopic and don't place enough weight on their long run needs. Key words are "some" and "long run." Some workers are myopic and mandates substitute for their own planning deficits. Some workers are far-sighted and will respond to incentives in a pension plan. Moreover, rules that have short run effects are more likely to elicit noticeable reactions. Many empirical analyses indicate that older men respond strongly to incentives from the pension system in deciding when to exit from the labor force (in contrast to the weaker response previously found for younger men deciding whether to marginally adjust their labor supply). (See references in Edwards and James 2008).

Women face especially large (dis)incentives--examples are the low incremental returns to work for widows or low earners and small rewards for continuing work beyond women's earlier allowable retirement age. The implicit tax that older women face from these policies is high. Additionally, in contrast to men, women have the socially acceptable alternative of working in the home rather than the market, while income flows for the family are generated by their husbands, so relative rewards are more likely to influence their choices even when young. Recent empirical evidence suggests that women respond to these incentives (see below), but these studies are scarcer than those for men. Estimating the size of the reaction to work (dis)incentives stemming from the social security system by women remains a fruitful field for future research.

### **I. Demographic and Labor Market Differences Between Men and Women and their Implications for Policy**

In most public pension programs, workers receive benefits that depend on wages and years of work or more directly on their contributions. However, women are likely to

have worked and contributed fewer years than men and earned lower wages when working, yet they live longer, which gives them a smaller pension and puts them at risk of poverty in very old age. Policies that take these behaviors as given and don't consider the effects of rules on work propensities may exacerbate the gender differences.

### **Labor force participation rates**

Women, especially married women, traditionally have less continuous employment than men due to the division of labor within the family. In low and middle income countries, they typically work 40-60% as many years as men. In industrialized countries this ratio has been rising in the last two decades, but is still only 80-90% (see Table 1). In OECD countries the gender gap is only 12% for women without children, but jumps to 32% for women with two or more children (James, Edwards and Wong 2008). In the transition economies of Eastern and Central Europe female work propensities are actually declining (from their very high levels during the Soviet period) and the gender gap is increasing (Woycicka et al 2003). Even when women work, their work is usually part-time, temporary and may be in the informal sector, where contributions are not made to formal social security schemes. Women's coverage by these systems is therefore likely to be highly sensitive to eligibility conditions and benefit formulae, which specify the linkage between contributory years and pension amount. The same rules may imply quite different degrees of protection and marginal work incentives for men and women, because of their different starting points, life trajectories and options.

### **Wage levels**

Women typically earn less per week or year of work than men. This may be due in part to their lower labor force attachment (past experience and expected future tenure), in part to occupational segregation, and in part to social norms that condone lower pay to women. In Chile, Mexico and Argentina, at age 20 women earn almost as much as men, but the disparity increases with age and by 50 they earn only 60-70% as much per month of work (James, Edwards, and Wong 2003 and 2008). The gender gap in work and pay is smaller, but still significant, in higher income countries. For example, in the U.K., U.S., Canada and Australia hourly wage rates for women are 15-30% less than that of men, controlling for age and education (Falkingham and Rake 2001, Ginn et al. 2001, U.S. GAO 1997). Thus any pension system that links benefits to earnings is likely to produce

lower benefits for women than men. Safety nets and the incentives they create are especially relevant to women, who are disproportionately at the bottom end.

### **Longevity**

In most countries, women at age 60 or 65 have a life expectancy that is 3-5 years greater than that of men. In Chile, a woman who stops work at age 60 can expect a retirement period of 8 years more than her husband when he retires at age 65. Thus retirement savings must stretch over more years, are likely to be exhausted if benefits or annuities are not guaranteed for life, and will yield smaller monthly pensions if gender-specific mortality tables are used in determining pension size. If pensions are not indexed for price growth, the real value has more years in which to decline in real value. In addition, women are more likely to grow very old, by which time they have used up any voluntary savings and their pensions have fallen way behind the contemporary standard of living, if not wage-indexed. As a result, poverty among the elderly is concentrated among very old women.<sup>2</sup> This problem is exacerbated if the statutory retirement age is younger for women than for men.

### **Widowhood**

Women tend to be younger than their husbands yet live longer, so are more likely to become widows. For example, in the U.S., 72 percent of women aged 80 to 84 are widows but only 27 percent of men that age are widowers (James, Edwards and Wong 2008). Widowers are more likely to remarry than widows; widows are more likely to live alone. Hence survivor's pensions are of key importance to women. Without survivor's benefits, widows who did not work in the labor market are likely to find themselves impoverished. Even widows who have a pension of their own would find their household incomes cut by much more than their cost of living when their husband (who is likely to be the high earner) dies. Survivor's insurance is included in most social security systems, to fill in this gap. In public DB systems survivors' benefits are financed by the common pool and usually the widow must choose between her own pension and the survivor's benefit; she cannot keep both even if she has contributed. In contrast, joint annuities, financed by the husband, play a major role in the new Latin American mandatory DC systems. Typically the widow can keep her own annuity as well as the joint annuity, thereby removing a disincentive to formal work.



## **Divorce**

Typically, in the past, men and women married for life. Divorce was illegal or bore a social stigma. But these patterns have been changing. In Europe almost half of all marriages now end in divorce. While the proportion is much smaller in most low and middle-income countries, divorce rates (or informal separation) have been rising there too. The fact that wives can't count on life-long financial support from their husbands is probably one reason for their rising labor force participation rates. Old age systems have been grappling with new rules for handling pension rights and accumulations in case of divorce. In some countries the couple's contribution credits and retirement savings are split between the spouses upon divorce. In the absence of well-designed rules, older women who unexpectedly find themselves divorced become likely candidates for social security's safety net.

## **II. Earlier Statutory Retirement Age for Women**

Rules of the system often allow women to start their pension earlier than men, thereby exacerbating the gender differential in labor force participation rates, benefit amounts and number of retirement years. For example, women are permitted to retire five years earlier than men in Brazil and Russia, ten years earlier in China and Iran. This enables them to retire at the same time as their husbands, who tend to be several years older. It is sometimes argued that working women have two jobs—one at home and a second in the market—so they are “entitled” to retire earlier, as compensation. But it is a costly compensation to women, the social security system and the economy. Rather than solving, it adds to the problems caused by lower wages and labor force participation and higher life expectancy among women. Early retirement may seem to be a privilege—appreciated by women who don't enjoy their work and prefer leisure—but they pay the price later on in terms of lower standard of living. It may also discourage employers from hiring, training and promoting older women, for fear they will retire soon. The longer years of retirement place a fiscal strain on social security systems. The loss of experienced labor reduces the country's GDP.

## Data and definitions

Table 2 presents data on the statutory retirement ages for men and women in many countries. By statutory we mean—the age at which men and women are permitted to start their pensions without meeting special pre-conditions. (Earlier pensioning, sometimes with a reduced pension, is usually allowed for individuals who meet special conditions—such as a threshold years of service for DB plans or a minimum retirement accumulation for DC plans). In many cases, individuals must stop work when they start their pensions.

We see large regional differences in patterns of statutory retirement ages for men and women. Pension age is highest and rising in the high-income OECD countries. In almost all these countries, statutory retirement age is the same for men and women, although historically they differed. In a few cases (e.g. Australia, Austria and the UK) equality is now being phased in. In contrast, pension age is lowest in Asia, Africa and parts of Latin America, where longevity is lowest, and is 3-5 years lower for women in about a third of these cases. This includes some of the most populated countries in the world. The picture is bleakest in Eastern Europe and Central Asia, where the longevity differential is greatest yet retirement age is 3-5 years lower for women than for men in almost all cases. Poland is a good case in point. Life expectancy at 65 is 19 for women versus 14.5 for men. Yet, women are allowed to retire at 60 instead of 65. The net result is a 9-year difference in life expectancy at normal retirement age.

A few distinctions should be noted: between statutory versus mandatory retirement age, statutory versus actual retirement age, and age that pension starts versus age that work stops.

*1. Statutory retirement age does not mean mandatory retirement age.* The statutory age allows the pension to start, but does not require that. Very few countries have laws that make retirement mandatory at a specified age. A larger number (e.g. Turkey, Sri Lanka, Thailand, Chad and Kenya) makes retirement mandatory for public sector employment, where it is easier for the government to monitor and enforce such policies. Wages in the public sector often rise with seniority, so after a point remuneration may exceed productivity, at which point mandatory retirement enables the government to shed them without complicated procedures. Although mandatory

retirement provisions rarely apply to the private sector, private employers are usually allowed to put such provisions into the employment contracts. The U.S. is one of a very small number of countries that makes such age-related provisions illegal.

2. *The statutory retirement may be quite different from actual retirement age.* The statutory retirement age sets a norm, but actual retirement age may be more influenced by system rules regarding early retirement. Earlier pensioning, sometimes with a reduced pension, is generally allowed for workers who meet certain pre-conditions—such as a threshold years of service for DB plans or a minimum retirement accumulation for DC plans. For example, in Chile, the vast majority of workers start their pension prior to the “normal” age of 60 for women, 65 for men. Men meet the early retirement pre-conditions more readily than women because their work patterns are more regular (and they are more likely to qualify for disability benefits), so the actual retirement age gap is far less than the statutory gap. When early pension pre-conditions were tightened in 1981, a dramatic postponement of pensioning occurred (Edwards and James 2008). In the U.S., the majority of workers start their pensions before the “normal” age of 65, but few start before age 62, which is the earliest possible age of eligibility for social security benefits.

Unfortunately, we do not have systematic data from many countries on actual retirement age of men and women. It would be useful for countries to start collecting this, so we know what is actually going on. However, studies from selected countries have shown that, once individuals meet the age or conditions at which they can start their pension, most do so (Gruber and Wise 1999 and 2004). That is, pensioning is more likely to be accelerated than postponed. This is partly because of myopia—the basic reason for social security in the first place. Many individuals have a high subjective discount rate, do not save voluntarily for their old age and will start using any available retirement wealth as soon as they can. Another reason is the structure of DB plans. These plans are usually not actuarially fair—pensions do not increase in line with the market rate of return if workers postpone, and sometimes they do not increase at all.<sup>3</sup> Then, even far-sighted individuals will not postpone their start of pension and exit from the labor force, since that would cause the net expected present value of total lifetime benefits minus contributions to fall.

3. *Work often stops when pension starts, but this is not always the case.* In principle, people can go on working after they start their pensions. However, in practice the two decisions often coincide. Evidence from many countries with DB plans shows that a strong preponderance of workers start their pensions as soon as they can, and stop work at the same time. (Gruber and Wise 1999 and 2004). (Of course, at the individual level many other factors, such as job satisfaction, education and availability of medical insurance also influence the decision. See Esser 2006). In some cases, pensioners are required to stop working or at least must leave their current jobs. In other cases, if they continue working they lose part of their current benefit and must contribute to the social security system without getting a commensurate increment in future benefit, so their net remuneration from work is severely cut. Finally, access to an alternative income source (the pension) allows them to “purchase” more leisure.

The labor force participation rates of pensioners tends to be lower in countries whose social security systems impose a high implicit tax on work (Gruber and Wise 1999). In the U.S., once the earnings penalty on continued work (i.e. the benefit cut for pensioners who had earnings) was discontinued, the labor force participation rate of older workers increased dramatically (Haider and Loughran 2008, Engelhardt and Kumar 2009, Song and Manchester 2007). Large labor supply effects also appeared shortly after the repeal of the earnings test in Canada and the U.K. (Baker and Benjamin 1999, Disney and Smith 2002). In Chile, the exemption of pensioners from the pension payroll tax after 1981 strongly increased their work propensities. Tightening the early retirement pre-conditions led workers to postpone the start of their pension and continue working longer (Edwards and James 2008). If women are permitted to start their pensions earlier than men they are likely to do so, and withdraw from the labor market at the same time. Only later do they realize that this has drastically reduced their future standard of living—but by then they are too old reverse their decisions.<sup>4</sup>

#### **Impact of earlier retirement age on pension amounts and fiscal costs: DB vs. DC**

Monthly benefits are usually lower for women than for men, because they have fewer contributory years and a lower wage history. Their earlier allowable retirement age is one factor that leads to this result. The impact of earlier retirement on pension amounts

and fiscal costs varies sharply between DB plans, which are usually pay-as-you-go, and DC plans, which are usually pre-funded.

In a DB plan a formula determines the pension a person will get. Usually it is of the form:  $\text{Pension} = \alpha * w * Y$ , where  $w$  is the reference wage (e.g. an average of the last few years' wage),  $Y$  is years of contributions and  $\alpha$  is the accrual rate per year. In contrast, in a funded DC system the person's annual contributions build up over his or her lifetime, are invested and the accumulation is eventually turned into a pension or other withdrawal upon retirement. The pension depends directly on amount of contributions, the rate of return earned on investments and rules regarding the payout stage. (See box on DB vs. DC plans)

We carry out a simulation to illustrate the differential effects of early retirement on pension amounts in DB versus DC plans (Table 3). Consider a woman whose statutory retirement age is 60, compared with 65 for a man. We assume that her DB plan is positively related to her earnings and contributions, but not on an actuarially fair basis. In an actuarially fair system, the expected present value (EPV) of incremental contributions produces an equivalent EPV in lifetime benefits and postponing the pension leads to higher monthly payments with an unchanged lifetime EPV. Most DB systems are not actuarially fair, so incremental contributions and pension postponement do not increase monthly benefits commensurately (Gruber and Wise 1999 and 2004). Often, after a specified retirement age or amount the benefit does not rise at all, or at a relatively low accrual rate. The DB formula in this example assumes a wage of \$500, a required contribution rate of 10% and a pension that is  $1.5\% * w * Y$  until age 60,  $.75\% * w * \delta Y$  for any contributory years thereafter. The woman is assumed to work 20 out of a potential 40 years between ages 20 and 60, at a constant wage. She is allowed to start her pension at age 60. Upon retirement, her wage-replacement rate would be less than that of an otherwise equivalent man, who has worked full career.

If, now, she is required to postpone her pension to 65 (like men) and doesn't work in that period, her monthly pension does not change. Instead, the EPV of her lifetime benefits falls, because she receives the pension for fewer years. If she works longer to get some income between ages 60-65, her monthly pension rises, but not enough to compensate for the additional contributions—so she has little incentive to postpone or to

work after 60 (Table 3, rows 1, 3 and 4). This effect is even stronger in countries where the public benefit is flat (uniform for all) and does not reward extra work (see Part III).

It is hardly surprising that women object to raising the statutory retirement age in such a system. When they are permitted to retire earlier, they get additional years of leisure while paying little or no price in terms of lower monthly benefits. Meanwhile, the system's financial pool pays the higher EPV and the economy loses the fruits of her labor. Most OECD countries are now moving toward higher and equal retirement ages and some countries in Eastern and Central Europe are also narrowing the gender gap in retirement age, to avoid these outcomes.

In contrast, in DC plans, retirement savings are usually converted to annuities on actuarially fair terms. This means that the expected discounted lifetime benefit must equal the accumulated savings, so women bear the financial cost of their earlier retirement by receiving smaller monthly pensions.<sup>5</sup> We calculate the monthly and lifetime benefits that the same woman would receive, under two different rates of return—3% and 4%. Under the 3% regime, her pension at age 60 in the DC plan is less than it would be in the DB. Under the 4% regime her pension is greater in the DC plan.<sup>6</sup> However, in both regimes, if the woman postpones her pension for five years, her monthly pension ends up higher under the DC plan than it would be under the DB. Under the DC she (1) accumulates interest for 5 more years, raising her total savings by 15-20% and (2) spreads these savings over 5 fewer years, raising her monthly annuity by another 25-30%. In addition, if she continues working and contributing, she further increases her monthly pension. The higher the rate of return on investments, the larger are these gains.

In the DC plan, the EPV of lifetime pensions is unchanged when pension age is postponed, since the larger monthly amount just offsets the smaller number of years. If she adds to her retirement saving by working and contributing longer, the EPV of her lifetime benefits rises in line with the EPV of her contributions. This contrasts with the DB plan, where the EPV of her lifetime benefits falls when her pension age rises, and if she works longer the EPV of her benefits goes up by less than the EPV of her contributions. This rise in lifetime benefits in a DC plan correctly signals the market productivity of the increased labor and capital that is lost to the economy when workers do not postpone pensioning and withdrawal from the labor market.

Taking Chile as an example: the earlier statutory pension age for women (60 vs. 65 for men) advantaged them when Chile had a DB plan, but in the DC system it has had since 1981 the advantages are far less clear. In the DC, leisure goes up but income goes down when the pension starts earlier. Women's monthly retirement income would be increased by 40-50% if their pension age were raised to 65, and by more if they worked and contributed during some of those additional years (see James, Edwards and Wong 2003 and 2008).

It would seem that, under DC plans, these incentives would lead women to voluntarily postpone pensioning and work longer--so raising the mandatory retirement age would not be necessary. To some extent we do see this voluntary adjustment, both by men and women, as countries like Chile shifted their social security systems from DB to DC plans (Edwards and James 2008 and 2010). However, the earlier access to retirement savings remains very attractive to many women when they are young-old—evidence of a high subjective discount rate relative to the rate of return they get in their DC accounts. (Indeed, this high subjective discount rate is the reason for having mandatory old age schemes and setting a floor on retirement age, in the first place). The political unpopularity of raising the retirement age led Chile's government to maintain the gender differential when the system revised in 2008. (see James, Edwards and Iglesias 2009).

### **Impact of earlier retirement on wages and investment in women workers**

Older workers typically earn more than younger workers. This is partly because their productivity increases with experience and partly because of remuneration rules that tie wages to years of tenure (particularly in the public sector). Cutting off the last few years of work therefore eliminates some of the higher-paying years, and accounts for part of the average male-female wage differential found in many countries.

It also makes it less profitable for women to invest in themselves via schooling or for employers to provide on-the-job training. Consider a man who is considering advanced education, after which he plans to work for 40 years, while the woman expects to work for only 20 (full time equivalent) years because of child-bearing, child-rearing and earlier retirement. Suppose the cost of another year of schooling is \$2000. The man will recoup that cost with an annual wage increment of \$87 (assuming a 3% discount rate, or \$101 at a 4% rate). But if the woman works only half the time, to recoup that same

total amount she must get an increment of \$174 per working year. She is less likely to meet this target and choose the additional schooling. Given their greater longevity, women could partially offset their child-bearing years by working longer than men, but the opposite happens in countries where they are permitted to start their pension earlier—and this exacerbates the differential. Their lower labor market participation rate decreases their incentive to acquire additional education and increases the male/female wage gap.

The impact on pensions, which are far into the future, is likely only a minor consideration when young women are making their educational decisions. The impact on on-the-job training of middle aged women and their employers is probably more significant. An employer who considers training a 45-year-old man sees 20 years of work ahead of him in which to get returns, but only 15 years for a full-time woman who, he expects, will retire at 60. If the investment costs \$1000 and yields incremental net revenues of \$100 per year, the rate of return for investing in the man is 7.8% but only 5.6% for the woman. An employer who wishes to maximize his profits will choose the man. Even if an individual woman plans to work to 65, the employer doesn't count on that if her statutory retirement age is 60. Consequently, women acquire less human capital, don't get the returns to human capital and have flatter age-earnings profiles.

For example, in Chile a 60-year-old man with some college education earns 140% more than a 20-year old, while 60-year-old woman earns only 60% more, in part because of her lesser experience and on-the-job training. The lower wage depresses her incentive to continue working, so the expectation that she will retire at 60 becomes self-fulfilling. Her future pension is depressed, both by her lower wage and fewer working years.

The lost incentives for education and training and their lower years of work mean less wage and pension income for women, less productivity and output for the national economy. Smaller pensions add to the social problem of poverty among the very old, especially widows. Longer years of pensioning put a strain on a country's social security system. The pressure to provide a non-contributory pension puts a strain on the country's tax system. These problems would be reduced if the statutory retirement age for women were raised to that of men.

### **III. Safety Nets: Eligibility and Phase-out Rules**



Many social security rules that are not explicitly gender-specific nevertheless have different effects on men and women because of the way they interact with employment and demographic circumstances. The most important such rules concern safety net arrangements such as flat (uniform) and minimum pensions that are designed to protect the elderly who do not have strong earnings-related pensions. Many of these potential beneficiaries are women, who have worked in the home instead of the market, and therefore have low contributory pensions. Indeed, older women are usually major gainers from safety net arrangements. But eligibility rules may exclude them; sometimes contributions for a long specified period are required, in order to qualify. This can cause startling dips and jumps in the rate of return to market work. In other cases, benefits are phased out as the person's contributory pension grows; the phase-out rate becomes an implicit tax. Then, policies designed to redistribute income to women and other low earners have the side effect of reducing the net remuneration from and incentive for formal market work. Women may be more sensitive than men to these incentives, because their income is in the low range where the phase-out and implicit tax are relevant and they have the socially acceptable alternative of non-market work in the home.<sup>7</sup>

### **Non-contributory flat benefits as a safety net**

In addition to (or in place of) an earning-related pension, some countries offer a universal flat (uniform) benefit to all residents, once they pass an age threshold such as 65. A contributory history is not required. The Netherlands and New Zealand are prime examples. Practically the entire old age security program in New Zealand consists of a generous flat public benefit (about 38% of average wage) for all residents over age 65; employment is irrelevant and no one is excluded. The Netherlands has a similar public flat benefit, but smaller (about 31% of average age and accompanied by a quasi-mandatory private occupational plan where benefits depend on earnings). These arrangements are meant to avoid poverty by setting an income floor for each elderly person. They are redistributive to low earners because everyone receives the same amount but those with high incomes pay more to finance it.

In the Nordic and Anglo-Saxon countries where non-contributory flat benefits are common, they are usually 20-30% of the average wage, financed by government's

general revenues. Typically they are indexed to wages; that is, they rise with wage growth (Table 4). So, they keep the elderly out of absolute poverty as well as relative poverty, compared with contemporary workers. Some low- and middle-income countries (Bolivia, Botswana, Kosovo, Mauritius, Namibia, Nepal) also offer flat benefits to all seniors. Given their limited fiscal capacities, the benefit level in these countries is usually low--only 10-20% of per capita income--and the qualifying age is high—70 (Palacios and Sluchynsky 2006).

Women are major gainers from such uniform pensions. They get the same monthly pension as men but, since they live longer, they get a larger EPV of lifetime gross benefits. And, since their low income implies a small tax payment toward financing the cost, women also get an income redistribution from men. These arrangements may discourage market work by women to some extent, because they provide additional lifetime income, hence allow women to allocate more time to household work or leisure. However, the work disincentive due to the tax cost of financing the pension is probably small and the implicit tax cost due to phase-outs, discussed below, is absent for pure flat benefits.

### **Phase-out rules**

In an effort to cut costs, the flat benefit is often phased out as private income grows. The phased-out benefit is even more redistributive than the pure flat, because high earners get less while paying more than low earners. But the phase-out rate becomes an implicit tax on work—much higher than the explicit financing cost. This rate varies widely across countries, from 15% to 50% (15-50 cents of flat benefit is lost for every dollar of contributory benefit). The phase-out typically ends (because the public benefit reaches 0) when private income is 50-90% of the average wage. This means that the benefit is received by roughly half of the population and the implicit tax deters work by that same group. Usually the phase-out takes into account all household income beyond a threshold amount, although in some cases (Finland, Norway) only the individuals' pension income counts (Table 4).

Australia has a typical plan--a flat benefit that is 25% of the average wage and means-tested against the income and assets (except for housing) of the individual (or couple, if married). Starting after a small exempt private income, the public benefit

phases out at the rate of 40%, which means it equals 0 when other retirement income equals 68% of the average wage. About 80% of all old people get some public benefit and are subject to the 40% implicit tax during the phase-out stage. Australia's plan is even more targeted toward low-earners and women than that in the Netherlands or New Zealand because of the phase-out. Women are the major recipients. The average monthly benefit per person is larger for singles, so divorced and widowed women get the highest EPV of lifetime benefits. The means-test economizes on fiscal costs; but as a trade-off, it also discourages work and saving more than a pure flat benefit would, because it decreases the net return to contributions. While approaching retirement age and shortly thereafter, within the range of the public benefit, individuals have less incentive to work due to the income effect, the explicit tax cost of financing it, and the implicit tax cost from the phase-out as their contributory pension grows. (See James, Edwards and Wong, 2008 for an analysis of an Australian-type plan).

South Africa offers a non-contributory benefit to all men over 65 and women over 60, whose income and assets fall below a specified threshold. The value of the grant is supposedly phased out as the person's private income rises; however, data show that almost all recipients receive the maximum amount so this phase-out may not be vigorously enforced. The benefit is received by 80% of age-eligible Africans and 30% of age-eligible Whites. Since it is very large relative to average African wage, this benefit provides large income and substitution effects toward stopping work and consuming more leisure. Extensive analyses of this system show significantly large improvements in child health and education in recipients families—evidence of poverty alleviation and inter-generational family sharing of income. They also show significantly large negative effects on the labor supply of elderly Africans, especially among women—evidence of the labor market trade-offs in poverty-alleviation programs and the need to design these programs to minimize work disincentives. (See Ranchhod 2006, Bertrand et al 2003, Duflo 2000, Case and Deaton 1998).

### **Minimum pension guarantees (MPGs)**

In some countries the phase-out rate is 100%--this is a minimum pension guarantee. That is, all seniors are guaranteed a minimum income, their contributory pension crowds out the public subsidy dollar for dollar, and income does not rise above

the minimum level until the public benefit is fully displaced.<sup>8</sup> Chile's minimum pension, like that in other Latin American countries, is a case in point. It guarantees a pension of about 25% of the average wage to all eligible seniors. If the individual's own annuity is lower, the public treasury tops it up to the MPG level. An extra dollar of own-pension simply reduces the subsidy by an equivalent amount. This 100% implicit tax strongly cuts the incentive to work in the formal market for individuals whose potential contributory pension is less than or close to the minimum. Women are disproportionate recipients and also disproportionately subject to these distortions.

### **Ways to improve the trade-off between poverty prevention and work incentives**

To avoid the work disincentives posed by phased-out flat benefits and minimum pensions, while still alleviating poverty and controlling fiscal costs, countries have adopted a number of measures—for example, they impose contributory requirements on eligibility, grant a higher minimum pension depending on years of contributions, pay a flat benefit per day or month of work, or split contributions and pension credits between husband and wife.

*1. Contributory requirements.* Sometimes flat benefits or minimum pensions are provided only to contributors, not to all residents. The contribution requirement is supposed to incentivize work. But it imposes new problems of its own. If set “too low” it becomes irrelevant. But if set “too high” many individuals, especially women, will fail to qualify and may end up below the poverty line. An on-off switch for eligibility also creates strange patterns of work incentives—a 100% implicit tax on work is imposed on those far below the cut-off point or just above it, but the marginal rate of return is high for those slightly below the bar, who become eligible if they work a bit more. Countries thus face a trade-off between tight eligibility requirements that cut costs while rewarding formal sector work in some ranges but not others, versus a more costly program that redistributes to the elderly who are probably the most needy, because they have the lowest contributory history. This tension is particularly apparent in Latin American countries that had contributory requirements for their flat and minimum pensions but now seem to be moving in the opposite direction (see James, Edwards and Wong 2008, James Edwards and Iglesias, 2009).

For example, Argentina required 30 years of contributions for its full flat benefit under the system that it established in 1994. This benefit was supposed to redistribute to low earners, without the work deterrent stemming from a high phase-out rate. However, relatively few low earners met the 30-year bar. Most women did not qualify, except for those in the top educational categories, who tend to work more. Thus, for most women, their contributions became a pure tax. Workers who passed the bar were also discouraged from further formal work, since the benefit did not increase with contributory years. At first Argentina tried to address this issue by granting a reduced flat benefit to individuals who contributed for only 10 years. But this solution was problematic because it cost the public treasury a lot and provided a large lifetime subsidy to women from high-income families who worked 10 years, while at the same time giving no protection to those who worked less. For the time being, Argentina has resolved the access issue by superimposing a minimum pension on top of the flat benefit and allowing retirees to qualify by contributing for the necessary number of years *ex post*, by taking a small deduction from their benefit. Women will be major recipients. This solution makes access easy but does not solve the fiscal problem or reward work.

2. *Two-tier systems—higher public benefits for longer years of work.* Facing the tension between the coverage and redistributive advantages of a residence-based system versus the work-incentive advantages of a contributory system, some countries (Belgium, France, Ireland, Luxembourg, Portugal, Switzerland, the Czech Republic, Latvia, Poland, Turkey) have set up a two-tier minimum pension—a poverty-level floor for all senior residents and a higher minimum for contributors (see Whitehouse 1997). Latvia has 3 tiers—a higher minimum for longer contributors. Norway is considering raising its minimum pension for those who work beyond the statutory retirement age of 67.

But this too poses problems, as illustrated by the case of Chile. Since its 1981 reform Chile has had a minimum pension (MPG) which required 20 years of contributions for eligibility plus a smaller means-tested benefit for non-contributors (PASIC). The MPG was criticized for imposing a 100% phase-out rate that discouraged work for recipients, while PASIC was criticized for being too close to the poverty line. Therefore, in 2008 Chile eliminated the two-tier system, opting instead for a phased out flat benefit that applies to all seniors in the bottom 3 quintiles of households: A tax-

financed basic benefit for non-contributors over 65 is gradually phased out for contributors as their private pension income grows; 29.4 cents of public benefit are lost for each dollar of private pension. The new non-contributory benefit is larger than PASIS and the 29.4% implicit tax on own-pension is lower than the 100% implicit tax associated with the MPG—but it affects a much wider group. Estimates indicate that some part of the public benefit and the implicit tax will ultimately reach practically everyone in the eligible group--about two-thirds of all seniors (James, Edwards and Iglesias 2009).

Since women constitute the majority of non-contributors, they will constitute the majority of recipients of the new basic benefit. Since the private pensions of contributing women are smaller than those of men, their average public benefit will be larger. This will keep women out of poverty and help to equalize gender ratios. But the additional retirement income, the explicit tax cost of financing the benefit and the implicit 29.4% tax on private pensions may discourage them from working in the formal labor market and may therefore slow down their march toward financial independence (see James, Edwards and Iglesias 2009).

*3. Flat benefit per day of work.* Low labor force participation and low wage rates are two causes of low earnings that lead individuals to qualify for minimum pensions and phased-out flat benefits. Since low labor force participation (which the individual may partially control) is rewarded, the work incentive is undermined. Mexico has tried to separate out these two causes of low pensions and to reward work instead of non-work. Mexico also avoids the on-off switch to eligibility that posed problems in Argentina and Chile.

When Mexico instituted its privately managed DC plan, it also adopted a safety net pension--a small flat amount is paid into the account of each worker for each day worked. Eligibility starts at day 1, but the amount of the benefit builds up for every additional contributory day. This approach is pro-work because it redistributes to workers who work a lot in the formal sector, but at low wage rates. However, it does little for vulnerable groups such as informal sector workers or those engaged in home production. It also limits the achievement of broader gender equality, because men work more than women. Mexico is now experimenting with a small non-contributory benefit for the poorest elderly in the poorest communities, a group that will include many women.<sup>9</sup>

4. *Contribution-splitting and child care credits.* Switzerland mandates contribution-splitting of pension credits between husband and wife and encourages contributions on behalf of non-working spouses. Then, women are more likely to meet the requirements for a contributory pension even if they themselves do not work; in effect, the husband transfers some of his rights to her. This can help prevent poverty among older women, partially financed by the forgone pension of their spouses (see below for discussion of contribution-splitting in case of divorce).

Most European countries grant credit toward eligibility for time spent in child-care and elder care, which adds to the contributory years counted for women. The presumption is that rearing children is a socially valuable function that should be encouraged, and those who do it shouldn't be penalized by loss of pension rights. It is therefore no surprise that such credits are less common in low-income countries, where fertility rates are considered high enough. In order to design such programs well, societies need to think through their objectives. Is the main goal to raise fertility rates; if so, are pension credits the most effective means to do so? Or would contemporaneous payments to families with young children or subsidized child care be more effective? Is the goal to redistribute to women as a group? Or to low-income women? In that case, a flat benefit might be more effective. Is the object to compensate for the "extra" job of raising children while doing market work? Then the credits should go both to men and women, whomever does the child-rearing. Or is the rationale to compensate parents who have taken time out of market work to raise children? This runs the risk of discouraging market work and subsidizing middle-class parent who can afford that luxury.

Increasingly, in Europe, the credits can be used either by husband or wife, although usually the family designates the woman as the recipient. (In Sweden at least two months of the total can be used only by the husband). Child care credits vary from 1-6 years per child. Usually the subsidy is larger (or goes only to) individuals whose incomes have fallen during periods of child-bearing and rearing. For example, in Italy they go only to women who take child care leave. In Sweden, if income doesn't drop the pension credit is very small. The message seems to be—at least one parent should take time out from work to raise their children and society should compensate them for their loss of pension earnings. In contrast, in Chile a "baby bonus" is paid into women's

retirement accounts for each baby born, whether or not they have worked, as a means of redistributing to women as a group. However, several transition economies in Eastern and Central Europe and the former Soviet Union, faced with strong fiscal pressures and falling work propensities of women, have reduced child-care credits, thereby trading off some poverty and equality objectives in favor of lower tax burdens and smaller work disincentives (Castel and Fox 2001).

**Summary: poverty-avoidance vs. work incentives**

Indeed, there is no easy way to avoid this trade-off, in old age safety net programs. A universal flat benefit is the most inclusive and neutral on work incentives but also the most costly. A flat benefit with a high contributory requirement for eligibility saves money but excludes most women (as well as many men who have worked in the informal sector) and turns any contributions they have made into a pure tax. Phasing out the non-contributory benefit as the contributory pension grows further targets it toward women and other low-earners and economizes on fiscal resources, but may discourage them from engaging in formal market work--which would help get them out of their low-income trap. Therefore, the benefit structure that increases the welfare of older women today, taking their past behavior as given, may slow down behavioral change that will improve the welfare of younger women in the future.

Perhaps the most cost-effective compromise between the poverty-avoidance and work incentive goals is to have a modest flat pension for all senior residents, starting at a very old age, when other resources are most likely to be used up. If a phase-out is applied for fiscal reasons, the implicit tax should be applied against all income sources in the household, after a threshold, to keep the tax low while avoiding a poverty trap. If a minimum pension is applied instead, it could have 3 or 4 different levels, starting at the poverty line and rising with contributory years. The redistributive flat or minimum pension can be accompanied by a separate earnings-related contributory DB or DC plan, in a multi-pillar system (as in Australia, the Netherlands, Sweden, Denmark, Mexico and Chile).

**IV. Survivors' Benefits and Joint Pensions**



Since women are likely to outlive their husbands, who usually provided the bulk of the family income, survivors' benefits are crucial to their financial welfare. In principle, this could be provided through voluntary saving or the voluntary purchase of life insurance. However, if households are myopic, or if the husband places greater weight on consumption during the period when he will be alive, the household will not save or insure a sufficient amount voluntarily (see Bernheim et al 2003, Friedberg and Webb 2006). Evidence from the UK suggests that, where the choice is voluntary, the vast majority of men use their retirement funds to purchase single life annuities rather than joint annuities (UK Pensions Commission 2005). This is the rationale for including survivors' benefits in the mandatory social security system—but in practice they are provided in very different ways depending on whether the plan is DB or DC, and sometimes not provided at all. Although in most cases these rules are not gender-specific, in practice most survivors are women, because wives are generally younger than their husbands and have a longer expected lifetime. In some low- and middle-income countries, widowers are not covered unless they were financially dependent on their wives—a criterion that is rarely met. Usually the rules do transfer income to women, but at the cost of penalizing their current or past work.

### **Survivors' benefits in DB systems**

Traditionally, in public DB plans, older widows received 50-80 percent of the primary benefit, starting at the point when the husband died. This was financed by the common social security pool—a costly benefit. As women's labor force participation rates have risen and fertility has fallen, fiscal pressures have led to cutbacks in these benefits, especially for young widows without children, who are now expected to work.

For example, in most Eastern and Central European countries, the U.S. and U.K., widows do not receive benefits until they are close to retirement age, unless they are caring for dependent children. If the husband dies young, the widow either gets no benefit at all, or a deferred benefit. In Latvia, Lithuania and Australia new claimants get virtually no survivor's benefit, regardless of age. In Western European countries that pay flat benefits to most elderly residents (as just discussed), special benefits to older widows are considered to be unnecessary. But in Italy, Luxembourg and most of the Middle East—countries where women's labor force participation rates are relatively low--the benefit

starts when the husband dies and last indefinitely. If women expect survivors' benefits, this becomes a part of the EPV of their pension wealth when young, which enables them to work less if they prefer to do so.

Rules regarding eligibility for survivors' benefits among older women typically reinforce traditional social roles. In almost all public earnings-related DB plans, survivors' benefits are considered a payment to widows who were dependent on their husbands. If they worked and have their own pension they must give up all or most of it in order to get the widow's benefit (Table 5). Since the husband's pension is usually much larger, they take the widow's benefit—this increases their income. But it also means that any contribution made by working wives is a pure tax; they get no incremental benefit in return.<sup>10</sup>

Some countries (e.g. Belgium, France and Germany) phase out the benefit against wages as well. For example, in Poland, widows receive a survivor's benefit at age 50 that is 85% of their husband's pension, but this is partially offset against wages if they work and entirely forgone at 60 if their own-pension is larger. In Estonia, widows must choose between their own-pension and the survivor's pension, which is also phased out against wages. The U.S. system pays an additional 50% of the husband's pension to wives while the husband is still alive and 100% to widows after his death—but these benefits are fully offset against own-pension and also reduced by wages (prior to the normal retirement age). In all these cases, survivors can receive investment income or inherit money without losing their benefit—only labor income is penalized. A recent study found that, in the United States, married women reacted to these incentives by working less than single women and retiring early (Munnell and Jivan 2005, Munnell and Soto 2005).

These rules also create perverse redistributions. The largest net benefits (gross benefits received minus payroll taxes paid) go to married women who never worked outside the home. These wives often get larger pensions than single women who worked. Part of the contribution of single people, who don't qualify for these benefits, goes to subsidize married couples. Dual career families, where the wife may take her own benefit instead of the widow's benefit, subsidize traditional families with a sole breadwinner, and low-earning couples subsidize high-earning couples, whose wives receive larger benefits.

For a wife who has worked part of her adult life, the fact that she can't keep her own pension as well as the survivor's benefit ignores household economies of scale and make it almost inevitable that her standard of living will fall sharply when her husband dies. Because of scale economies, household costs for a given living standard will typically fall by only 30% when they covers a single person rather than a couple.<sup>11</sup> Yet, the husband's income is usually much greater than the wife's, so household income falls by more than 50% when he dies. It is not surprising that, under these rules, the standard of living of widows falls and very old widows are one of the poorest groups in society.

In sum, DB systems either provide generous survivors' benefits at high fiscal cost or economize on public funds by cutting back severely on these benefits. The most common form of saving is to require widows to give up their own pension if they wish to keep the survivors' pension (or vice versa). The survivor's benefit, in effect, forces working wives to contribute toward the pension of non-working wives. These rules make it difficult for widows to maintain their previous standard of living and discourage women's work.

### **Joint annuities in Latin American DC systems**

Survivors' benefits are handled quite differently in Latin American DC systems. Each spouse is required, upon retirement, to purchase a joint annuity or other joint pension that covers the widow as well as the primary beneficiary. This reduces the husband's pension by 10-20%, depending on size of survivor's benefit and age of wife. The theory behind this mandate is that wives have lower earnings and pensions because of the implicit contract they made with their husbands to allocate time toward household and child-care services, in exchange for the monetary income that he will provide. The joint pension requirement enforces the wife's entitlement after his death and prevents families from externalizing the cost of household services, as occurs under common pool financing. Therefore it avoids distorting choices about marriage and work.<sup>12</sup>

Most important, widows are allowed to keep the benefit from the joint annuity as well as their own benefit. Since the husband has paid for the joint annuity by taking a lower payout himself, this becomes his wife's property upon his death and there is no reason for her to have to pay twice, by forgoing her own pension. This ends the high

taxation of married women who work in the market and enhances the incentive for them to work.

In Chile, the labor force participation rate of older married women has increased dramatically since 1981, when the new system was adopted (after controlling for other factors; see Edwards and James 2010). Simulations show that the joint annuity comprises over 60% of the total monthly pension of the average widow and will raise the EPV of total lifetime benefits for the average woman by over 40% (Table 6). The widow's benefit plus her own benefit maintain household purchasing power at about 70% of the previous level, so her standard of living is roughly unchanged. The joint annuity requirement also extends system coverage to many women who have not worked in the formal market--without placing a burden on the public treasury or an implicit tax on working women. (It does, however impose an implicit tax on men who do not value the extra protection for their wives).

Despite these advantages, the joint annuity is not always required in DC systems. In Eastern and Central Europe, for example, the decision about whether to cover one's spouse from the DC account is left to the discretion of the individual. Survivors' benefits are provided mainly through the remaining PAYG system. And, as discussed above, widows lose most of their own pension when they get the DB survivors' benefit—discouraging their work. Making joint pensions mandatory in DC systems and allowing women to keep their own pensions as well would maintain their living standards and remove a disincentive for formal labor market work—without increasing the burden on the public treasury. This concept could also be adapted to DB systems.

## **V. Annuitization and Other Rules that Shape Gender Redistributions**

This section deals with payout rules that arise explicitly in DC systems, implicitly in DB systems, which strongly affect the distribution of retirement resources between men and women. Specifically, mandatory annuitization protects women, who tend to live longer, from the family's myopia. Indexation shifts retirement resources away from the young-old toward the old-old. Wage-indexation shifts them toward very old age, where women predominate. The required use of unisex tables in benefit calculations

redistributes from the average man to the average woman. This effect is enhanced by mandatory annuitization and indexation, because women are not charged for the fact that they are heavily concentrated in the old-old age groups and men, most of whom will die sooner, cannot escape from the redistribution. Splitting retirement assets upon divorce further enhances women's welfare. In contrast to the preceding sections, these rules do not impose an implicit tax on women and, in fact, often increase the rate of return they get on their contributions. But these required transfers have the opposite effect for men.

### **Mandatory or optional annuities?**

DB plans, in principle, pay a pension for life; the option of lump-sum payouts is usually not even given. This is an advantage to women, some of whom live 30-40 years after retirement. In contrast, in a DC plan, workers build their retirement saving, which they consume during their retirement period—but they don't automatically get a lifetime pension. If lump sum or flexible withdrawals are permitted, myopic workers may use up their savings well before their death. Women are especially prone to outlive their savings, because of their greater longevity. This is accentuated in households where husbands have dominant decision-making power over family resources and may place greater weight on consumption during their own shorter lifetimes. When the husband dies, the wife is left with the risk of inadequate savings.<sup>13</sup> Moreover, expected lifetimes have been increasing by about one year per decade—that is, an average person born a decade later will probably live at least a year longer. Workers may not take this into account in their calculations, basing their expectations on the experience of their parents, who had much lower expected lifespans. The shift to DC plans in many countries produces the danger that very old women will not have adequate resources left to support themselves.

Annuities solve this problem by providing longevity insurance. With annuities, retiring workers turn over their retirement savings to a (public or private) insurance company, which takes on the longevity and investment risk and guarantees a monthly benefit for the rest of their lifetimes. DC systems can protect workers from uncertainty and their own myopia by requiring or encouraging annuitization. This pushes some potential income flow and consumption into the distant future, thereby protecting society from the liability of supporting very old individuals who have outlived their retirement

saving. Thus, such rules are consistent with the dual objectives of avoiding poverty and controlling fiscal costs.

On the one hand, every constraint makes the DC plan less popular and efficient, because some individuals may not be able to obtain their preferred payout form. Individuals who are in ill health or want access to their money during emergencies, will resist mandatory annuitization. On the other hand, constraints over payouts protect retirees from making serious mistakes due to misinformation, myopia, or conflicting interests within a family. If everyone is put into the same annuity pool, high-income retirees are big gainers from mandatory annuitization—a perverse redistribution—because of the positive correlation between longevity and income. Also much of the gains are experienced by women, who are more likely to live far into the future.

Countries with DC systems have reacted in very different ways to these pushes and pulls. Annuitization is mandated in Sweden's DC system, to ensure that everyone has a lifelong income without imposing a cost on the public treasury. In Chile (and most of the other Latin American countries), perhaps in response to their greater inequality in incomes and expected longevity, retirees are allowed to choose between annuitization and gradual withdrawals, according to a schedule set by the regulator. Since 2008, Chile has required that retirees who choose a gradual withdrawal must set aside a special reserve fund to draw upon when their account is exhausted—turning it into a kind of self-financed annuity. Two-thirds of all current pensioners have annuitized (James, Martinez and Iglesias 2006). In contrast, lump sum withdrawals are allowed in Australia's mandatory DC plan, to make the accounts less restrictive and more attractive. Australia is counting on its flat public benefit to provide a floor on old age income. But if seniors use up their retirement savings quickly, this will put a big burden on the government's budget as the population ages. And women, who live longer than men, may find that their standard of living falls dramatically when they have used up their private savings. Many countries in Eastern and Central Europe have not yet made a decision on this issue.

Annuities come in many forms, which meet the needs of differing individuals. Those with short expected lifetimes who wish to protect their heirs may purchase joint annuities that cover a designated beneficiary or annuities with a guaranteed payout period, that continue making payments to the estate for a specified number of years.

Individuals with a higher tolerance for risk may seek a higher payout by purchasing variable annuities in which payouts each year depend on investment returns. Countries vary according to whether they permit or prohibit these payment forms in the mandatory systems. Another possibility is to mandate only partial annuitization—say, up to 150% of the poverty line—while allowing the individual to take the remaining part of his or her money in a lump sum or other flexible manner. Or the individual might be given the option of purchasing a deferred annuity, which starts once she has passed some threshold age; these provide longevity insurance at lower cost than an immediate annuity. For individuals who annuitize, Chile requires joint annuities for married individuals, recently began allowing variable annuities, allows gradual withdrawals backed up by a deferred annuity, and permits the withdrawal of a lump sum after the annuity size has passed a high threshold. But Sweden's mandatory annuity must be immediate and fixed income, individual in the notional DC plan, individual or joint in the funded DC plan.<sup>14</sup> Given their greater life expectancy and smaller voluntary savings, it is particularly important for women that annuitization be required or strongly encouraged. A variety of annuity options could be offered—so long as they all provide longevity insurance.

### **Indexation rules—nominal, price or wage indexed pensions?**

DB benefits can be nominal or indexed to price or wage growth. In the past, many countries simply promised nominal benefits—the dollar amount was unchanged regardless of what happened to prices or wages in the broader economy. In an inflationary context, this means that the purchasing power of the benefit gradually declines. If inflation is 5% per year, purchasing power will be halved in 14 years. If a person retires at 60, her pension will fall to 50% of its initial real value by the time she is 74, and to 25% by age 88. In many third-world countries, annual inflation is much higher than 5% so the decline in real value is much greater. Ad hoc pension increases are sometimes adopted, but this is uncertain. This lack of indexation particularly hurts women, because of their greater longevity. Their lifetime real pension is much less than it appears initially.

Currently, many countries index the DB to inflation, so the real value remains constant as prices rise. However, if wages are growing, the purchasing power of pensioners will continue to decline relative to that of workers over the retirement period,

unless the pension is linked to wages. Wage indexation maintains the relative position of workers and pensioners. This is especially valuable to retirees with long expected lifetimes, predominantly women. But it costs much more than price indexation (assuming positive real wage growth). Given this trade-off, some countries index the flat or minimum safety net pension to wages, but the contributory earnings-related pension to prices (see Table 4). Other countries use a mix of wage and price indexation (e.g. a 50% mix in Switzerland, a 75-80% weight to prices in Latvia and Poland but an 80% weight to wages in Finland).

In DC plans, annuities can also be specified in nominal terms or price-indexed, to insure against inflation. The latter is much more costly to insurance companies because they are bearing the inflation risk and often don't have financial instruments available to hedge this risk. In Chile all annuities are price-indexed yet companies offer a high money's worth ratio to annuities (a high ratio of expected payouts to premiums) because many price-indexed financial instruments are available for insurance company investments, but these are unavailable in most low and middle-income countries (and even in some high-income countries). If governments wish to encourage price-indexed annuities, they must first issue long-term price-indexed treasury bonds, in which insurance companies can invest. Wage-indexed annuities are practically impossible for private insurance companies to provide.

Holding constant the EPV of the total lifetime benefits (as in an actuarially fair annuitization scheme), wage indexation simply pushes more of the individual's benefits into the distant future than price indexation, and price indexation pushes more into the future than no indexation at all. However, if community pricing based on unisex mortality tables is used (see below), indexation implies a redistribution of total retirement resources to individuals with greater longevity, like women--even though the rules are not gender-specific. It also increases the rate of return to women's contributions and thereby potentially generates a positive work incentive. However, this positive effect will be small and may even turn negative if women don't realize they will eventually get larger benefits.

**Unisex tables?**



Annuity payouts in competitive insurance markets are set so that the EPV of lifetime payouts approximately equals the initial balance in the DC account (see note 5; also Brown et al 2001, James and Vitas 2001, James, Martinez and Iglesias 2006). In DB schemes, community rating is implicitly used. That is, the same formula applies to all individuals regardless of gender, health or other characteristics. In a DC regime, explicit rules are needed to decide which characteristics of the individual can be used for annuity pricing. If unconstrained, insurance companies will take into account many factors, such as health status, parental history and race, to put people into different mortality risk categories that yield different monthly payouts from a given premium. Should they be allowed to put men and women into different categories—that is, to use gender-specific mortality tables in calculating expected lifetimes, or should unisex tables be required?

Sweden has answered this latter question in the positive. Community mortality tables, including unisex, are used when accounts in the DC pillar are annuitized, and this is likely to prevail in most EU countries. Eastern and Central European countries use unisex tables in their notional DC plans but still have not decided which way to go in their private funded DC plans. It is likely that pressures from EU will push them toward unisex.<sup>15</sup> At the opposite end, most Latin American countries allow the use of gender-specific tables by insurance companies issuing annuities (see James, Martinez and Iglesias 2006).

If gender-specific mortality tables are used, women's monthly pensions will be smaller than those of men with similar retirement accumulations, to compensate for their longer expected period of payment. In contrast, unisex tables assume a common (average) survival probability for men and women. Since they treat both genders as if they have the same expected lifetimes, they raise the monthly pensions of women and lower those of men, relative to gender-specific tables. This implies a redistribution of income to women who, on average, get back more over their lifetimes than they paid for, and vice versa for men. Their higher income may lead women to work less than they would otherwise. However, the income comes from a higher return to their contributions, which may lead them to work more—if they are aware of and correctly calculate this effect. On balance, these positive and negative forces may cancel each other out.

The chief argument in favor of the unisex requirement is that it tends to equalize the monthly benefits, therefore the standard of living, of men and women. Since older people, especially very old people, are disproportionately female, this helps to equalize incomes across age groups. Those in favor also point out that the life expectancy distributions of men and women are wide and overlapping so it is unfair to attribute a higher average lifetime to all women, thereby penalizing them because of an average characteristic of their gender.

The chief arguments against the unisex requirement are that it implies a lifetime redistribution from men to women that may be inequitable and it poses implementation problems, including adverse selection by individuals and cream skimming by insurance companies. If annuities are not required, men may avoid them because under unisex they will get poor terms—this is a form of adverse selection. Then, the market may end up dominated by the risky group—females—and their higher longevity rates. In the opposite direction, insurance companies will seek to “cream skim”—attracting men, who are lower risk and therefore more profitable, and avoiding female annuitants who will live longer. While they may not be legally permitted to exclude women, they may concentrate their marketing or offer better rates in occupations and industries where men dominate.<sup>16</sup> In countries where women can retire earlier than men, higher rates might be charged for early retirees, who are predominantly women; this was a concern in Poland as it deliberated its annuities law.<sup>17</sup> Another argument against unisex is that some of the implied redistributions go from low-income men (with low life expectancies) to high-income women (with high life expectancies). Given society’s limited capacity for redistributions, it may be more important to target them to low earners.

How big are the changes in monthly income and lifetime redistribution due to unisex tables? Simulations show that these are surprisingly small—only 2-3 percent—in the context of joint annuities purchased by married couples. This also implies that the distortionary effects just described can be largely mitigated by a joint annuity requirement. The reason is that the mortality rates of both spouses enter into the determination of payouts in joint annuities, whether or not unisex tables are used. The effect is more noticeable—7-8 percent—for individual annuities purchased by single individuals (see Table 6 and James, Edwards and Wong 2008). Nevertheless, even in the

latter case, unisex tables have a much lesser impact on women's living standards than equal retirement ages or joint annuities would have. And a lesser impact on poverty than a redistributive public benefit would have, since most women who benefit are not poor while some men who implicitly pay by getting lower pensions are poor. The incentive to work is likely to rise for women (and fall for men) under unisex—but only by a minor amount because of the complex calculations and small amounts involved.

### **Rules for divorced women**

Rules regarding division of retirement assets and eligibility for survivors' benefits after divorce strongly affect women's welfare, given the increasing rates of divorce worldwide. Divorce, like widowhood, means that the woman no longer has access to wages from the family's main earner or to his pension after retirement and she loses the economies of scale from living as a couple rather than an individual. Since social norms lead women to marry older men and male/female population ratios fall with age, women are less likely than men to find another partner after divorce. The divorced status is therefore more likely to persist for women, who run the risk of an unexpectedly low standard of living.

Younger women can plan for this risk by staying in the labor market and building their own earning capacity—and increasingly this has been happening. However, many women underestimate the risk of divorce; upon marrying, they expect their experience to be better than average. During the child-bearing and rearing years they divert some of their time and effort to household responsibilities, withdrawing from the labor market and taking a less demanding job, which permanently reduces their career prospects and pension accumulations. (Typically, married men earn more than singles, while the opposite is true for women). Even if women consider themselves subject to the average divorce probability, such as 50%, this cannot be insured against so the actual event is experienced 100% by those to whom it occurs. Their income loss may be particularly great in old age, when they counted on the husband's retirement benefits or savings, which they cannot readily replace on their own. How pension systems cope with this situation has a large impact on the well-being of older divorced women.

Splitting of current and/or prior contributions has become increasingly common in high-income OECD countries, primarily as a response to divorce but secondarily as a

substitute for survivor benefits and as a way to meet minimum pension standards without a public subsidy. These arrangements take a variety of forms. For example, splitting contributions between spouses is required in Switzerland's PAYG system, so the wife acquires half of the husband's pension credits during the marriage and retains them upon divorce. Similarly, in Japan contribution credits are automatically split at divorce if one spouse has not worked, and this can be implemented on a voluntary basis if both spouses have worked. In Austria couples can voluntarily split pension credits acquired by the working partner during child-raising periods. In Germany, Canada and the United Kingdom the sharing of pension rights can be negotiated, upon divorce. In the U.S., voluntary retirement savings accumulated during the marriage are considered community property that may be divided at divorce, and the divorced wife also retains full rights to spousal benefits from the social security system. In the mandatory funded DC plans of Sweden and Australia, couples may make an annual transfer of mandatory savings to their spouse, while in Poland the balance in the account is split upon divorce. More commonly, sharing of DC assets or pensions is permitted but not required, at time of divorce but not before.

Rules regarding survivors' insurance for divorced women also vary widely. Most Latin American and Middle Eastern countries exclude divorced women from these benefits. But most European countries that pay survivors' benefits include divorced wives if alimony was granted in the divorce settlement or share benefits between the current and former wives. Additionally, divorced women are likely targets for public safety net benefits since their old age income (adjusted by equivalence scales) is usually smaller than that for couples.

We view these arrangements mainly as having distributional consequences, with only minor impacts on work incentives. Contribution-splitting implies a net transfer from the high to the low earner in the family (usually from husband to wife) as part of the marital obligation, while the payment of spousal or survivors' benefits from the common pool implies a redistribution from never-married individuals to married and divorced women--so the equity consequences are quite different. The acquisition of contribution credits by the wife puts her above the safety net subsidy level in some cases but helps her meet the contributory requirements for subsidies in other cases. Mandatory contribution-

splitting arrangements reduce the returns to work for individuals who don't value the enhanced security of their spouses; but the expected value of this reduction is small ex ante if divorce is not anticipated and splitting applies only to pension rights acquired during marriage. Strong protections for divorced wives may also diminish their work incentive since they now have an alternative source of pension wealth and income. But most divorced women still need to work to support themselves when young and build an adequate pension for old age.

## **VI. Lessons for Policy-makers**

In many countries, the statutory retirement age at which women are permitted to start their pensions is younger than that for men—most typically, 60 instead of 65. Although they are not required to do so, and many other factors enter into the decision, extensive empirical evidence from many countries shows a strong tendency of workers to start their pensions as soon as they can, and to stop work at the same point. It follows that raising the pension age leads them to work longer. Early retirement may appear to be a privilege for women and, indeed, it is a very popular provision. However, the hidden consequences may hurt them, as the truncated pay-back period reduces the incentive for women to acquire advanced education and for employers to provide on-the-job training. In the long run, this dampens women's wages and pensions. Even in the short run, in an actuarially fair plan, earlier retirement cuts their monthly pension. Women get extra leisure time but less financial resources--which they may enjoy when young-old but regret in very old age. For example, in Chile equalizing statutory retirement ages between the genders is the single largest step that policy-makers could take to enhance gender equality in pension amounts—raising monthly payouts by 50% or more. From the macro-economic perspective, early retirement contributes to the phenomenon of poverty among very old women and reduces the supply of savings, experienced labor and human capital in the economy.

Many other rules in old age systems are not gender-specific but have different incentive effects on men and women, because of their differing employment rates and longevity. This is particularly true of safety net and survivor benefit provisions. For

example, if a flat benefit or minimum pension has no contribution requirement but is phased out as private income grows, women are more likely than men to gain as recipients, but also to be caught in the phase-out range, where they face a high implicit tax on work. If a high contribution bar is set for eligibility for the safety net benefit, many women will never accumulate enough years of work to qualify. The contribution that women have paid while working simply becomes a tax, for which they get no corresponding benefit—which discourages their work in the first place.

Each of these situations create incentives for women to withdraw from the labor force even when their wages and productivity are high, because the safety net provisions place a substantial implicit tax on formal market work. These taxes also apply to men, but often at a lower effective rate because men are more likely to pass the eligibility barrier for benefits, to earn wages that exceed the phase-out range and to place a lower value on their alternative work at home. Many recent studies have shown that men respond to these incentives from the social security system in deciding when to start their pensions and stop working. Fewer studies have tried to measure women’s response; this would be a fruitful area for future research.

The incentives embedded in survivor benefit rules are even more clear-cut. In DB plans typically widows must choose between survivors’ benefits and their own-pension. Since the survivor’s benefit is often larger, this means they get no marginal benefit from the contributions they made to their own pension. This again pushes them toward home work, where contributions are not required. Survivor benefits are often also offset against wages. While this benefit helps widows who have no other income source, it also discourages them from acquiring other income. Empirical evidence shows that married women work less and retire sooner than single women and sooner than they should given their longevity, consistent with the behavior we would expect under these incentives.

In contrast, DC plans that protect survivors through the requisite purchase of joint pensions typically do not require widows to give up their own pension in return; they are permitted to keep both. Thus, the market-home work decision is not distorted. If more women choose formal work, this indicates that the value of their labor in the market outweighs its value in the home, both to them and to the economy as a whole. The country’s GDP and total welfare rise. The joint annuity requirement also extends system

coverage to many married women who have not worked in the formal labor market, without imposing high fiscal costs.

Provisions that push retirement income to very old age—such as mandatory annuitization, price or wage indexation and unisex requirements benefit women disproportionately, because they are more likely to reach very old age. Indexation and unisex requirements produce positive work incentives by increasing the rate of return to women's labor—but these higher benefits accrue late in the retirement period so these incentives operate only if women are well informed and can make complex calculations about the long run. At the same time, the income redistribution to women induces more leisure, less labor. For men, the incentive and income effects have the opposite sign. Splitting retirement assets upon divorce have less impact on rate of return but a possible income or wealth effect that discourages work by women, encourages work by men. The net impact on work of these measures has not been studied but is likely to be small.

If women's labor market behavior is dictated by strong social norms, implicit taxes in old age security programs have only minor distortionary effects. This was the case in the past when almost all women married, had children and stopped working in the market shortly thereafter. However, social norms regarding women's roles have changed, so younger women have greater discretion than they did previously and their choice of household versus market work varies widely, both within and across countries. Their propensity for market work may be more sensitive to incentives than that of men, because they have a socially acceptable alternative—working at home. Then, rules of the old age system that reduce their net remuneration may discourage them from taking formal jobs, even if that is the most productive option. To avoid this outcome:

1. System rules should not signal lower formal work expectations for women.

The allowable retirement age sends a signal about how long people must plan to work, to support themselves throughout the life cycle. It sets an enforceable constraint that prevents the retirement period from growing too long and the working period too short to finance a comfortable retirement and a sustainable pension system. These goals hold equally for men and women, so their retirement ages should be equalized. (Or perhaps women should work longer than men because they live longer).

2. A safety net should be provided that keeps out of poverty older women who have not worked in the market or have had low earnings. However, this should be modest and avoid imposing a high bar for eligibility that excludes many women, turning their contributions into a pure tax. It should also avoid high phase-out rates against contributory pensions, since these distort the choice of home versus market work. A higher minimum pension for long contributors or a flat benefit without a phase-out, started at a very late age as a kind of public deferred annuity, would have better work incentive properties.

3. Survivors' benefits are an important way to maintain widows' standard of living and prevent poverty among very old women. However, they can be financed within the family, without cross-subsidies from women who worked in the market to those who stayed at home and without requiring recipients to give up their own benefit in exchange. For married couples, survivors' benefits can be provided to both spouses through the purchase of joint annuities. A widow could then keep her own pension in addition to the joint pension—which would improve her welfare and remove a work deterrent, without imposing costs on others. In the context of joint annuities, payout rates are very similar regardless of whether gender-specific or unisex mortality tables are used, since the expected lifetimes of both spouses enter into the calculation.

4. Policies like wage (or partial wage) indexation, use of unisex tables and pension-splitting upon divorce increase women's lifetime income by transfers from men and may thereby deter their work via a pension wealth or income effect. But indexation combined with unisex may encourage women's work by increasing the rate of return to contributions (and vice versa for men). Over-all, the primary effect of these policies is distributional; the net impact on work—positive or negative—is likely to be small. (See Table 7 for a summary of all these policies).

5. Besides the statutory retirement age, actual retirement behavior is important to monitor. Toward this end, data should be collected on the effective age of pensioning and withdrawal from the labor force (e.g. the pension probability and labor force participation of various older age groups), by gender and marital status. This is currently available in very few countries outside the OECD.



6. Policy-makers should consider implementing pension literacy programs that help women make informed choices about career interruptions, voluntary retirement savings and age at which to start their pensions and exit from the labor market. This is especially important in view of the greater choice that women now have and the on-going shift toward DC plans, in which monthly benefits are more closely linked to contributions and retirement age.

Although designed to help women who lack their own means of support, common rules found in many old age security systems deter women from achieving financial independence, by penalizing their formal market work. Their own means of support may therefore be reduced and their dependence on others increased. The policy changes discussed in this paper will remove distorted incentives and unequal constraints and thereby create a level playing field, in which women can make choices that are better for them and for the broader economy.

### **Box on Defined Benefit (DB) vs. Defined Contribution (DC) Plans**

In a DB plan a formula determines the pension a person will get. Usually it is of the form:  $\text{Pension} = \alpha * w * Y$ , where  $w$  is the reference wage,  $Y$  is years of contributions and  $\alpha$  is the accrual rate per year. The reference wage may be the final year's wage, the average of the last few years' wage, or the average lifetime wage—the choice varies but recently countries have been shifting to a longer averaging period because it links benefits more closely to contributions and prevents perverse redistributions to those with higher earnings at the end. Sometimes  $\alpha$  is higher for the first few years, to build up the pension quickly; this costs the system more. DB plans often require a minimum number of contributory years, such as ten, for eligibility. Typically, the worker gets the “full” pension at the specified statutory retirement age, a smaller amount if started earlier and a larger amount if started later. But generally these adjustments are less than actuarially fair, so incentives lead individuals to start at the earliest possible age, which is younger than the statutory age. Public DB plans are usually pay-as-you-go (PAYG), which means that workers today pay to finance the benefits of retirees today. Early retirement, a high accrual rate for the first few years, evasion of contributions, increasing longevity and decreasing fertility have led to fiscal problems in most countries with PAYG DB plans.

In contrast, DC plans are usually pre-funded by the worker's own contributions. The person's annual contributions build up over his or her lifetime, are invested (often by private companies) and the pension depends directly on amount of contributions as well as the rate of return on investments and rules regarding the payout stage. Amount of accumulation and pension increase when investments have fared well, and vice versa. Notional DC plans are a variation on this theme, in which “notional” contributions are recorded and earn a “notional” interest rate set by the government, but the system remains PAYG—that is, there is no accumulation, investment or market return. In both funded and notional DC systems, upon retirement the worker's lifetime accumulation is withdrawn gradually or turned over to a (public or private) insurance company, which converts it into an annuity, roughly on actuarially fair terms. This means that monthly pensions automatically rise when the person retires later and fall when life expectancy increases, both of which create incentives for continued work. In “multi-pillar systems” DC plans are buttressed by a safety net public pension, to share risk and avoid poverty.

**Table 1: Life expectancy and labor force participation rates, men and women, 2006**

	Life exp. at 65		Labor force participation rates		
	female	male	female	male	F/M
<b>Middle East and North Africa</b>					
Bahrain	15.9*	14.1*	31	89	35%
Jordan			30	79	38%
Morocco			29	84	35%
Tunisia			32	78	41%
<b>Latin America</b>					
Argentina	18.4*	14.1*	62	82	76%
Chile	20.4*	17.0*	41	75	55%
Colombia	17.9	15.3	67	85	79%
Costa Rica			50	85	59%
Mexico	18.4*	16.4*	43	83	52%
Peru	16.5*	14.7*	62	83	75%
Uruguay	19.4	14.7	67	86	78%
<b>Eastern and Central Europe</b>					
Czech Republic	18.3	14.8	64	77	83%
Estonia	18.3	13.2	65	74	88%
Hungary	17.7	13.6	54	67	81%
Latvia	17.8	12.1	63	72	88%
Lithuania	17.7	13.1	66	73	90%
Poland	18.8	14.5	57	68	84%
<b>High Income OECD Countries</b>					
Australia	21.4*	18.1*	68	80	85%
Austria	20.6	17.2	64	77	83%
Belgium	20.7*	16.6*	58	72	81%
Canada	21.0*	17.7*	73	82	89%
Denmark	19.2	16.2	74	82	90%
Finland	21.2	16.9	73	77	95%
France	22.0*	17.7*	62	73	85%
Germany	20.5	17.2	68	79	86%
Iceland	20.7	18.4	83	91	91%
Ireland	20.3	16.8*	63	80	79%
Italy	21.4*	17.4*	51	74	69%
Japan	27.9	22.4	61	85	72%
Luxembourg	20.3	17.0	56	74	76%
Netherlands	20.5	16.9	70	84	83%
New Zealand	20.5	17.8	72	83	87%
Norway	20.9	17.7	77	83	93%
Portugal	20.2	16.6	68	80	85%
Spain	21.1*	17.2*	58	81	72%
Sweden	20.8	17.6	75	79	95%
Switzerland	22.1	18.5	76	87	87%
United Kingdom	20.2*	17.5*	70	82	85%
United States	20.0*	17.1*	70	81	86%

Sources: Life expectancy at 65 is from OECD, UNECE Statistical Division Database, and UN Demographic Yearbook. Indicates average number of years of life remaining at age 65, based on current age-specific mortality rates. \*indicates various years from 2001-05; otherwise 2006. Labor force participation rates are from World Development Indicators, taken from International Labour Organization, Estimates and Projections of the Economically Active Population data base.

**Table 2: Statutory Pensionable Ages for Men and Women**

Country	Statutory pension age		Comments	*M&W differ
	Men	Women		**difference phased out soon
High income countries				
Australia	65	63	rising to 65 for W by 2014	**
Austria	65	60	Rising to 65 for W by 2033	*
Belgium	65	65		
Canada	65	65		
Cyprus	65	65		
Denmark	65	65		
Finland	65	65	contracts terminate at 68 but can be renewed	
France	60	60		rising after 2010
Germany	65	65	rising to 67 by 2029	
Greece	65	60	rising to 65 for W by 2058	*
Iceland	67	67		
Ireland	66	66		
Israel	67	67		
Italy	65	65		
Japan	65	65		
Korea, South	60	60	increase planned	
Luxembourg	65	65		
Malta	61	60		
Netherlands	65	65		
New Zealand	65	65		
Norway	67	67	mandatory at 70	
Portugal	65	65		
Singapore	62	62	increase planned	
Spain	65	65		
Sweden	65	65		
Switzerland	65	64		*
United Kingdom	65	60	rising to 65 for W by 2010;	**
			rising to 67 for M&W	
United States of America	65	65	rising to 67; mandatory retirement prohibited	
Russia, Eastern Europe and Central Asia				
Albania	65	60		*
Armenia	63	59.5		*
Azerbaijan	62	57		*
Belarus	60	55		*
Bulgaria	63	60		*
Croatia	64	59		*
Czech Republic	62	61	57 for W with 4+ children; rising to 65 for M&W 2030	*
Estonia	63	60		rising to 63 for W by 2016
Georgia	65	60		*

Hungary	62	62		*
Kazakhstan	63	58		*
Kyrgyzstan	62	57		*
Latvia	62	60.5		*
Lithuania	62.5	60		*
Moldova	62	57		*
Poland	65	60		*
Romania	62	57		*
Russian Federation	60	55		*
Serbia	63	58		*
Slovak Republic	62	60	56 for W with 5+ children; 62 for W by 2014	* **
Slovenia	61.5	55.3		*
Turkey	60	58	mandatory for public sector; 65 for M&W by 2048	* *
Turkmenistan	62	57		*
Ukraine	60	55		*
Uzbekistan	60	55		*
South and East Asia and the Pacific				
Afghanistan	60	55		*
Bangladesh	57	57		
Brunei Darussalam	55	55		
China	60	50	55 for salaried prof. W	*
Fiji	55	55		
Hong Kong	65	65		
India	55	55	mandatory at 58	
Indonesia	55	55	mandatory	
Lao People's Dem. Republic	60	60		
Malaysia	55	50		*
Mauritius	60	60		
Micronesia	60	60		
Nepal	55	55		
Pakistan	60	55		*
Papua New Guinea	55	55		
Philippines	65	65	mandatory	
Solomon Islands	50	50		
Sri Lanka	55	50	mandatory at 60, public sector	*
Thailand	55	55	mandatory at 60, public sector	
Viet Nam	60	55		*
Latin America and the Caribbean				
Antigua & Barbuda	60	60		
Argentina	65	60		*
Bahamas	65	65		
Barbados	65.5	65.5		
Belize	65	65		
Bolivia	65	65		
Brazil	65	60		*

Chile	65	60	basic benefit at 65 for M&W	*
Colombia	60	55	62 for M, 60 for W, by 2014	*
Costa Rica	62	60		*
Cuba	60	55		*
Dominican Republic	60	60		
Ecuador	55	55	depends on yrs of contrib.	
El Salvador	60	55		*
Grenada	60	60		
Guatemala	60	60		
Guyana	60	60		
Haiti	55	55		
Honduras	65	60	mandatory at 65	*
Jamaica	65	60		*
Mexico	65	65		
Nicaragua	60	60		
Panama	62	57		*
Paraguay	60	60	mandatory	
Peru	65	65		
Saint Kitts and Nevis	62	62		
Saint Lucia	62	62		
Saint Vincent & the Grenadines	60	60		
Trinidad and Tobago	60	60		
Uruguay	60	60		
Venezuela	60	55		*
Middle East and North Africa				
Algeria	60	55		*
Bahrain	60	55		*
Egypt	60	60		
Iran (Islamic Republic of)	65	55		*
Iraq	60	55		*
Jordan	65	60		*
Kuwait	60	60		
Lebanon	64	60		*
Libyan Arab Jamahiriya	65	60	mandatory	*
Morocco	60	60		
Oman	60	55		*
Saudi Arabia	60	55		*
Syrian Arab Republic	60	55		*
Tunisia	60	60	50 for W with 3+ children	
United Arab Emirates	60	60	mandatory	
Yemen	60	55		*
Africa				
Benin	55	55		
Botswana	65	65		
Burkina Faso	55	55	55-63 depending on sector	
Burundi	60	60		
Cameroon	60	60		

Cape Verde	65	60		*
Central African Republic	55	50		*
Chad	55	55	60 for public sector	
Congo (Brazzaville)	55	55		
Congo (Kinshasa)	65	60		*
Côte d'Ivoire	55	55	50-58 depending on sector	*
Equatorial Guinea	60	60		
Ethiopia	60	60		
Gabon	55	55		
Gambia	55	55		
Ghana	60	60		
Guinea	55	55		
Kenya	55	55	mandatory for public sector	
Kiribati	50	50		
Liberia	60	60		
Madagascar	60	55		*
Malawi	55	55	mandatory; reconsidered	
Mali	58	58		
Mauritania	60	55		*
Mozambique	60	55		*
Niger	60	60		
Nigeria	50	50		
Rwanda	55	55		
Senegal	55	55		
Sierra Leone	60	60		
South Africa	65	60	mandatory in some contracts	*
Sudan	60	60		
Swaziland	50	50		
Tanzania	60	60		
Togo	55	55		
Uganda	55	55		
Zambia	55	55		
Zimbabwe	60	60		

Sources: U.S. Government, Social Security Administration. 2006. Social Security Programs Throughout the World. Washington DC.; Economist Intelligence Unit. Country Risk Services. London. England; and Whitehouse, Edward. 2007. Pensions Panorama. Washington DC: The World Bank.

Note: refers to main schemes only; many countries have multiple schemes.

**Table 3: Simulated impact of earlier retirement for women on monthly and lifetime pensions in DB and DC plans (in \$)**

	r=3%			r=4%		
	Monthly pension					
	RA60	RA65	RA65, more work	RA60	RA65	RA65, more work
<b>DB</b>	150	150	159	150	150	159
<b>DC</b>	120	168	179	220	318	330
	EPV of lifetime pension, as valued at age 60					
<b>DB</b>	2391	1704	1810	2168	1500	1594
<b>DB--Increm. benefit/contrib. from increm. work</b>			106/118=90%			94/121=78%
<b>DC</b>	1912	1912	2030	3179	3179	3295
<b>DC--Increm. benefit/contrib. from increm. work</b>			118/118=100%			116/116=100%

Assumptions:

DB formula: Pension = 1.5%\*years of contributions\*reference wage up to age 60, .75% for each year after age 60

Woman works 20 years between ages 20-60

Monthly wage = \$500 throughout working life

Contribution rate = 10%

years of contributions at age 60 = 20

RA60 gives pension of women who retires at statutory retirement age of 60

RA65 gives her pension if statutory age is raised to 65 but her behavior doesn't change

RA65, more work gives her pension if retirement age is raised to 65 and she works and contributes an extra 2.5 years

DC plan assumes investment and annuitization of retirement saving on actuarially fair terms, r=3% and 4%.

EPV of lifetime pension is discounted to age 60 in all cases

Expected age of death is 82



**Table 4: Flat residence-based old age benefits in high-income OECD countries<sup>1</sup>**

	Ben as % of av. wage	Phase-out rate	Relevant income	Phase out begins-ends (% of av. wage) <sup>2</sup>	Indexation method
Australia	25% (40%)	40%	all inc, assets	6-68%	wage
Canada-basic <sup>3</sup>	14%	15%	all income	150-360%	price
-suppl. <sup>3</sup>	17% (23%)	50%	all income	14-48%	price
Denmark-basic	17%	30%	wage	75-132%	wage
-suppl.	17%	30%	all income	33-90%	wage
Finland <sup>3</sup>	20% (35%)	50%	pensions	€567-50%	price
Iceland-basic	9%	30%	non-pensions	50-80%	wage
-suppl.	16%	45%	all income	16-50%	wage
Netherlands	31% (43%)	0	na	No phase-out	wage
New Zealand	38% (58%)	0	na	No phase-out	wage
Norway-basic	18% (31%)	0	na	No phase-out	discr.
-suppl.	17%	50%	pensions	18-35%	discr.
Chile	19%	29.4%	pensions	0-65%	price

Source: Calculations by author, based on Whitehouse 2007 (except for Chile, which is based on James, Edwards and Iglesias 2009).

<sup>1</sup> The flat (basic) benefit is paid to all seniors whose income falls in the eligible range. It is based on age and residence, not contributions. Many of these countries also set a minimum pension that is higher than the basic; if this minimum income is not met, a supplementary top-up is paid. Rows labeled suppl. indicate the maximum supplement. In effect, this implies a two-tier basic benefit, with the first tier (the supplement) paid only to very low earners, phased out first and at a higher rate. Often the couple's rate for the basic benefit and/or supplement is less than double the individual's rate. In that case, the couple's rate is indicated in parentheses. If a couple's rate applies, phase-outs depend on combined income of the couple and the exempt threshold for couples is usually double the threshold for singles. If a number is not given in parentheses, this indicates that individuals are treated the same, whether single or part of a couple. This is the case for Denmark, Iceland and Chile.

<sup>2</sup> Threshold income for starting phase-out for supplementary benefit is generally above basic benefit, so basic benefit is not phased out for recipients of supplementary benefits.

<sup>3</sup> Benefit and threshold as % of average wage are based on data for 2002. Since benefits are price-indexed, while real wages have risen, these percentages would have fallen by 2009 unless compensatory ad hoc adjustments were made in the interim.

**Table 5: Penalties for Remarriage and Work in Survivors' Programs<sup>1</sup>**

Country	Type surv. benefit	Survivor Benefit Stops If			
		Remarries	Has wage	Pension	No Work Penalty
<b>Latin America</b>					
Argentina	DB, DC				x
Chile	DC				x
Mexico	DB, DC	x			x
Peru	DB, DC	x	x		
Uruguay	DB, DC		x	x	
<b>Eastern and Central Europe</b>					
Czech Rep.	DB	x		x	
Estonia	DB, DC bal.	x	x	x	
Hungary	DB,DC	x if <62		x <sup>2</sup>	
Latvia	2 months				x no ben
Lithuania	Flat (€20)	x			x
Poland	DB,DC bal.		x	x	
<b>High Income OECD Countries—With Flat Benefit<sup>3</sup></b>					
Australia	none				x no ben
Canada	DB			x	
Denmark	LS				x no ben
Finland	DB	x if <50		x	
Iceland	DC 2 yrs	x			x no ben
Netherlands	DC varies				x
New Zealand <sup>4</sup>	none				x no ben
Norway	DB	x	x	x	
<b>Other High Income OECD Countries</b>					
Austria <sup>5</sup>	DB	x	x	x	
Belgium	DB	x	x	x	
France	DB	x if <55	x	x	
Germany	DB	x	x	x	
Ireland	flat	x		x	
Italy	DB	x	x	x	
Japan	DB	x		x	
Luxembourg	DB	x	x	x	
Portugal	DB	x			x
Spain	DB	x if <61		x	
Sweden					x no ben
Switzerland <sup>6</sup>	DB,DC	x		X	
U. K.	DB,DC	x if <60		x	
United States	DB	x if <60	if <66	x	

Source: Calculated by author based on data provided by expert informants in various countries and country web sites. Also see James 2009.

## Notes for Table 5

- 1 This table refers to survivors' benefits that are paid on an on-going basis, usually after retirement age, even if the widow has no children. Many OECD countries pay a temporary means-tested benefit to widows under retirement age if they have small children and little or no wage income of their own. These are not included in this table. By definition, means-tested programs penalize work.  
Column 1 indicates the type of benefit paid to survivors, even if there are no children—a public PAYG DB, a private funded DC, a flat benefit or a lump sum (LS). The DC implies survivors' insurance based on a specified premium.  
In Columns 2, X indicates that the benefit is discontinued if the widow remarries.  
In columns 3-4, X indicates that the benefit is fully or partially phased out if the widow has wage-income or her own-pension. This may be achieved by setting a threshold to an allowable wage or own-pension, setting a ceiling on total pensions or income from all sources, granting only a fraction of the survivor benefit if other income is received, or phasing out the survivor benefit against other income.  
In Column 5, X indicates survivor benefit program has no penalty (in terms of reduced benefit) for widows who have current wage income or pension from work in the past. X no ben indicates no penalty because there is no on-going survivor benefit.
- 2 In Hungary, if a widow inherits money from her deceased husband's retirement savings account and puts it into her own-private savings account, there is no offset. If she credits it to her public account to increase her public DB, there is a 50% offset.
- 3 This includes countries (mainly high income OECD countries) with a residence-based flat benefit after retirement age (RA). Upon reaching retirement age, women get this benefit whether or not they are survivors and whether or not they worked in the market. Most other European countries have a minimum pension, which also applies to women, whether or not they are survivors. As discussed in the text, minimum pensions and most phased-out flat benefits include an implicit tax on work.
- 4 New Zealand has no survivor's benefit after age 65. Survivors, like other residents, get the old age flat benefit. New Zealand has a means-tested survivor's benefits for widows under age 65. These widows are expected to work if they have no children.
- 5 In Austria, the size of the survivor benefit depends on the relationship between the widow's and husband's wages during their active lives. It does not depend on current wages. If she has a high pension, this probably means that she also had higher past wages, which reduces the survivor benefit.
- 6 In Switzerland, for Pillar 1, the survivor must choose between her own-DB and the survivor DB. Her survivor benefit from the DC is not offset against wages or own-pension.

**Table 6: The impact of joint annuities and unisex tables in Chile<sup>1</sup>**

(based on 5% return during accumulation stage, 3.5% during annuity stage, real wage growth= 2%; 1994 data in 2002\$'s)

Education	incomplete primary	incomplete secondary	Complete secondary	up to 4 post secondary	5+ years post secondary
<b>Payouts to males, retiring at 65</b>					
<b>1. Individual-gender specific</b>	\$ 217	\$ 314	\$ 467	\$ 651	\$ 1,501
<b>2. Individual-unisex</b>	\$ 200	\$ 290	\$ 431	\$ 601	\$ 1,385
<b>3. Joint--gender specific</b>	\$ 179	\$ 259	\$ 386	\$ 538	\$ 1,240
<b>4. Joint—unisex</b>	\$ 175	\$ 254	\$ 378	\$ 527	\$ 1,215
<b>Payouts to females, retiring at 60</b>					
<b>5. Individual-gender specific</b>	\$ 59	\$ 83	\$ 146	\$ 241	\$ 444
<b>6. Individual-unisex</b>	\$63	\$88	\$156	\$257	\$ 472
<b>7. Jt. Annuity to widow</b>	\$ 107	\$ 156	\$ 232	\$ 323	\$ 744
<b>8. Widow's + own annuity (gender-spec.)</b>	\$ 167	\$ 238	\$ 378	\$ 564	\$ 1,188
<b>9. Widow's pensions as % of H+W pensions<sup>2</sup></b>	70%	70%	71%	72%	71%
<b>10. Widow's joint annuity as % of widow's joint + own-annuity<sup>3</sup></b>	64%	66%	61%	57%	63%
<b>11. % incr. in EPV of lifetime benefits from joint annuity<sup>4</sup></b>	45%	47%	39%	33%	42%

Source: James, Edwards and Wong 2008 and calculations by author.

Notes:

- <sup>1</sup> Joint annuity assumes 60% to survivor. Wife is 3 years younger than husband.
- <sup>2</sup> (Own-annuity of wife + jt. annuity to widow after husband dies)/(own-annuities of husband + wife while husband was alive )
- <sup>3</sup> Joint annuity to widow/(wife's own-annuity + joint annuity to widow)
- <sup>4</sup> EPV of joint annuity to widow/(EPV of wife's own-annuity + joint annuity to widow)

**Table 7: Summary of old age policies that deter labor market participation by women—and how to reduce work disincentives**

<b>Policy</b>	<b>Rationale</b>	<b>Impact on work</b>	<b>How to reduce work disincentives</b>
<b>Earlier statutory RA for women</b>	Compensates women for 2 jobs; allows them to retire with husband	Women stop work at younger age than men; get lower wages, pensions, on-the-job training	Equalize statutory RA for men and women while allowing earlier retirement with actuarially reduced pensions for those who meet some minimum pension target (Ex: Most high-income countries have equal RA)
<b>Non-contributory flat benefit (phased out) or MPG</b>	Poverty prevention	Income from benefit and implicit tax from phase-out discourage work	Replace with pure flat or have low phase-out rate after threshold; finance by starting at late age (say 70) when work is unlikely (Ex: Netherlands, New Zealand, Nepal)
<b>Survivors' benefits</b>	Prevent poverty among widows and help them maintain living standard	Survivors' benefit often displaces own-pension from work, so reduces net reward and discourages work	Require each spouse to purchase survivor's benefit for other spouse; survivor then keeps own-pension as well as survivor's benefit (Ex: joint annuity requirement in Latin American DC plans)
<b>Unisex requirement</b>	Avoid the lower monthly pension for women that is due to their greater life expectancy	Redistributes to women. Increases their rate of return to contributions, so encourages their work (opposite effect on men)	Work disincentive from higher pen. wealth. Work incentive from higher rate of return. Net impact on work is likely small. Effects are larger when unisex is combined with wage indexation. Cost is smaller if unisex is combined with joint annuities
<b>Indexation</b>	Price indexation holds purchasing power constant; wage indexation holds ratio between wages and pensions constant	Redistributes to women who work. In conjunction with unisex tables, wage indexation increases real rate of return and work incentives for women (and vice versa for men)—if they understand how it works	Work disincentive from higher pen. wealth. Work incentive from higher rate of return. Net impact on work is likely small. Effects are larger when wage indexation is combined with unisex. Opposite effects for men.
<b>Contribution-splitting</b>	Gives wife pension credits in case of divorce, death or retirement	Higher pension wealth may deter women's work; opposite effect for men	Work disincentive from higher pen. wealth. Little ex ante effect on rate of return to work. Net impact on work is likely small.

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## Footnotes

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<sup>1</sup> I wish to thank Montserrat Pallares of the World Bank for her help in assembling the data on statutory retirement ages in different countries. This paper draws on other research by the author, including James, Edwards and Wong 2003 and 2008; James, Martinez and Iglesias 2006; James, Edwards and Iglesias 2009; Edwards and James 2008 and 2010; James and Vittas 2001; James 2009.

<sup>2</sup> For example, in the US, the poverty rate of women over 65 is 15%, compared with 7% for men. For women over 85 it is 20%. For divorced, separated or never-married elderly women the poverty rate is 27% (Shirley and Spiegler 1998). Using the Luxembourg Income Study database for the U.S and 7 representative OECD countries, Smeeding and Sandstrom (2004) conclude that poverty in old age is almost exclusively a problem of very old women living alone due to widowhood or divorce.

<sup>3</sup> The U.S. tries to make its system actuarially fair with respect to pension postponement. Annual pension amount increases by 6-8% for each year of postponed pensioning, leading some workers to postpone retirement until age 70. However, women are less affected by these incentives, since the pension they ultimately get (the spousal or survivor's benefit) often depends on their husband's entitlement rather than their own.

<sup>4</sup> It is sometimes questioned whether employers will hire these older workers, given the possibility of age discrimination in the labor market. While ageism may exist and negatively impact the employment of older workers, nevertheless empirical evidence shows a large response to social security incentives. Often workers simply stay at their current jobs. In any event, given their early allowable pension age in many countries, retiring women are relatively young.

<sup>5</sup> That is, the expected present value of the annuity,  $EPV(A)$ , summed over all time periods  $t$  from first date of annuitization ( $F$ ) to death  $= \sum_t P_t * A / (1+r)^{t-F} = RS$ , where  $A$  = monthly annuity payout,  $P_t$  = probability of being alive at time  $t$ ,  $r$  = discount rate during the annuitization stage and  $RS$  = retirement savings.  $RS/A$  is the actuarial factor that tells us how to calculate the monthly payout once the retirement accumulation is known. Both the  $EPV$  and the actuarial factor depend on  $P$  and  $r$ .

<sup>6</sup> In reality, the pension at 60 may be higher or lower in a DB plan compared with a DC plan. This depends on the interest rate in the DC versus the benefit formula in the DB. In the early years of a new system, when there are many workers per retiree, pay-as-you-go DB plans have often paid generous benefits to retirees who have contributed relatively little, so the pension at age 60 is likely to be higher in a DB than it would be in a funded DC plan. However, more recently, as the number of retirees has risen dramatically, fiscal pressures have led DB plans to cut their benefits rates, so the opposite may be true. In this simulation we are not concerned with the pension at age 60 under DB vs. DC, but rather with how the pension changes if postponed to 65 and if longer work ensues—under DB vs. DC. Under most DB formulae, the DC plan will yield a larger increment.

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<sup>7</sup> On a broader level, progressive income taxes may have the side-effect of discouraging women's work, since women are often considered secondary wage-earners and therefore subject to higher marginal tax rates. Some women accurately calculate that, after taking account of the child care and other services they would have to hire, it is not worth their while to substitute taxed market work for untaxed home work.

<sup>8</sup> Flat, phased-out flat and minimum benefits all take the form  $B = F - aP$  or 0, whichever is higher, where  $B$  = benefit paid,  $F$  = flat amount,  $P$  = private pension and other private income,  $B+P$  = total pension and  $a$  = rate at which  $F$  is phased out as  $P$  increases. For a pure flat benefit,  $a = 0$ , for a pure minimum income guarantee  $a = 1$  (if  $P \leq F$ ) and for a phased-out flat  $a > 0$  but  $< 1$  within the phase-out range.

<sup>9</sup> Mexico also offers a minimum pension guarantee to workers who have contributed for at least 25 years. This poses all of the problems discussed for the cases of Argentina and Chile. Given the tendency of workers to move in and out of the informal sector and the tendency of women to engage in household production, few individuals are projected to meet the 25-year eligibility requirement.

<sup>10</sup> Along similar lines, remarriage is penalized, presumably on grounds that the woman now has another husband to support her (see Table 5).

<sup>11</sup> The relative expenditure needed to maintain a given standard of living for families of different sizes is estimated using equivalence scales. These scales give us an adjusted number of equivalent full cost family members by attributing different marginal costs to incremental members depending on their age and family size. Since the "right" adjustment is far from clear, several alternative scales exist. The previous OECD scale weights the first adult as 1, additional adults as .5 each, and children as .3 each. The square root scale, commonly used by the OECD at present, takes the square root of the number of family members as the divisor (OECD 1982, Hagenars, De Vos and Zaidi 1994). Based on the previous OECD scale, the cost of maintaining a given living standard is  $100/150 = 67\%$  as much for a uniperson household as for a couple, while the square root scale implies it is  $1/1.4 = 71\%$  as much. In both cases, it costs a couple only 40-50% more than an individual to maintain a given living standard. For a single person plus 2 children compared with a couple plus 2 children, the previous scale yields a relative cost of  $1.6/2.1 = 76\%$ , while the square root scale yields a relative cost of 87%. Much of these economies of scale stem from similar housing needs for an individual and a couple.

<sup>12</sup> A different arrangement is used during the working stage. In Chile, for example, each pension fund purchases a group disability and survivors (D&S) insurance policy for all its working members. Survivors' benefits for widows are financed by the balance in the husband's account, topped up by the D&S policy in an amount sufficient to purchase a defined benefit for the widow that is 60% of the husband's wage. The insurance fee is charged as an equal percentage of wages for all workers, so singles subsidize married couples and female workers (who are less likely to die) subsidize male workers. Chile has

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recently required a rebate into the accounts of women workers, to reflect the lower risk cost they imply.

<sup>13</sup> For the same reasons, families tend to under-purchase life insurance. See Bernheim et al 2003.

<sup>14</sup> Sweden has two mandatory DC plans—notional and funded. Notional DC plans are public plans in which the worker’s contributions, together with an imputed interest rate, are accumulated in an account statement and, upon retirement, are converted into an annuity under terms set by the government. However, the accounts are “notional” in the sense that there are no assets. Contributions are not saved and invested; instead, they are used by the government to pay other benefits on a pay-as-you-go basis. These plans originated in Sweden and are used in Poland, Latvia and other countries, especially in Eastern and Central Europe.

<sup>15</sup> In the U.S., voluntary employment-based defined benefit plans are legally required to pay equal monthly benefits to men and women, implying unisex tables, and a joint benefit is also required, unless the spouse specifically waives that right. However, voluntary 401k plans are typically paid out in a lump sum. If the worker later decides to annuitize, gender-specific tables may be used and individual annuities issued. The rules might be quite different if these or similar accounts became part of the mandatory system.

<sup>16</sup> If nation-wide unisex tables are required, companies that end up with a concentration of female annuitants will lose money. If companies are allowed to build unisex tables based on their own experience, those with a disproportionate number of females will offer lower pension payouts than others, effectively reintroducing gender-specific pricing. But potential future consumers will then seek out better rates elsewhere, so the high rate companies with many females may lose market share.

<sup>17</sup> Thus, unisex tables may not be compatible with voluntary annuitization in competitive insurance markets. Probably they should not be imposed unless annuitization is mandatory and exclusion is prohibited. If unisex is imposed, countries might consider using a risk-adjustment mechanism to compensate insurance companies that end up with a disproportionate number of women. Under such a mechanism, companies with a disproportionate number of men would pay a premium to a central authority to absorb the profit they are making due to unisex and this would be used to compensate companies with disproportionate females for their losses due to unisex. This would allow all companies to charge consumers the national unisex rate while remaining indifferent to the gender of their annuitants, so it avoids the cream skimming and instability issues mentioned in the text. However, such risk-adjustment procedures require good mortality data and considerable technical skills—both of which are in short supply in low and middle- income countries. Alternatively, a competitive bidding process might be applied to concentrate the entire annuity business in one company for a specified period, to minimize selection and cream skimming. Poland has recently decided to implement decentralized annuity provision with unisex requirements, with a risk-adjustment mechanism. Sweden uses centralized provision with unisex.