

**Retirement Systems in
Developed and Developing Countries:
Institutional Features, Economic Effects,
and Lessons for Economies in Transition**

by

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Abstract:

Multiple-pillar retirement systems have widely differing roles for private retirement savings, government regulation and insurance of private savings vehicles, and government provision of old-age income support. Despite their diversity, and despite the fact that public and private sector retirement systems command a great deal of wealth and have potentially powerful effects on labor and capital markets, they are often overlooked in structural analyses of country problems and prospects.

This paper examines important institutional features of retirement systems in developed and developing countries, and outlines what is known about their economic effects. Also identified are ways in which public and private retirement systems affect the process of economic adjustment, with special attention to the costs and benefits of encouraging early retirement.

The review shows that a coherent reform plan for a retirement system must identify how much old-age income security is affordable, how the government and private sector can address private market failures in providing this security, and how these objectives can be attained given available financing mechanisms. There is evidence that many retirement systems will be forced to change a great deal in the next few decades. In some cases, retirement benefits will have to be reduced (perhaps by imposing a means test), the age for early retirement will have to be raised, multiple-pillar plans must be integrated and streamlined so as to rationalize work incentives, and the incentives and opportunities for private saving will be increased. In any case, using high-cost long-term retirement systems to mitigate short- and medium-term unemployment problems will probably prove costly and inefficient as a solution to problems faced by economies in transition.

There are more persons over age 65 living today than at any previous moment in the world's history, and their numbers are growing. Among the industrialized nations that are members of the Organisation for Economic Cooperation and Development (OECD), there is one person 65 years of age or older for each five persons age 15 to 64, and the dependency ratio will increase rapidly over the next few decades.¹ Despite longer life expectancies and no evidence of deterioration in health profiles among most older workers, early retirement is becoming increasingly common. The cost of supporting retirees is climbing: public retirement systems amount to about 10 percent of national income, and make up 20 percent of total government expenditure in most developed nations (see Table 1). As the new century dawns, it seems clear that public retirement systems along with their private-sector counterparts will be increasingly called on to support the world's aging population.

Although public and private sector retirement systems command a great deal of wealth and have potentially powerful effects on labor and capital markets, they are often overlooked in structural analyses of country problems and prospects. This paper examines important institutional features of retirement systems in the developed world as well as in several developing nations, and outlines what is known about their economic effects. Also identified are ways in which public and private retirement systems affect the process of economic adjustment, with a special focus on the costs and benefits of encouraging early retirement for older workers affected by structural adjustment.

Retirement systems differ across nations. Sometimes a publicly-provided old-age pension is the primary component of retirement security, while in other countries, individual, company, and family sources comprise older generations' main source of support. Institutional rules regarding benefit levels, and the manner in which these benefits are financed, differ tremendously across countries. These structural differences imply that the economic effects of retirement systems vary greatly from one country to another.

Despite these differences, the retirement systems of most developed nations, and increasingly developing economies as well, confront a number of common problems. In the years to come, most nations will experience population aging, high unemployment rates, and shifts in economic structure. These pose new challenges for retirement systems, and may require fundamental reforms in both benefit formulas and financing approaches. An understanding of how existing retirement systems work, or sometimes fail to work, offers valuable lessons for the future. No country would wish to simply import another nation's model *in toto*. Nevertheless, it is useful to identify successful experiences to be emulated, and unsuccessful experiments to be avoided. Better understanding of what makes for efficient and equitable retirement systems that can meet the

changing demographic and economic needs of future generations of workers and retirees will be invaluable for both developed nations and economies in transition.

The plan of the paper is as follows. Section A briefly reviews recent trends toward early retirement, and evaluate explanations for these trends. Institutional characteristics of retirement systems are discussed in Section B, which introduces the notion of "multiple-pillars" for retirement income security including government, employer, and individual/family support. Of central interest are pension coverage and benefit patterns, as well as funding and investment practices. Section C presents a discussion of the economic effects of retirement systems on labor and capital markets. Conclusions, policy options, and research needs for policymakers offering economic assistance to economies in transition are enumerated in the final section.

A. Retirement Patterns and Flows

This section presents data on recent trends toward early retirement, and evaluates several explanations for these trends. One of the most important change in industrialized nations' labor markets over the last two decades was a massive movement to early retirement. There is support for the view that the trend toward earlier retirement was facilitated and strongly motivated by factors which made it possible for older workers to leave their main jobs, including public and private pensions, as well as other income support programs. This long downward trend in lifetime work comes despite longer life expectancies in many developed nations, and without any evidence of system-wide deterioration in health. How retirement systems have contributed to this long-term downward trend in work at older ages is examined in the next Section.

Trends to Earlier Retirement

Defining what constitutes "retirement" differs not only from nation to nation, but from one person to the next. In many developed nations, a transition to retirement is taken to mean the point where one accepts a public pension; this may or may not coincide with labor force withdrawal. In Sweden for example, many retirees are partially employed after accepting a public pension, while in the United States pension acceptance and work cessation are virtually synonymous (Fields and Mitchell 1984b). In other countries, accepting a privately-provided retirement payment, rather than a public pension, constitutes retirement; in Japan, for instance, many workers retire from their career job with a lump sum pension, and often move to some other, usually lower paying employment, for several years (Rebick 1993).

Yet a different view of what constitutes retirement is garnered by surveys of older persons who "self-report" their retirement status using any definition they wish; usually such surveys produce higher rates of retirement than objectively defined measures which equates retirement with complete labor force withdrawal. Additionally, retirement is not an absorbing state in many nations, in that many older persons move fluidly between full and part-time wage jobs, self

employment, unemployment, leisure activities, and perhaps in some countries work in the "grey" or "underground" economy.²

These different definitions of retirement are more than semantic, since alternative measures produce very distinct estimates of the size of the country's actual and potential labor force. In general, labor economists prefer to define retirement using an objective labor force participation measure, in lieu of a self-reported definition or one which relies on pension acceptance. Even here, however, there are cross-country differences in the definition of labor force participants making these so-called more objective measures less than fully comparable across nations. Thus in the former West Germany, older persons became eligible for a special unemployment benefit after being jobless for a specified time; on accepting this special benefit, they were removed from the official unemployment count, and were thereafter excluded from the labor force count (Kohli et al. 1991). Elsewhere, as in the United States, older workers are not privy to a special unemployment subsidy and are thus more likely to be included in labor force statistics as long as they seek work.

Which specific retirement concept is used is also important for policy reasons, and the concepts of most interest may depend on which policy concern is preeminent. Analysts concerned with a pension plan's funding status will tend to focus on the age of pension acceptance for the purpose of predicting benefit outflows. In contrast, labor force measures (e.g. labor force participation or hours of work) may be more useful in determining whether tax collections will be sufficient to meet pension financing needs. Analysts focusing on alleviation of poverty in old age will wish to know not only older persons' labor force status in the wage labor market, but might also wish to examine whether income is generated by self-employment, and the employment and earnings status of other family members.

While no single retirement concept is appropriate for all policy matters, the best data for the countries of central interest to this study are labor force participation rates for older persons. Hence a brief examination of these is useful, with the caveat that cross-country comparisons may be somewhat inaccurate, as compared to within-country time series labor force participation patterns.

Retirement Trends in the OECD: Labor force participation rates of older individuals are by no means uniform across the developed countries (see Table 2). For example, only 4 percent of the men age 65 and older were in the labor force in 1985 in the Netherlands, while in Japan as many as 37 percent participated. Similar cross-national differences are observed for men age 55-64, with rates of 19 percent in Austria, and 76 percent in Sweden.

Despite persistent long-run differences in levels of labor force participation across countries, there has been a common downward trend in men's participation in developed nations since World War II. This persistent long-run labor market trend was widespread across developed

nations through the mid 1980s and is one of the most striking labor market developments in the last half-century. These trends translate directly into earlier retirement ages: for instance, in the United States, twenty years ago men retired at age 65 on average, and now the average retirement age is 62 (Ippolito 1986).

The general downward trend in market participation which characterized older men was also seen among older women across the OECD countries, but in a muted form. Participation rate trends of older women are more difficult to summarize because many women entered the paid labor market only relatively recently, and have not accumulated enough years of service to retire with a pension plan in their 50's. Hence institutional factors no doubt provide an incentive for women to remain on the job at older ages, which offsets the general trend to earlier retirement predominant for males. As is evident from Table 2, women's market participation rates among those over age 65 have remained quite low across the OECD nations, and the slow change among those aged 55-64 reflects both positive and negative influences on retirement patterns.

As a whole, the data show that fewer and fewer older persons are working for pay in developed nations. This trend is particularly striking in view of the fact that life expectancies in most of these countries have been rising in the last fifty years, and health problems for people in their 50s and 60s are, at the very worst, no more serious than they were fifty years ago (Baily 1987). Earlier retirement is therefore increasingly the norm, despite the fact that people are now living longer in the retirement period.³

Retirement Trends in 'Transition Economies' : Tracking retirement trends is more difficult in the transition economies, which here are taken to mean Eastern Europe and the former Soviet Republics. These countries share some retirement system problems with those nations in Asia, Latin America and Africa conventionally included in the developing country group. Time series are less readily available, surveys tend to be less comparable, and the meaning of labor force participation rates is less clear when large segments of the population are engaged in subsistence farming and related activities. Also older workers' health patterns tend to be worse in the developing nations. For example a recent survey of older workers' health status in Hungary pointed out that life expectancies have actually declined over the last several decades in that country, and the incidence of occupational illness is far higher.⁴

Because of these caveats, about the most that can be said is that there is a great deal of cross-country variation in participation rates for older workers in transition economies, as can be determined by an examination of the data from Table 3. Labor force participation rates of older persons tend to be higher here than the average for developed nations: for instance, in Poland 33 percent of the men age 65+ were in the labor force at the end of the 1980s, as compared to rates below 10 percent in France and Italy. A notable outlier is Hungary where only 3-4 percent of men

and women age 65+ are employed. Only in Poland is a trend identifiable, and here too it seems to be downward, particularly for the younger age groups (age 55-64).

Explaining Earlier Retirement

What explains this trend toward earlier retirement? One widely held view emphasizes factors forcing or "pushing" workers out of their jobs, while the opposing perspective contends that "pull" factors attract older workers into retirement (International Labor Office 1989; Kohli et al. 1991). This distinction is obviously somewhat arbitrary, since for example the onset of poor health can "push" a worker out of his job, but also can make leisure more attractive thus "pulling" that worker into retirement. Despite this caveat, it is useful to classify evidence on these two hypotheses for descriptive purposes.

Evidence on the "push" hypothesis : This theory holds that people truly wish to remain employed at older ages, but are forced from their jobs by declining productivity and poor health, mandatory retirement and age discrimination, and structural shifts in labor demand.

Productivity and Health: Many believe that productivity falls and employee health deteriorates with age, leading employers to force out older employees when health problems strike. Indeed, many surveys report that when people are asked why they retire, poor health is a common response.⁵ Nevertheless, it is difficult to measure the independent effects of health problems on older persons' work behavior, and in many countries people feel it is socially acceptable to retire because of poor health, as compared to saying that "they got tired of working". Furthermore, as shall be shown below, many countries offer income-support maintenance programs which require the applicant report he or she cannot work. It has been suggested, therefore, that at least some older people reply that they are in poor health as an *ex-post* rationalization for retiring at relatively young ages (Fields and Mitchell 1984b; Sammartino 1987).

Good-quality evidence is difficult to obtain on the effect of poor health on retirement. On the one hand we know that people retire earlier from physically demanding jobs, from jobs where they are exposed to heavy machinery and equipment, and from jobs with extremes of temperature, stress, and other unpleasant working conditions (Gustman and Steinmeier 1986; Mitchell 1990). On the other hand, these jobs also tend to offer above average pensions, so earlier retirement may be due to pension opportunities rather than because the workers are forced out. There is little suggestion that on-the-job accidents and injury rates rise with age in the United States: work accidents are lower for older than for younger employees, but little is known about patterns in other countries.⁶

As yet there is little evidence to support or to refute the view that worsening health and productivity problems among older persons explains trends toward earlier retirement in the set of developed countries. If anything, most older persons in developed nations are probably living

longer and in probably as good health (if not better) as compared to previous decades.⁷ In developing countries, by contrast, this conclusion may not hold since urbanization in many developing countries sometimes exposes people to more disease, pollution, and risk of injury than in wealthier economies.

•Mandatory retirement and age discrimination: Retirement research over the last decade casts serious doubt on the view that age discrimination and mandatory retirement rules explain observed early retirement trends in developed countries. To summarize the labor economics argument, long-term compensation contracts with upward-sloping pay profiles are often used as a means of spurring worker productivity and ensuring long tenure. Ex ante, a long-term contract specifies that an employee will leave the firm at the point when his total compensation comes to exceed his total productivity (Lazear 1979; Gustman et al. 1992). From this perspective, the age of mandatory retirement plays a central and valuable role: it is the pre-agreed point at which the labor contract comes to an end, after which the employee would be overpaid relative to his value to the firm. Hence mandatory retirement is rationalized as an economically important phenomenon, rather than as evidence of employer age bias without economic rationale.

The hypothesis that mandatory retirement demarcates the end of a long term labor contract is supported in several research studies. In the U.S. for instance, individual companies (and unions) were originally permitted to set mandatory retirement ages until a recent change in federal policy outlawed the practice. After the law was changed, companies responded by developing alternative inducements for retirement, including pension incentives and special early retirement "window" plans.⁸ In Japan many firms retire workers on attaining a retirement age, but do not necessarily require that older workers drop out of the labor force -- instead, many Japanese employers re-hire these older workers (at lower pay) rather than forcing them out of their firms altogether (Rebick 1993; Clark 1992). This fact suggests that mandatory retirement plays the role of endpoint in a long term employment contract, rather simple age discrimination.

Can mandatory retirement policy account for the entire trend to earlier retirement over time, in developed countries and perhaps in some developing countries? Here the answer is probably no. Even in the United States when retirement policy was in the firms' jurisdiction until recently, most older workers appear not to have been constrained by mandatory retirement -- the vast majority of workers left their jobs well prior to the age they would have been "forced out", and continued to do so after the government lifted the mandatory retirement age altogether. While mandatory retirement ages clearly played different roles in different countries and times, it is certain that mandatory retirement policy cannot explain all of the long-term decline in labor force participation rates among workers in their 50's and 60's.

Even if mandatory retirement is not binding on most older workers, it may be that there is age discrimination in hiring limiting older workers' job opportunities. To establish the prevalence of age discrimination, it is necessary to determine whether employers treat equally productive workers less generously simply because of age. Direct evidence on this point is scanty, in part because of the difficulty of holding worker productivity constant while comparing employers' pay, hiring practices, layoff and firing patterns, and the like. Some researchers contend age discrimination in employment is quite widespread, a deduction based on survey evidence showing that many retirees report that they wish to work.⁹ This conclusion requires a caveat, however, since a self-reported interest in employment does not imply actual willingness to seek and take a job, nor does it reflect potential productivity. In the United States, a recent study found that only 9 percent of nonworking men age 55-65 and 18 percent over age 65 reported that they could not work because of lack of opportunity. For women, the figures were higher -- 26 percent of the 55-64 year old female nonworkers, and 11 percent of those age 65 and over (Fields and Mitchell 1984b). These figures suggest that a fairly small percentage of those who want to find work actually report that they are stymied for job market reasons. Further examination of survey responses by those nonworkers who indicate they might like to work, also reveals that they have restrictive and in many cases quite unrealistic perceptions of their labor market opportunities. That is, many have only a very narrow set of jobs and wage levels they are willing to accept, and would not take jobs requiring strenuous working conditions or long commuting distances (Commonwealth Fund 1990).

A different insight into older persons' job market opportunities comes from information on joblessness and job finding after plant shutdowns. Older persons displaced from their jobs due to plant shutdowns in the U.S. apparently do have a more difficult time finding new work, as compared to younger employees displaced from the same firms. Further, when they do obtain employment, their earnings are somewhat lower than younger persons. However older workers, after being displaced, appear more likely to remain in their same industry/occupation, as compared to their younger counterparts.¹⁰ Whether this illustrates employer bias, or employee reluctance to undertake investments such as skill acquisition and migration, is not yet known. Additional studies on other countries' experiences are needed to examine this problem in more depth.

•Structural Shifts in Labor Demand: Still another explanation for why older workers' labor market attachment has declined in the last two decades is that older workers may lack computer skills, or their human capital may have depreciated so much, that they are passed over in favor of other more productive inputs. In other words, older workers may suffer disproportionate job loss as a result of a shift in the economic composition of jobs, due in part to structural shifts and in part to technological change.

Direct tests of this hypothesis have been hampered by the difficulty of measuring structural shift and technological obsolescence, and direct measures of the degree of substitutability between older and younger workers (and capital) are rare.¹¹ Evidence shows, however, that the trend toward earlier retirement in Europe and the U.S has not been concentrated in sectors experiencing the most economic growth, nor those experiencing the largest declines. Instead, earlier retirement has characterized most if not all the major industrial sectors, suggesting that this argument is less potent than at first it might seem (Jacobs et al. 1991a and b; Pampel and Weiss 1983).

Evidence on the "pull" hypothesis: An alternative explanation for the trend to earlier retirement is that many older workers leave employment because they value leisure and home time strongly. Overtime, factors which permit, if not encourage, older workers to withdraw from the wage labor market have become more important, particularly retirement income levels, and retirement income incentives. Income levels are determined by public and private pensions, family support, and other assets available during retirement. Retirement incentives are determined by comparing the utility of additional income received as a result of continued work offset by less leisure or time spent at home, with the utility of retirement activities and any pension or other benefits receivable after retirement.

•The Role of Economic Factors: Research over the last decade has demonstrated that economic factors prove to be an extremely important determinant of the retirement decision. Never the less a precise measure of their effects is available for only a few countries.¹² In the United States, for example, economic factors appear to account for about 75 percent of explained variation in retirement ages, as compared to health factors which account for only 25 percent. These economic factors include wage earnings while employed, and private pension as well as Social Security payments when retired. Such financial factors have two offsetting effects, however, which must be clearly distinguished. First, economists emphasize that workers with more retirement income retire earlier, whether it is from public or private sources. Second, there is a complex interaction between income and substitution effects which occurs when workers are offered more income to delay retirement. Existing evidence on men suggests that for a reasonable range of policy changes, the substitution effect tends to overcome the income effect. In other words, for men, raising the reward for deferring retirement tends to induce some delay in the retirement age.

Having said that earnings and pension opportunities matter, it should be emphasized that the particular institutional details of public and private retirement programs must be understood in order to evaluate how older workers adapt their work patterns in response to retirement systems. Thus, for instance, the Swedish public pension system permits a worker to accept his pension annuity and remain employed part-time, a practice which produces higher employment rates among

older Swedes as compared to virtually any other Western European nation. In the United States, in contrast, retirees earning above an annual threshold amount have their social security pension reduced by one-half to two-thirds, and pay income tax on a portion of remaining benefits; partly as a result of these restrictions, labor supply among the elderly in the US is quite low.

Clearly retirement systems can and do affect work incentives at older ages. This is best seen by noting that when retirement is delayed, additional pay (and ultimately later pension benefits) is earned, and then must be compared with the benefits foregone by an additional year of work. If returns from work drop sharply at a particular age, such as in Japan when workers attain the mandatory retirement age, the "pull" of the pension may be enough to induce early retirement (Rebick 1993). This calculation also depends on the specific pension rules in place: that is, a benefit reduction factor is often used to lower the retiree's monthly pension benefit if he elects to retire early, on the grounds that the early commencement of monthly payments makes the present value of the lifetime benefit paid equal in actuarial terms to the regular, higher benefit (the lower benefit for early retirement is received over a longer period of time).

Evaluating pension incentives for different retirement ages thus requires one to compare the present value of (net) benefit streams at all feasible retirement ages. Thus for instance, a pension plan which pays "full" benefits at age 65 would be actuarially neutral if it reduces benefits by about 50 percent for an age-55 retiree -- in present value terms, the age-55 and the age-65 benefits would be roughly equal.¹³ Many public sector employers and the majority of private sector pension plans, are not neutral, however, at times strongly subsidizing early retirement by offering payments of 75 or even 100 percent of the age-65 benefit for those leaving early (Fields and Mitchell 1984b; Leonasio 1993). In contrast, the Japanese national retirement system has the opposite feature, paying only 58 percent of the full benefit for someone retiring at age 60, instead of the higher benefit, around 70 percent, which would make pension wealth and work incentives neutral (Myers 1991).

Plans are sometimes influential in work decisions at later ages as well, such as when work beyond the "normal" retirement age yields benefit increases which are too small, or too large, to be actuarially neutral. Penalties for continued work beyond the normal retirement age occur when a plan offers benefit enhancements which do not offset the now-shorter retirement period. This is quite common among private sector plans in the United States, where continued work after age 65, and sometimes even after age 60, is often penalized (Luzadis and Mitchell 1991). In contrast, social security retirement pension rules in the United States are roughly actuarially neutral for those working beyond age 65, while in Japan, work between the ages of 65 and 70 yields benefits higher by 88 percent instead of the more actuarially neutral 40 percent (Myers 1991). These

retirement system incentives influence workers' decisions about when to retire, and must be a central focus of those seeking to alter retirement patterns and trends.

It should also be noted that in many countries private and public pension systems interact in such a way that benefit formulas include cascading or cumulative effects on retirement incentives.¹⁴ Furthermore, as has been recognized in a few recent studies of retirement trends in Western Europe, the availability of other, non-pension income transfer programs also interacts closely with the pension schemes to influence the relative appeal of retirement at young ages. For example, as will be discussed below, unemployment relief and disability benefit systems sometimes offer alternative routes out of the workplace for persons seeking alternatives to the job market. Though existing studies are thus far mainly descriptive, they tend to support the view that these other transfer programs have generated new pathways to retirement which to some extent work outside the regular public and private pension systems.

Researchers are currently examining whether the long term trend toward early retirement can be explained adequately by analyzing changes over time in pension plan characteristics and formula-driven benefit reduction or increase factors. There is some evidence that these have, in fact, played a powerful role. Incentives to retire early have strengthened in many nations over the last four decades, and these benefit increases seem to "track" declining labor supply patterns quite closely. In a study using US aggregate data, Levine (1993) found that average social security retirement benefits predicted men's labor force participation fairly well, and certainly much better than a simple time trend would. More research is needed on this topic, particularly using individual-level survey data now becoming available in many developed and developing countries.¹⁵

•Other Factors: It should be emphasized that in some nations, older persons retire from the paid labor market to engage not in leisure activities, but in self employment and/or home production. In Hungary, for example, where large segments of the older population report working in agriculture, retirement has signified a change in industry and occupation -- a movement away from the state-run system to the non-socialist sector (Szalai 1991).

B. Retirement Systems in Practice

Over the last two decades, many nations have developed innovative policies influencing retirement and work patterns, including (but not limited to) private and public pension systems. A "traditional" motivation for this increased attention to retirement policy has been demographic aging -- there are increasing numbers of persons requiring old-age income support. The population and labor force estimates discussed above imply growing concern along this dimension, given expected aging trends. A less traditional, but increasingly common, rationale for the new concern about

retirement policy is the fact that many nations have been adapting their retirement systems in times of slack labor demand, increasingly providing generous retirement payments in lieu of unemployment payments.

Benefits and financing arrangements of retirement systems differ greatly across the set of developed countries, as well as their reliance on private market provision, government regulation, and government provision. Despite these differences, it appears that many nations have increasingly relied on multiple-pillar systems to draw older workers out of the labor force. A review of experience from developed countries shows that many public retirement systems made early retirement financially attractive in the last decade. Such offerings included low early retirement eligibility ages, generous pension and other benefit levels, and strong disincentives to remain employed at older ages. High payroll tax rates also characterize many public retirement plans.

Overview of Multiple-Pillar Retirement Systems

It is useful to employ a common conceptual framework for comparing multiple pillar retirement systems across countries. Following a brief overview of these systems, key benefit and funding features of retirement systems are identified, including both public and private schemes. Overall strengths and weaknesses of public versus private systems are then sketched. Specific effects of retirement systems on labor and capital markets are taken up in the next section.¹⁶

Most developed and developing countries have some form of old-age income support systems. Nevertheless, they differ tremendously in structure and impact both within and across countries, earning the designation of "multiple-pillar" systems. This concept reflects the fact that old age support usually derives from a number of sources including public pensions (e.g. social security retirement plans), private group mechanisms (e.g. company pensions), and family and other private support (e.g. self-insurance, individual saving, children's support). The mix of plans differs greatly across nations, and indeed in some cases different workers within a particular country may be covered by vastly different programs. Hence understanding multiple pillar retirement systems requires learning a great deal about many diverse public and private pension institutions, which vary greatly across countries and even within a country.

In addition to understanding pension institutions, it is important to point out that many other public and private programs influence retirement, sometimes intentionally and other times not. In many European countries, for instance, unemployment insurance and disability benefits were offered during the 1980's as a form of subsidized early retirement, with the goal of permitting employers to substitute younger workers for those older individuals who could then retire early, and absorbing what were perceived as "redundant" older workers from the unemployment rolls. These alternative paths to early retirement were widely used. Lenient eligibility rules produced

higher disability rates in some countries such as the Netherlands, which had 1,033 disability recipients per 1,000 labor force participants age 60-64, for example, while the United States had only one-quarter as many (Kohli et al. 1991; Burkhauser 1993).

Key Features of Retirement Systems

Retirement systems in most countries are extremely complex, particularly when plans interact and overlap to create an institutionally complex web of rules. In addition, multiple-pillar systems behave differently depending on each country's specific mix of public and private components. A brief description of the two most important aspects of retirement plans is offered to aid in understanding how the many different approaches to retirement systems work: benefits and financing. Instead of cataloging all possible retirement systems, the key characteristics common to most plans are identified, making reference to individual country plans in selected instances. Unless otherwise noted, specific country retirement system examples throughout this section are taken from Tables 4 and 5 describing retirement system characteristics in OECD nations.

Regarding Benefits:

1. Retirement System Coverage Rules and Practice: Whom does a country's retirement system cover, and which groups are excluded by law or de facto from participation?

In many countries, participation in a formal retirement system is restricted to citizens who are wage and salary workers, and in some cases only fractions of the entire workforce are covered.¹⁷ At times, one tier of the retirement system is limited in coverage but other tiers are unrestricted. Thus in Finland for instance, five years of residence suffice for coverage under the basic public pension scheme which does not require citizenship. Japan, by contrast, allows only resident citizens to be eligible for the basic pension plan, though residency is not required for a second tier of employees' pension. As a result, coverage rates vary widely across countries. For example in the United States, most private sector workers are covered by a public social security pension system, but only about 45 percent by the private retirement system.

Uneven coverage produces higher benefits for employees participating in national and occupational systems, but may leave more vulnerable workers who are uncovered. Of particular concern is the situation of immigrants who are often excluded from retirement plan coverage due to participation rules requiring citizenship. These barriers to mobility will become increasingly restrictive as the Western European job market opens up in the next decade, and may hamper labor flows across the community of economies in transition, as they begin to experience more flexible labor markets (Commission of the European Communities 1991).

In addition to national or occupational pension plans, retirement systems often include private income support mechanisms. These can include benefits offered by labor or social organizations, family groups, or even individual retirement savings accounts. Cross country

differences in the private "pillar" of the multiple pillar system defy a common classification scheme. Nevertheless, a careful analysis of the multiple aspects of a nation's retirement system requires a full review of retiree income support offered by the private sector.¹⁸

2. Retirement System Entitlement Requirements and Practice: What requirements must be met in order to receive benefits, and what kinds of people can meet these requirements?

Most formal pension plans require covered workers to be employed some minimum number of years in order to be eligible for retirement benefits, though the range of eligibility requirements is fairly wide and varies both within and across countries. Thus in the United States, individuals must be employed in covered jobs for at least 10 years in order to be entitled to social security pensions, whereas a maximum of 5 years of participation is typically required in order to become entitled to private pension benefits. In other countries, employees must also fulfill a certain number of years of work immediately prior to retirement; for example in New Zealand, 7 years of work within the 10 years before retirement are required for public pension benefit entitlement, while in Spain a total of 10 years of coverage is required, including at least 5 years in the 10 years immediately preceding retirement.

Many countries also have special government, or mandated occupational, pension programs covering particular industries or economic sectors. These generally require employment for a specified number of years in that sector before a worker becomes entitled to benefits. For example, many developed countries offer special pensions to public sector employees, military and diplomatic personnel, miners, and farmers; a similar pattern of special pensions has existed in many transition economies such as Hungary and Poland as well. These special plans frequently offer more generous and earlier benefits than do the regular public and private retirement plans, and their entitlement rules can make workers unwilling to change jobs for fear of losing or lowering their pension. In assessing the way a retirement system works, then, it is important to distinguish between coverage and benefit entitlement rules in formal retirement income programs.

3. Rules Governing Benefit Eligibility and Receipt: What is required to receive retirement benefits, and how do benefits change when workers retire early or late?

Most retirement programs specify that covered individuals attain a specified age, or age plus service, in order to begin receiving "normal" benefit payments defined according to an unreduced or "full" benefit formula. The normal retirement age varies across OECD nations and even within countries: in the United States, for instance, it has been age 65 under the social security system but as young as age 55 in some private pension plans. In Japan, the public plan requires age 65 for full benefits but many private plans permit full benefits at age 60 (Tables 4 and 5). Looking across OECD countries, most public and private plans set their normal retirement age

at 65 for men (the country weighted average is just over age 64) and somewhat earlier for women (the public plan average is 62.5 and the private plan average is 59.7 years of age).

In line with the trend to earlier retirement noted above, workers frequently retire at ages other than the normal age. Early retirement ages range from a low of 55 to 64 in public plans, averaging between age 59 to 62. OECD country private pensions tend to allow even earlier retirement, around age 55 as a rule. Those electing to retire prior to the normal retirement age generally receive reduced annual benefits. Delayed retirement, which means retiring later than the plan's specified normal age, frequently produces annual benefit amounts which exceed the normal or full benefit.

Benefit eligibility rules also vary along other dimensions. Some countries have a means test, and reduce or cut benefits to those with income, or assets, higher than a threshold, as in Australia. Other countries have a work test, permitting benefit receipt only among those who have little or no earnings. For example in the United States, older workers have their social security retirement payments reduced by 50 percent if earnings exceed a threshold. Such rules have the effect of targeting retirement benefits on the needy, enhancing the welfare aspect of the plan and reducing the earnings-replacement insurance aspect. They also tend to reduce work incentives for those subject to the test.

Not all nations discourage work among the older population: for example Sweden encourages its older citizens to remain employed under its partial retirement option, by allowing older persons to work part time and continue receiving pension benefits. As a result, labor force participation rates of older persons in Sweden are among the highest of the developed world. It should also be noted that as benefits rise, and eligibility requirements become more restrictive (including means tests), peoples' incentives to misrepresent their eligibility and/or degree of disability increases, and this becomes particularly a problem when record keeping is less than perfect.

4. Retirement Benefit Amounts: How are benefits determined, and how do they vary in different states of the economy? Are benefits real or nominal? How are benefits from different programs integrated, and how are these taxed?

Benefits received under a retirement system vary according to whether the plans offer benefits according to a specified formula, or whether benefits are determined by contribution amounts. Defined benefit plans are most typical of publicly provided retirement plans and, in most countries, employer-sponsored plans as well. In such a plan, annual benefits are specified according to a formula based on years of service and pay, and benefits are frequently two-tier in nature: the first-tier is a flat or minimum pension, and the second tier focuses more closely on earnings replacement. The relative importance of the first-tier flat benefit versus the second-tier

earnings-based component varies from country to country. In Hungary, for instance, roughly two-thirds of all retirees are said to be receiving only the minimum or welfare pension, while in Canada and West Germany more emphasis was traditionally placed on earnings replacement. Defined benefit plans which emphasize minimum benefits tend to be more redistributive than the earnings-based plans, though even in the latter some formulas cap the amount of earnings that can be credited toward the retirement benefit, or the benefit replacement rate is structured so as to replace lower-paid workers' wages at a higher rate than higher-paid workers. As will be demonstrated below, such benefit formulas have differential effects on work incentives for the lower-paid and those earning more.

Defined contribution plans, by contrast, specify not the benefit formula but rather the amount to be contributed to the worker's account. The monies are then invested until retirement. In this type of plan the worker bears investment risk since most defined contribution plans do not guarantee a minimum pension nor a particular replacement rate on earnings. Since early retirement spreads benefit receipt over a longer period of time, early retirement also requires actuarial reduction of benefits. These reductions are large: for example, in the United States, an age-55 retiree with a defined contribution plan would receive about half the benefits of a worker retiring at age 65 (McGill and Grubbs 1989). In contrast, many defined benefit plans subsidize early retirement by paying early retirees more than half the normal benefit amount (Fields and Mitchell 1984a). Since subsidies discourage work incentives (see the next section), it is important for analysts of a retirement system to determine whether and how the net present value of retirement annuity flows vary with retirement age. An actuarially fair plan would be consistent with constant net present value amounts as retirement is delayed.

Consideration of benefits under retirement systems also requires attention to how benefits respond to other considerations. One issue is how benefits are affected by inflation: some plans partially or fully index payments, while many others do not. For example, retirees under the social security system in the United States receive nominal increases as long as the inflation rate exceeds 3 percent (Tables 4 and 5). Canada and the United Kingdom offer indexed assets held by private pension plans, which enhances benefit security of private pension holdings. In many other cases, however, public and private retirement benefits erode in real value with inflation. Tax policy toward benefits also varies: when benefits are subject to taxation, this reduces their net value and hence their attractiveness. Integration of benefits across many plans is also very important, and takes a variety of guises. One form of integration occurs when many programs are overlaid: thus older workers may retire under one plan (e.g. a private or disability plan) and then transition to the regular social security pension when the retiree is old enough. This has been particularly important in Western European nations where unemployment insurance and disability pensions were used

during the 1980s to remove many older persons from the labor pool. A different kind of integration arises when retirees' pension payments are reduced by other payments, such as disability or workers' compensation systems. Last but not least, if benefits fluctuate over time with the health of the economy, or with demographic characteristics, these fluctuations will also affect older workers' assessment of likely benefit security. Sometimes the government guarantees minimum benefits, which changes the risk characteristics of the retirement benefit promise considerably. For example, in Chile the government continues to guarantee a minimum pension even though the national pension system is a mostly-private mandatory national defined contribution system.¹⁹

Analysts examining how a retirement system affects economic behavior will typically require a careful understanding of these benefit formulas and benefit eligibility rules in order to carefully assess what retirement systems benefit promises are. In general, replacement rate calculations are an inadequate method of summarizing benefit formulas and the complex structure of the benefit promise. Nonetheless, many analysts refer to these as a summary statistic representing benefit generosity. With appropriate caveats understood, the evidence shows that public plan replacement rates across OECD nations stood at about 38 percent, and private plans replaced about 60 percent of average pay (Tables 4 and 5).

Regarding Financing:

5. Paying for Retirement Systems: *Are contributions mandatory or voluntary, who pays them, and how do they vary in different states of the economy? If voluntary plans are available, do contributions receive any special tax treatment? If mandatory taxes are collected, how do these affect labor costs?*

When retirement plans are mandated nationally, as in the case of social security systems and some occupational pension schemes, they are often paid for with a payroll tax levied on wage and salary workers (and sometimes on the self-employed). Tax rates vary widely across countries, and are sometimes levied only on earned income up to a cap, which opens such retirement systems to charges of regressivity. (On the other hand, such plans often do not recognize earnings above the cap for the purposes of benefit computation, which lessens the force of this charge.) In mandatory systems there is also the recurring policy concern that high payroll tax rates make labor more expensive, inducing employers to either evade taxes by redefining pay in new ways, or to substitute away from labor in favor of capital. If, in addition, there is an uncovered sector of the labor force not subject to payroll taxes, employment can become concentrated in the uncovered sector, with an offsetting decline in covered sector jobs. (Evidence on these points is offered in the next section). Finally, in the case of mandatory retirement systems, there is the very difficult issue of determining how mandated contributions change with the state of the economy. This is

important in addressing whether retirement system contributions can be flexible enough to guarantee promised benefits in slow economic times, and also in the long run as the population age mix changes.

When a retirement scheme is voluntarily provided, it may be offered by employers, workers and their labor groups, other social organizations, or a mix of these. Frequently contributions to these accounts are negotiated in a collective agreement, and often national governments encourage these accounts by granting them a tax-preferred status. Individual retirement accounts have also been tried in some developed nations such as the United States, where special tax breaks are available to those depositing funds in accounts directed toward retirement savings. A full picture of the retirement system's multiple pillars requires assessing the tax preferences granted to such accounts as well.

***6. Retirement System Assets and Administrative Performance:** How are contributions invested, if it is a funded system, or is the system organized an pay-as-you-go arrangement? Is the retirement system administratively efficient? How well does it manage its portfolio?*

Nationally-run retirement plans are generally operated on a pay-as-you-go (PAYGO) basis, which means that taxes collected in a given year are used to pay benefits in that year. Most national plans are unfunded, though more rarely, national plans may be partly funded (which implies that some of the taxes collected are invested rather than paid out immediately). Here too, however, plan assets tend to fall short of the full amount needed to pay promised future benefits. In such systems, benefits paid out often bear little relationship to taxes paid in, either for individuals or for entire generations of participants.

A major rationale for PAYGO plans is that such systems are able to provide benefits to a "start-up" or transition generation of retirees needing old-age income protection, who did not save enough in advance to achieve retirement security. A related explanation is that an unfunded system provides a support mechanism for a poor cohort, or poor members of a cohort, by future generations of workers. Hence redistributive goals are often deemed central to PAYGO systems. Detractors of these systems argue that PAYGO systems have undesirable market effects, mainly (1) reducing savings by substituting public indebtedness for privately-held retirement capital, and (2) reducing labor supply by transferring wealth to relatively less well-off cohorts. Evidence on these contentions is offered in the next section.

In contrast to PAYGO plans, funded retirement plans have contributions which are invested, and eventual retirement benefits are then directly linked to asset performance. Many privately provided pension plans are fully funded, by which is meant retirement benefits depend directly on an actuarial division of the retiring workers' available asset pool. For example, in a defined contribution plan, each working generation pays contributions which are then invested in a

well-diversified portfolio of financial instruments. As each cohort retires, it then receives the expected present value of its portfolio in annuity form. Supporters of funded retirement plans emphasize that (1) these plans offer old-age insurance without imposing redistribution across generations, and (2) because funded plans generate savings, these plans have been said to increase national saving and expand domestic capital markets. Detractors emphasize the lack of redistribution present in these systems, and argue that funded systems may be risky when their assets are subject to capital market fluctuations and political manipulation.

In the last decade an intermediate form of plan funding has received a great deal of attention, combining features of both funded and PAYGO systems. A much-discussed example is found in the Chilean national defined contribution pension plan, which in 1981 replaced the previous social security PAYGO system. The Chilean plan is best viewed as an intermediate system since, like a defined contribution plan, it required that worker contributions be invested in a pension fund. However, the government initially restricted fund investments to Chilean assets, and mainly to government bonds, rather than requiring it to have an internationally diversified portfolio.²⁰ In addition, the Chilean government continues to serve as guarantor of the system in many ways, including the promise of a minimum benefit payable irrespective of actual fund performance. In the mid-1980s the government also bailed out the country's financial institutions, including the national pension fund.

Irrespective of whether a retirement plan is PAYGO, fully funded, or in between, a well-run system should be administratively efficient. Many nations have apparently suffered problems in this regard, with negative rates of return characterizing many Latin American countries. Well performing systems have been identified in which administrative costs total only one or two percent of total collections, whereas other national systems are reported to spend up to 20 percent on administrative costs.²¹ Data problems also plague many countries making the transition away from a socialist system; for instance, earnings records are apparently unavailable in Hungary and Poland despite the retirement system's need to link benefits with wage histories. In other countries no data were kept on employees' years of coverage under the retirement system, making it almost impossible to determine benefits. This clearly opens the possibility for fraudulent claims and massive administrative inefficiencies.

Strengths and Weaknesses of Public and Private Retirement Systems

Having reviewed some of the key institutional features of retirement systems, it remains to address the overall rationales for public versus private plans more generally. This section reviews several important motivations for the different pillars of a multiple-pillar system. Depending on a country's needs and abilities, one or another mix may be more appropriate. Since retirement systems offer retirement insurance, it is important to ask how the insurance varies with

characteristics of the group being covered, the nature of the benefits being provided, and the funding mechanisms used to pay for the coverage.

Group characteristics matter for the adverse selection problem, which arises because individuals will always have better "private" information about their health and their life expectancies, than will an external business or government agent. A retirement plan that permits members to enter and leave voluntarily will suffer from adverse selection, because those who expect to have a short life expectancy leave, and those who expect to live a long time in retirement will remain. As a result voluntary group plans will either be forced to charge higher rates as a result of this unbalancing of the risk pool, or may simply fail to develop.²² In contrast, making a retirement plan universal spreads the risk across the larger population and avoids this form of adverse selection.²³ Of course, strictly speaking, this explains why many retirement systems are mandatory, but does not necessarily entail public provision of the plan. Private or family provision of retirement income support may be less subject to this type of adverse selection as compared to worker groups, to the extent that membership in the family is not voluntary (Kotlikoff and Spivak 1981).

Moral hazard arises in a number of forms in retirement plans. One aspect has to do with retirement decisions: many retirement plans pay benefits only after withdrawal from the labor market, and especially in public plans, pay benefits according to a redistributive formula. Thus for example the Japanese government provides a two-tier social security system, with the first tier consisting of a uniform flat benefit for all citizens. Similar plans, though offering different guarantee levels, are available in many other developed countries as well. Offering a flat benefit raises the possibility that some persons able to work will instead retire sooner than they would otherwise. A discussion of empirical evidence on this point is left to the next section; nevertheless, it seems likely that types of benefit plans would be less susceptible to moral hazard than others. For instance, a pure defined contribution plan avoids this problem by fully adjusting benefits so as to make the worker's pension wealth constant irrespective of his or her retirement age. Also, when retirees must rely on family members to care for them, they may tend to work longer instead of imposing on their families and/or reducing their likely bequests.²⁴

Another factor motivating public intervention in retirement systems relies on externalities. For example, some taxpayers may suffer externalities when other people fail to insure themselves against old-age poverty, and taxpayers must support them. This argument has been offered when elderly wind up without medical care, nursing home care, or adequate housing. In this case, it has been argued that government intervention is required in the establishment of a mandatory retirement income system into which all must pay, and from which all may benefit at least at a minimum level of support. What remains less clear is whether government provision of the benefit itself is

justified. In other words, this market failure may require private market regulation to force provision, but may not necessarily require that the government should take on the task of providing the full benefit.²⁵

An additional concern in the debate over whether retirement plans should be public or private is the worry that private retirement schemes are intrinsically unable to protect against certain types of macroeconomic risk. For example, even when private capital markets are well established, the risk of inflation remains one which is impossible to insure against completely in the private market (Bodie 1990; Pesando 1991). Hence private pensions cannot guarantee constant real retirement consumption streams, a failure which seriously undermines confidence in private pension benefit systems, and thus is especially troubling in countries with high inflation histories. Added to this is the concern over undiversifiable capital market risk of other types, which only the national government can offer partial protection against. In the U.S. for example, the capital market crash of the 1930s destroyed both jobs and private pension savings, and is often cited as a primary motivation for publicly provided pensions. On the other hand, public pension plans do not guarantee constant real benefit values either, since recent history shows that their assets and oftentimes their benefit payments can be subject to fiscal pressure and political manipulation. Thus the vaunted greater stability of public plans given macroeconomic variation may be, in fact, not much superior to that of private plans (Mitchell and Smith forthcoming).

Credible long-term real pension promises do appear to require some form of government intervention, though the particular form this takes varies widely across countries. One method which stops short of complete government takeover of the system, is to encourage the creation of private plans with some government insurance against macroeconomic shocks. Private sector pension plans are permitted to purchase real government-backed securities in the U.K. and in Canada for example, a practice which has been hailed as increasing retirement security without a fully nationalized system (Munnell and Grolnic 1986). In the U.S., defined benefit pensions offered though the private sector are required to participate in a government-run mandatory pension insurance plan, which protects beneficiaries against partial loss of benefits in the eventuality of company bankruptcy (Ippolito 1989). Partial government insurance for privately-run pension plans is also provided in Chile, though the government has sought to "privatize" the national social security retirement plan as a whole (Diamond 1992; Bodie and Merton 1992; Marcel and Arenas 1992; Merton and Bodie 1992).

Despite the appeal of government pension insurance, some concerns should be noted. First is the problem that government pension insurance is still relatively new, and the economic features of these insurance programs have yet to be fully worked out. Pricing government insurance so as to reflect the true cost of coverage, without driving private plans and/or the government insurer out

of business, has proven elusive and thus far has required considerable subsidies from the public sector (Ippolito 1989; Bodie 1992). A related problem is that government guarantees regarding future pension promises require that the public be confident of long-term political and economic stability. Whether and to what extent retirement systems in developing and developed countries can keep the promises made to future generations despite serious demographic pressures is, as yet, unknown.

In addition to market failure motivations for public intervention in retirement systems, many feel that equity considerations are an important factor explaining why both public and private pensions co-exist in a multiple pillar retirement system. Public social security programs are frequently used to provide guaranteed income floors under those who are economically vulnerable and unable to sustain themselves due to infirmity, lack of job skills, or other problems. Minimum income insurance is often seen as a government responsibility, inasmuch as only a government can exert the necessary taxing authority to finance widespread income support programs.

It should be emphasized, however, that the redistributive rationale does not necessarily mandate that old-age insurance should be public. Thus in some countries, most notably in parts of Africa and Asia, older persons are virtually completely privately supported by family members, by religious and community groups, and/or charity (Deaton and Paxson, 1992). Also, there is at least the potential for private purchase of insurance by younger workers, against likely events threatening consumption patterns when they are old, such as nursing home insurance. (It should be noted that adverse selection and moral hazard problems seem sufficiently severe that these instruments have not developed very widely even in the United States.) In any event, the equity motivation for old age benefit plans requires that an individual or group identify a living standard against which older peoples' resources are compared, and provide a means to achieve affordable insurance. Policymakers often disagree over the proper equity standard, making it difficult to compare retirement systems in some cases. In addition it is widely held that young workers underestimate their future needs, either as a result of poor information or systematic myopia, and as a result should be forced to purchase more insurance for paternalistic reasons.²⁶

Before leaving the discussion over public versus private provision of retirement income, it must be noted that retirement systems are often criticized for two other reasons as well: because of administrative inefficiencies, and because of inadequate integration. Administrative inefficiencies in public systems were recently highlighted in a study of several Latin American public pension funds; that report concluded that most public plans reported negative rates of return during the decade of the 1980s, and devoted excessive funds to bureaucratic management (Mesa-Lago 1989, 1990). This problem is not limited to Latin American public plans; a recent study of U.S. private pensions found that rates of return earned were below market rates earned by diversified mutual

fund portfolios (McCarthy and Turner 1989). It has also been reported that record-keeping is problematic in many Eastern European and Latin American pension systems, particularly when they lack modern computers and computer software to keep track of contributions and assets.²⁷ Similar bookkeeping difficulties in Eastern Europe make it virtually impossible to compute governmental liability for long-term benefit promises. This is obviously a matter of much concern to the governments and to lending institutions, since retirement system promises are a form of national debt which affects a country's economic health. Data collection and processing problems are not limited to public plans; indeed, computerized record-keeping and analysis of privately sponsored pensions has been possible in only the last half decade in the United States.

An administrative problem just beginning to be understood in the early 1990s is the fact that in many countries, private and public sector plans affecting retirement are often not well integrated, and sometimes have unforeseen and complex overlaps between the separate components. As noted above, many European nations and some others as well offer a diversity of pathways to retirement, including partial retirement, flexible retirement, disability and unemployment coverage. These are generally managed through distinct agencies which do not necessarily communicate and integrate benefits in a coherent form. This generates problems of sometimes unforeseen overlaps between different components of the many plans, and makes an assessment and overhaul of the system complex. In addition, as the international labor force becomes increasingly mobile with trade agreements fashioned in Western Europe and the Americas, lack of retirement system integration will create barriers to labor that may become increasingly problematic.

In addition to the other rationales offered for public versus private retirement plans, it should be noted that retirement systems are not simply neutral players in an economic system. Instead, analysts have argued that they can have quite different effects in labor and capital markets, and generate spillovers with vastly different consequences for overall economy-wide equity and efficiency.

C. Economic Effects of Multiple-Pillar Retirement Systems

Many questions remain about the economic effects of retirement systems on labor and capital markets, though some conclusions are drawn out in this section. In terms of labor market effects, there is evidence that early retirement incentives contributed to the trend toward earlier retirement both in the developed countries, and in some developing countries. This is because relatively generous benefits are relatively easier to get, and because employers under stress have found high payroll tax rates a disincentive to employment. It is not yet known whether early retirement offerings reduce overall unemployment rates and open up job opportunities for younger workers that otherwise would not have developed, though there is good reason to suspect they do not. Early retirement plans are an expensive long-term subsidy to relatively young persons, which

in the long run will require imposing higher taxes. Most likely, less expensive, shorter-term programs with fewer work disincentives could be designed to attack unemployment, while reducing income insecurity among the poor.

In terms of capital market effects, the literature suggests that underfunded public pension systems do not appear to massively depress private savings, though they certainly do not seem to increase it. Fully funded private pensions in the United States apparently increase capital formation modestly, though it is not clear whether this positive effect carries over to developing economies with less extensive capital markets. It has also been alleged that private pension plan growth can generate healthier capital markets, though pension plans in the developing countries examined here have thus far fallen short of spurring massive new private savings.

Retirement Systems' Labor Market Effects

Retirement systems provide old-age income, and some might think that their main labor market effects would therefore be limited to the end of the worklife. Indeed, retirement plans do exert a powerful effect on workers' choice of retirement age. In addition, however, retirement systems affect a myriad of labor supply decisions made by younger and middle-aged workers as well, depending on the way the benefit formulas are structured, and also depending on the way benefits are financed. Effects of retirement systems on labor demand are also important and varied. In the case of a voluntarily-supplied company pension plan, the retirement promise is an integral part of the firm's compensation package; hence pension financing and benefit formulas are endogenously determined with labor demand, and not external to it. Governmental social security systems also have important effects on labor demand, especially when they cover only portions of the workplace, are supported by payroll taxes making covered workers relatively expensive, and when they offer benefits which favor early retirement. These effects are sketched in this review of how retirement systems affect labor markets.

Retirement Systems and Labor Supply: A great deal of microeconomic research during the 1980s examined the effects of retirement systems on retirement behavior.²⁸ Specifically, studies have shown that workers with generous pensions retire earlier than those with lower pension benefits. Also, workers offered more money to delay retirement tend to do so. In both cases, these responses are statistically significant, but small. For example in the United States, a 10 percent increase in the present value of total retirement income at age 60 has been found to induce earlier retirement by only about 1-2 months, and a 10 percent income increase for deferring retirement induces later retirement by 1-4 months (Fields and Mitchell 1984a).²⁹ What this implies is that the generous early retirement benefits made available throughout most of the developed countries during the decade of the 1980s contributed to the declining labor supply of older workers, though they probably do not explain the entire downward trend.³⁰ One

phenomenon which deserves more research in the next decade is how uncertainty affects retirement patterns. For instance when inflation threatens a benefit promise, or when plans become unstable due to underfunding, retirement behavior is forced to adapt and retirement dates must be readjusted. Too little is known about these causes and consequences of such adaptations, and more research on these reactions is needed.

Retirement systems influence not only older workers' labor supply; they also influence labor supply by younger employees as well. One effect is a deterrent to mobility, which may be explained by pension plan rules requiring long service before vesting, plans' failing to protect against inflation the benefits of job-leavers, and in the case of defined benefit plans, formulas which defer benefit accruals until late in an employee's worklife. The facts are clear: workers with employer-supplied private pensions change jobs only half as often as workers without pensions.³¹ Whether reduced turnover is deemed socially desirable depends on whether more stable employees are more productive, and there is some suggestion that they may be.³²

Young and middle aged workers' behavior may be influenced by retirement system rules in other ways as well, because of complex benefit accrual patterns. Thus in the United States, for instance, earnings below a ceiling are credited toward the social security pension, and hence are subject to payroll tax, but earnings above this are neither credited toward benefits, nor taxed. This tax system is combined with a redistributive benefit formula, so that highly-paid workers have an incentive to concentrate work and earnings during narrower segments of the worklife, so as to reduce their tax burden, than would be true otherwise. As yet there has been little research on the question of whether workers fully understand complex retirement system rules, and how flexibly they can reallocate work so as to maximize net pension returns over their lifetimes, as well as toward the end of the worklife.³³ This too remains a topic for additional research.

Retirement Systems and Labor Demand: Studies of retirement systems recognize that such systems can influence the demand for labor in important ways. The negative effect of high payroll taxes on labor demand is a concern in many nations. Payroll tax rates for public pensions in Latin America range from over 50 percent of the wage base in Brazil, and 28 percent Paraguay. Payroll tax rates of 50 percent are not uncommon in the Eastern European and former Soviet nations, while France and Germany impose rates closer to 20 percent for their public plans (U.S. Department of Health and Human Services 1990; Atkins 1991). Rates such as these added to labor costs depress the demand for labor, which in turn reduces wages and employment. In addition, to the extent that payroll taxes are seen as fixed costs of employment, firms hire fewer workers, each of whom works longer hours, rather than spreading the now-smaller overall employment across more employees.

Many economic studies have sought to pinpoint the precise magnitude of these payroll tax effects on labor market outcomes, with mixed results due to data constraints (Dilnot 1991; Hamermesh 1993; Hart 1984). Theoretical models indicate that payroll taxes affect wages and employment depending on how flexibly labor is supplied to the market, and on employers' labor demand elasticities. While no single set of empirical results is commonly accepted, Hamermesh (1993) suggests that in developed countries, the burden of the payroll tax falls primarily and almost completely on labor, rather than consumers or producers. Specifically, higher payroll taxes are apparently fully translated into reduced wages, with relatively little disemployment effect, among adult male manufacturing full-time workers in industrialized economies where payroll tax coverage is virtually universal.

In the nonindustrialized countries, lack of data and special labor market features have made it difficult for researchers to produce useful estimates of the effects of retirement systems' payroll tax.³⁴ Depending on the country, workers may have options outside of the economic sector subject to payroll taxes, labor demand elasticities may vary greatly across sectors, and minimum wage laws may restrict wage declines. Each of these factors makes it far more complex to estimate payroll tax effects. For example, in some developing countries, the existence of an informal and/or rural labor market permits workers escaping the taxed sector to find employment, albeit at lower pay. This can mitigate the disemployment effect produced by the payroll tax in the covered sector, but may also increase earnings inequality. In many developing countries there is also widespread tax evasion, an institutional reality which is likely to carry over to some of the economies in transition as well. For instance, in Argentina, where the social security tax rate is 50 percent, one-third of tax revenue is apparently not collected; this finding led McGreevey (1990) to suggest that social security revenues might actually increase if the payroll tax rate were lowered. Alternatively, if retirement systems were financed by more general revenue instead of payroll taxes, there could be fewer negative labor market consequences for employment and wages. More research is urgently needed on the consequences of payroll taxes for wages and employment in the developing country context.

Other ways in which national retirement systems shape the demand for labor should also be mentioned. Firms' compensation and pension offerings are thought to be responsive to government labor market and tax policy, as well as government-sponsored retirement benefits. Higher and more secure benefit promises from public plans permit employers to worry less about company-sponsored retirement saving, which offers additional latitude within which pay packages can be designed. Hence changes in tax and retirement policy can have direct and potent effects on worker pay, turnover and retirement patterns, and productivity more generally. It is fair to say that

these effects have not been the subject of sufficient study, and are a vital research need in the decade to come (Gustman et al. 1992).

Retirement Systems, Unemployment, and Income Security: It is widely contended that early retirement benefits in the developed countries devised during the 1980s are a response to a persistent unemployment problem. As one viewer put it, "those who fear unemployment (especially youth unemployment...) argue for a consciously oriented 'exchange of the generations' in the labor market...[which] is both legally and socially more acceptable and cheaper than introducing a decent scheme of unemployment benefits" (Szalai 1992). A natural follow-up question is whether in fact the policy shift toward earlier retirement reduced unemployment rates, and whether it was more acceptable, and cheaper, than various policy alternatives.

No satisfactory answer to this fundamentally important policy question yet exists, and it should be high priority to undertake this research. Initial explorations demonstrate that it is difficult to compare unemployment definitions, and early retirement programs, across nations. In Britain, for example, when older men receiving unemployment payments were no longer required to register as unemployed, official unemployment rates dropped by half, from 19.7 percent in 1982, to 9.6 percent in 1983 (Laczko and Phillipson 1991). A similar result prevailed in West Germany, after persons age 58 and older were no longer required to register in order to receive unemployment subsidies. Certainly it can be said that these early retirement schemes were "successful" in reducing unemployment, but by redefining unemployment rather than by raising employment levels. In other countries, older workers in training programs or in sheltered employment are variously included or excluded from the unemployment count, which in turn affects estimated official unemployment rates (Piachaud 1986).

The key issue is clearly not how to design early retirement plans which through definition changes reduce official unemployment rates. Rather, the important question is whether early retirement plans adopted during the 1980s ultimately produced healthier labor markets and more growth than would have occurred otherwise, while easing the transition process.

In order to answer this query, it is necessary to formulate a counterfactual, characterizing what would have happened if the early retirement offerings had not been implemented. Job markets in the early 1980s were not particularly strong for any age groups in most countries, and older persons suffered from relatively high unemployment rates as well as longer spells of unemployment. Since most unemployed older people tend to move out of the labor force rather than seek new jobs, the early retirement benefits probably provided an income cushion for many persons who were on their way out of the work world anyway. Clearly many of the older unemployed had little chance of becoming re-employed; in Great Britain, for example, only 60

percent of women age 50-59 receiving unemployment benefits actually sought jobs (Laczko and Phillipson 1991; OECD 1990).

Before taking this as evidence that the programs succeeded, one must ask whether older workers such as these might have reentered the labor force without the early-out benefits, and what the economic consequences of offering the benefits were. Surprisingly little research has explored this question. Layard et al. (1991: 566) compare unemployment trends and the growth of early retirement across many developed nations, and conclude that "the countries that have experienced more early retirement (often encouraged by government policy) are those with the biggest rise in unemployment." The direction of the causal relationship was not explored in that study. Certainly this question should be a high priority research topic for policymakers in the retirement arena.

One topic that no one has devoted much attention to is the question of whether continued work might have been an option for many early retirees, since they were quite young (many in their 50s) and probably in no worse health than previous generations which worked far longer. Had this cohort remained in the labor force, it might have exerted downward pressure on wages by swelling the ranks of those seeking jobs. To the extent that wage rigidity has been identified as a major cause of unemployment, it is at least possible that early retirement schemes could have actually raised rather than lowered overall joblessness, by permitting high and rigid wages to remain in effect longer. Indeed in West Germany, older women's and men's unemployment rates were three to five times higher in 1989, as compared to 1977.³⁵ What they would have been without the programs is uncertain.

A related question is whether younger workers' labor market options would have been markedly worse, had the early retirement options not been in effect. More evidence on this point is needed, but there is reason for skepticism. An early-out policy which reduces the supply of older workers can improve demand for younger workers only when the two age groups are substitutes in production, and this has not been demonstrated. A study of substitution between different age groups of workers using data from the United States concluded that 1) within a given gender group, workers from different age groups are complementary (with the exception of teenagers); and 2) most substitution occurs across gender for different age categories (Levine and Mitchell 1988). While other approaches to measuring substitution should be investigated with data for more countries, there is certainly *no a priori* reason to expect that forcing workers in their 50s to retire automatically opens up job possibilities for younger employees. In addition, of course, if one recognizes that early retirement plans increase current and future tax burdens on younger workers, there is no clear-cut presumption that early-out programs are cheaper in the long run than the alternative. Indeed it is at least plausible that shorter term commitments to persons in their 50s

would have been less expensive, given that early retirement pensions frequently entail huge subsidies which must be met by higher future taxes.

It is also important to address the question of whether retirement systems reduce old-age income insecurity, particularly in difficult economic times. Of course, answers vary from one country to the next, depending on actual coverage rates of the working population (e.g. in Honduras less than 20 percent of the population has social security coverage, whereas in many Western European nations coverage is virtually universal), what types of benefits are provided (e.g. whether benefits are mainly of the flat type, or whether benefits more insurance-oriented by being tied to preretirement pay), and other institutional features of the benefits including whether they are indexed. Social security systems the world over have the potential to reduce poverty, and many have done quite well (see Andrews 1990; Mitchell 1992; Pestieau 1991; and Young 1991 among others). On the other hand, some appear to be biased against the poor, as noted by Grosh (1990), who concluded that pension and disability programs in Latin America favor the more highly paid primary sector workers, after accounting for both taxes paid and benefits received. In addition, early retirees also tend to more heavily subsidized than most, since they pay into the system for a much shorter period yet live longer, all the while receiving benefits which exceed the amounts they would have received at the regular retirement date. Too, as McGreevey (1990) adds, the elderly are not of necessity those who most require income supplementation.

For these reasons, serious questions remain about how effectively early retirement plans were in shielding from poverty older persons at risk of low income during the decade of the 1980s, and how target-efficient the systems were in concentrating limited funds on the most needy. Of even more policy concern is the question of how vulnerable future generations of retirees will be to future retirement benefit cuts. Many eminent analysts have expressed profound concern about the likelihood of such retirement system benefit reductions, based primarily on their gloomy assessment of anticipated fiscal pressures paired with the rapid growth of the aging population (Marchand and Pestieau 1991). It will be critically important to track, and correct where possible, changes in retirement systems which force older persons into poverty. This is a high priority research need in the next decade.

Capital Market Effects of Retirement Systems

Analysts concerned with the effects of retirement systems on capital markets generally ask whether retirement programs increase savings, and if so, whether these retirement plans can be used to generate new capital for growth.

Many authors have argued over the years that public retirement systems, particularly unfunded ones, "crowd out" and thereby reduce, private saving.³⁶ This pessimistic assessment rests on the argument that social security promises replace saving that people would otherwise

engage in on their own, to protect against the possibility of old-age poverty. Particularly when an unfunded social security system is first started, benefits are granted to older persons in excess of their contributions. Hence the transition generations receive subsidies from future cohorts and accordingly have the incentive to save less privately, to offset their greater wealth offered through the public plan. Opponents of the thesis have argued that social security payments will not alter savings, since publicly-supplied benefits simply substitute for intergenerational transfers that would have occurred via private conduits. These contradictory views of the predicted effects of public pension systems, and others involving possible rearrangement of work effort over the lifetime, imply that there is no a priori theoretical relationship between public pensions and private savings levels.

Because theory is ambiguous, empirical evidence is required on whether public retirement plans reduce savings, in practice. Some authors do find negative effects, but many others conclude with Kotlikoff that "the findings lend little support to the notion that social security has reduced the capital stock" (Kotlikoff 1979: 409). Certainly there is no conclusive evidence that public benefits trade off one-for-one with private savings in developed countries, nor is there any apparent positive effect of public plans on savings.³⁷ There is very little evidence on this point from developing countries.

Turning to the question of whether private pensions affect savings, again theory offers little clear evidence. For instance, if fully funded private pensions are perfect substitutes for nonpension private saving, monies invested in these pensions would offset nonpension saving one-for-one. However, some workers covered by pension plans are likely to save more than they would have otherwise, due to myopia or inadequate information; in this instance, pensions could increase savings. Tax preferences in many countries also alter the terms of trade between pension and other savings instruments, making it clear that net effects will depend on specific institutional structures in each country. Adding leavening to this discussion is the recent suggestion that capital markets may be quite local in nature, so that commercial loans are sensibly provided by locally-operated, well-informed financial organizations. (This was concluded in the United States, though studies elsewhere remain to be conducted; see Hannan 1991). Perhaps private pension fund capital can beneficially add to supplies of local capital, and take advantage of investment opportunities, that otherwise would not be noted by outside investors.

Empirical studies on private pensions are modestly optimistic, though here too there are a variety of estimates (Munnell and Yohn 1992). In the United States, analysts tend to find that another dollar of private pension benefits reduces nonpension private savings by 70 cents; on net then, additional private pension wealth appears to increase capital formation, by 30 cents on the

dollar. It is not yet known if this small positive effect carries over to other countries, particularly developing economies with much less extensive capital markets.

Irrespective of whether new capital is generated, it is still possible that private pensions can channel existing savings to promote equity and bond markets often absent in developing countries, and for this reason policymakers sometimes favor private over public pensions. Unfortunately this preference begs the question of whether developing countries lack funds for truly worthwhile private investments which somehow international investors fail to perceive, or whether capital markets are absent because domestic projects are insufficiently attractive to compete for available funds on the international capital market (Zollner 1991).

In any event, private savings plans can alter the composition of national savings if they change savers' asset risk/return portfolios. In Poland, for example, pensions have been nominated to hold commercial paper generated by newly-privatized firms. Clearly, forcing pensions to concentrate investments in domestic firms of questionable profitability imposes nondiversified risks on pensioners' shoulders, with the possibility of high (or no) return. This pension portfolio differs substantially from a diverse set of international holdings hedged against regional risk, exchange rate and inflation risk, and other more local concerns (Diamond 1992; Bodie and Merton 1992; and Boswell and Granato 1992). It is unlikely that workers will feel as secure about these plans as they would about their previous claims against public retirement plan benefits. Another case in point is the Chilean system, seen by many as the most successful reform in this regard, since the underfunded social security system was replaced by a mandatory private defined contribution plan system. To date however, it is not clear that that this changeover will produce net new domestic private savings, because pension holdings until recently have been restricted mainly to government debt.

In sum, in the early stages of economic transformation, private pension plan asset composition may differ little from that of public plans, and consequently may have little immediate positive effects on capital markets. In the longer run, perhaps, pensions can certainly participate in capital market growth. The evidence suggests, however, that private pension plans may not be the "engine of growth" desired by many, though they may contribute modestly.

D. Lessons and Research Needs

Many nations have expensive and complex multiple pillar retirement programs. The need to provide income security in old age will continue to grow in years to come -- workers in many nations have grown accustomed to increasingly early retirement, the aging population is expanding, longevity continues to increase in most countries, and the family is no longer a primary source of old-age support. At the same time, many countries confront impending crises in their public retirement plans since they face dwindling tax bases due to recession, labor force

shrinkage, and industrial restructuring, and are reluctant to increase already-high payroll tax rates. During the 1990s the challenge will be to redesign multiple-pillar retirement systems to as to ensure continued old-age economic security, while reducing the depressive effects of retirement systems on labor and capital markets.

Retirement systems are commanding increasing attention from development analysts seeking to restructure country economies with an eye toward growth. Policy analysts interested in integrating retirement system reform with other aspects of country fiscal and financial reform should be aware of the following guidelines and lessons.

Guidelines and Lessons

- Developing and developed countries are increasingly turning to two-tier benefit plans. Often the first tier is formulated to deliver a minimum welfare benefit, sometimes means tested and funded out of general revenue. A second tier is usually geared toward replacing a portion of pre-retirement pay, and may be privately financed (though often some form of government insurance is offered). Cleaner separation of the two tiers may become increasingly important for better-targeted social safety net poverty reduction programs.

- Many developing economies have not formally valued, nor recognized, retirement system promises. Development agencies can help devise methods of measuring these long-term debts, in order to determine how these will affect long term economic planning and growth.

- Governments are only beginning to recognize that high payroll taxes as a means of financing retirement benefits have undesirable efficiency and equity consequences. This is particularly a problem when these benefits favor relatively well-off young retirees, and when tax evasion is widespread.

- There is no evidence that the Western economies are better off by having heavily subsidized retirement for workers in their 50s. Furthermore, generous early retirement benefits promised in the last decade will carry large and long-term costs. An emerging lesson is that retirement systems are not well-suited to solve unemployment problems.

- Many developing countries need to computerize retirement system data on workers and retirees. Systems are also required to computerize financial data, track fund inflows, outflows, investment returns, and so forth. Development agencies can help with this task, installing computers and creating software to track earnings and payroll taxes paid, as well as benefit eligibility and benefit payouts, along the way offering technical assistance on accounting and administrative efficiency standards.

- Many industrializing economies are in need of improved financial systems which development agencies are in the process of providing. It will be important to incorporate retirement

system reforms in the course of formulating technical assistance plans, since in many cases a perceived need for private pension plans will interact with capital market development strategies.

•Along with assistance establishing better financial systems, developing countries are finding it necessary to codify law and property rights so as to clarify conditions of capital ownership. It is crucial to include retirement savings instruments in the process, so that individuals, companies, and the government will better understand the risk/return characteristics of different retirement savings components.

Research Needs

A fundamental obstacle to better retirement policy is the lack of data on the economic effects of retirement systems on labor and capital markets. Greatly needed in the developing countries are household living surveys indicating the economic activity and well-being of workers and retired persons. Perhaps even more critical is the need for employer-side surveys which can illustrate how retirement system taxes and benefits affect labor demand. Sample surveys will probably be required to fill both objectives. Finally, but equally important, better databases should be developed on the institutional features of and interactions within multiple-pillar retirement systems, and the ways in which the private and public systems interact. Information of this type will be of great help to policymakers setting the agenda for retirement system reform in the next century.

Research subjects deserving of particular attention from retirement program analysts in the decade to come include the following:

1. How do the institutional components of retirement systems work? Better information is required on the complex multiple-pillar systems shaping retirement behavior around the world, including data on tax evasion, public and private plan benefit integration, and resulting income distribution outcomes.
2. How do older workers respond to the incentives embedded in retirement systems? Better data are required to evaluate behavioral responses to benefit instability due to uncertainty, inflation, underfunding, and political instability. Also more research is required on worker understanding of retirement system rules. Are early retirement subsidies more acceptable, and cheaper, than other policy alternatives -- especially with the tax burden is recognized?
3. How does the demand for labor respond to retirement system provisions? Better data are needed to devise improved models of labor demand, which take into account retirement options and payroll taxes. In particular, it will be useful to obtain measures of labor demand elasticities for developing countries, taking into account covered and uncovered sections, minimum wages, and other institutional realities.
4. How do the retirement systems themselves respond to political, demographic, and economic pressure? Under what circumstances can they keep, or will they break, promises made to current

and future retirees? How do specific benefit offerings alter old-age economic insecurity and overall income redistribution?

5. When can private retirement systems have desirable effects on savings and investment in developing countries with incipient capital markets? This requires asking whether developing countries lack funds for truly worthwhile private investments which somehow international investors fail to perceive, or whether capital markets are absent because domestic projects are insufficiently attractive to compete for available funds on the international capital market.

As the developed and developing nations move into the next century, some countries may not be able to maintain retirement promises made to older persons. It will become increasingly expensive to maintain systems which provide relatively young workers strong incentives to retire early, either through regular early retirement benefits, or a variety of other early-out pathways including disability and unemployment benefit options. Given these predictable fiscal stresses, it seems prudent to begin discussion of alternative approaches to retirement system overhaul. Such discussions may indicate which sequence of policy changes in taxes and benefits over time can best smooth labor and capital market adjustments. A deliberate approach surely seems more sensible than the alternative of doing nothing now, and then being forced to impose massive benefit cuts when the aging workforce retires. Even with this tack, however, the fiscal problems confronting some retirement systems are so immediate that they will require more immediate attention.

What are the hallmarks of retirement systems that work well? It seems clear that a healthy retirement system would be judged as efficient, fair, and fiscally sound. And most policymakers would agree that poorly functioning retirement systems are those plagued by inefficiency and fraud, with inequity in the distribution of benefits and taxes, and fiscally unsound, possibly on the verge on financial ruin. Unfortunately the real world offers many examples of poorly functioning retirement systems, and few if any represent a "gold standard". Nevertheless, specifying reform goals is helpful in order to determine what is likely to be beneficial, and what is not. Using high-cost long-term retirement systems to mitigate short- and medium-term unemployment problems will prove costly and inefficient as a solution to problems faced by economies in transition.

¹The 24 OECD nations are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States.

²For a discussion of different definitions of retirement see Fields and Mitchell (1984b). There is relatively little research on the nature of older persons' labor force flows; for an examination of United States data see Quinn et al. (1990).

³Whether this long-term downward pattern in work at older ages will persist throughout the next several decades is unknown. There is emergent evidence that in the latter half of the 1980s the downward participation trend stabilized and in some cases even slightly reversed itself in a few nations. See OECD (1991). In the United States, for instance, labor force participation rates for mean age 60-64 in 1966 were 78%, they dropped to 54% in 1988, and then rose to 55.5% in 1990. For men age 65+, the male LFPR rate in 1966 was 27%, which fell to 15.8% by 1985 and then rose to 16.4% by 1990 (unpublished data provided by the US Bureau of Labor Statistics). Nevertheless, it is premature to determine whether this trend reflects business cycle conditions, whether it resulted from curtailed early retirement policies, or whether it is part of a new long-run secular trend.

⁴See Szalai (1991). Without discounting that evidence on differential life expectancies in Hungary, it should be noted that the availability of disability and sickness benefits probably does increase the incidence of reporting of illness, and reduces labor force participation rates, in at least some countries. For example Burkhauser (1993) points out that high disability benefits and relatively lenient qualification standards contribute to low work rates in Germany and the Netherlands.

⁵For instance, in the United States, 25 percent of early retirees and 12 percent of all retirees cited poor health as their reason for retirement (Fields and Mitchell 1984b). Less information is available from other countries, though there may be somewhat greater age discrimination (Kohli et al. 1991).

⁶See Mitchell (1988a) for evidence on accident patterns by age in the United States; there is no information on age profiles of job-related illness. The data show that workers over age 65 are slightly more likely to become fatally injured on the job than workers at younger ages.

⁷On morbidity trends see Baily (1987). More research is needed on this topic in other countries as well.

⁸In the United States, the government first prohibited firms from imposing mandatory retirement before age 65, then raised it to age 70, and eventually prohibited mandatory retirement in virtually all occupations. Most private sector employers are now prevented from using mandatory retirement; exempted groups are generally in the public sector and include judges, police, pilots, and firefighters. For a discussion of mandatory retirement policy, see Quinn et al. (1990) and Gustman et al. (1992).

⁹For instance, a survey of United States retirees by the Commonwealth Fund (1990) found that many claimed they were interested in employment.

¹⁰Hutchens (1993) found that more than one quarter of workers aged 50 to 59 had no job after displacement, compared to about 16 percent for younger workers. More older persons also dropped out of the labor force or were unemployed as compared to younger employees (about 35 percent versus around 25 percent).

¹¹Levine and Mitchell (1988) explored this question using data from the United States. More cross-national evidence on the question would be useful.

¹²The material in this paragraph is developed in more detail in Fields and Mitchell (1984b). The economic effects of pensions described here apply primarily to men; women's responses are apparently weaker. See Pozzebbon and Mitchell (1989).

¹³For a discussion of actuarial reduction factors see McGill and Grubbs (1989). Figures given in the text are illustrative only, since life expectancy tables and discount rates must be specifically tailored to each population to determine actuarial neutrality.

¹⁴For a discussion of integration between public and private plans in the United States see Mitchell (1992). A nice discussion of selected OECD countries' experiences is available in Dilnot and Walker (1989), Kohli et al. (1991) and Schmähl (1989). Pension plan features are reviewed in Dailey and Turner (forthcoming), Turner and Beller (1992), and Turner and Dailey (1991).

¹⁵The average "baby boomer" will attain age 65 in the year 2011 in the United States. The timing of this pattern will differ a great deal across countries, however, since the baby boom lasted only three years in Japan, as compared to 15 years in the U.S. As a consequence, Japan will experience more rapid population aging than will the US and

most other Western nations. Developing countries are typically younger, with the median age of the population likely to remain ten years younger (around age 30 by the year 2025) as compared to their more developed counterparts (around age 40). See Clark (1991, 1993). Projecting future labor force trends is complex, and is likely to be an area for fruitful future research. Levine (1993) discusses the United States experience. For information on other countries see Esping-Andersen and Sonnberger (1991), Pampel and Weiss (1983), and Zweimüller (1991).

¹⁶Space constraints restrict our discussion to retirement programs, to the exclusion of unemployment compensation, health and poverty benefit systems. Surveys of other social insurance systems are available in Atkinson (1987, 1989, 1991), Atkinson and Mickelwright (1991), Hamermesh (this volume), Holzmann (1991), and OECD (1991), among others.

¹⁷It should be noted that most OECD nations, and many of the economies in transition, also have special and distinct retirement systems for special groups of workers including the military, public employees, miners, railway workers, and so forth. Depending on the country, these special plans can offer much more generous benefits than the schemes covering regular employees, and in many cases impose large and growing burdens on public budgets. A complete discussion of these special programs is, however, beyond the purview of this paper.

¹⁸The relative importance of the extended family in caring for older persons varies a great deal and over time. In the United States, less than 10 percent of the elderly live with their children, and very few receive any direct income support from their children (Kotlikoff 1992); by contrast, in Japan, still a large fraction of the elderly resides with their children. The importance of other groups also varies internationally: labor unions have played a central role in organizing and managing worker pension plans in most of Western Europe, for example. Other social groups at times provide a source of short term funds, as in the case of rotating savings and credit associations; however these institutions probably do not offer long term retirement income security (Besley et al, 1992).

¹⁹For discussion of the Chilean system see Baeza (1986), Baeza and Manubens (1988), Bodie and Merton (1992), Cheyre (1991), Diamond (1992), Marcel and Arenas (1992), Myers (1985), and Wallich (1983).

²⁰These investment restrictions are being liberalized slowly to permit more diversification.

²¹For example, Mesa-Lago (1991) found that several Latin American nations' Social Security portfolio performance was quite poor during the 1980s. Most experienced negative real rates of return, and in the case of the single exception, Chile, the government was forced to bail out the funds in the early 1980s to forestall bank failure (Marcel and Arenas 1992). This pattern clearly bodes ill for the funding status of public plans, which in principle should seek to earn returns comparable to those of an internationally diversified portfolio. Bodie and Merton (1992) offer an interesting discussion of how to attain this target while limiting capital flight for the case of Israel. Not only have public pensions performed poorly in the last several years; private pension funds have recently been found to earn less than comparable private mutual funds, a phenomenon which has not yet been fully explained (McCarthy and Turner 1989).

²²Adverse selection is discussed by Bodie (1990) who notes that it has expensive consequences for privately provided pension plan premiums.

²³Mandating pensions can, however, have undesirable effects of other sorts depending on how benefits and financing are structured (Mitchell 1991a). For example, a pension plan financed by a payroll tax makes labor in the covered sector relatively more expensive, which ultimately depresses employment. Also, an unfunded retirement plan may reduce national savings. Section III evaluates such economic effects in more detail.

²⁴The literature on bequests is extensive; see Hurd (1990).

²⁵Also there is likely to be a welfare loss from mandatory benefits even when private sector providers are used to deliver them. Whether the government should provide the benefit itself, or require that private sector entities offer it, depends on one's assessment of how efficiently and equitably government agencies behave. This would require attention to whether there are substantial scale economies (or diseconomies) in centrally managing one pension fund, how bureaucrats behave when awarded control over huge budgets with typically little administrative oversight, and how government agencies respond to interest and pressure groups. See Barr (1992) and Mitchell (1991a) for a discussion of these and related public choice problems when government is the sole provider of retirement and other benefits.

²⁶Direct evidence on this point is thin, and controversial. For example, most persons in the United States do not have private insurance covering old-age nursing home care, and many say they believe that the government provides such coverage. Whether lack of formal insurance coverage is sensible or not depends on how one assesses the costs and benefits of private insurance coverage; Pauly (1990) has recently argued that observed behavior may be optimal inasmuch as it makes extended families more likely to care for their elderly relatives. In the case of pensions, there

seems to be more agreement that workers tend to save too little, explaining why paternalistic employers and governments tend to require pensions. Empirical evidence on the latter point appears in the next section.

²⁷See McGreevey (1990) and Grosh (1990) for a discussion of Latin American plans; among others, Atkins (1991), Diamond (1992) and Takahashi (1992) discuss Eastern European plan difficulties.

²⁸This discussion is taken from Gustman et al. (1992).

²⁹These responses have been estimated for males; women's retirement responses to economic factors may be somewhat smaller (Pozzebbon and Mitchell 1989).

³⁰These conclusions are supported by a number of microeconomic retirement studies on the United States and Canada, capably reviewed by Quinn et al. (1990). British retirement studies by Zabalza et al. (1980) using microdata also tend to confirm these conclusions. English-language journals offer fewer micro-data studies on retirement patterns in other OECD countries; aggregate time-series studies include those by Zweimüller (1991) and others cited in Section I.

³¹Information in this paragraph derives from Gustman et al. (1992).

³²On the other hand positive productivity effects of lower mobility due to pensions is difficult to find (Allen and Clark 1987).

³³In the United States, Mitchell (1988) found that many workers did not adequately perceive their private pension plan benefit rules, and Bernheim (1988) reported that public social security retirement offerings were also widely misunderstood. Information apparently improved as workers approached retirement age. The extent to which workers reallocate labor across economic sectors, as well as labor and leisure over their lifetimes, deserves far more study, particularly in developing countries.

³⁴In his literature review McGreevey (1990) refrains from drawing any conclusion about the size of the payroll tax effect on the demand for labor. Hamermesh (1992) discusses and payroll tax incidence in the developing country context and concludes that more research on this topic is required before a consensus can be drawn.

³⁵One study examined whether unemployment compensation benefits were used to smooth the path to early retirement in the United States, and found little evidence in support of the thesis (Hamermesh 1979).

³⁶See Munnell (1986), Munnell and Ernsberger (1989), and Munnell and Yohn (1990), for a survey of theories and empirical work in the area. The most well-known proponent of the view that social security reduces savings is Feldstein (1976).

³⁷There is also considerable controversy regarding the question of whether the demographic aging of the population will increase or decrease the demand for savings; see Auerbach and Kotlikoff (1991), among others.

Table 1.
Public Pension Expenditure as a Percent of GDP in OECD Nations^a

	1960	1975	1980	1985
Australia	3.3	4.5	4.9	4.9 ^c
Austria	9.6	12.5	13.5	14.5
Belgium	N/A	10.5	11.9	N/A
Canada	2.8	3.7	4.4	5.4
Denmark	4.6	7.8	9.1	8.5
Finland	3.8	6.1	6.5	7.1 ^c
France	6.0	10.1	11.5	12.7
Germany	9.7	12.6	12.1	11.8
Greece	N/A	4.8	5.8	10.7
Iceland	N/A	N/A	N/A	N/A
Ireland	2.5	4.2	4.5	5.4
Italy	5.5	10.4	12.0	15.6
Japan	1.3	2.6	4.4	5.3
Luxembourg	N/A	N/A	N/A	N/A
Netherlands	4.0	8.9	11.0	10.5
New Zealand	4.3	5.3	7.6	8.1
Norway	3.1	8.0	7.9	8.0 ^c
Portugal	N/A	4.1	6.1	7.2
Spain	N/A	4.3	7.3	8.6 ^c
Sweden	4.4	7.7	10.9	11.2
Switzerland	2.3	7.7	8.0	8.1
Turkey	N/A	N/A	N/A	N/A
United Kingdom	4.0	6.0	6.3	6.7
United States	4.1	6.7	6.9	7.2
OECD average ^b	4.3	7.1	8.2	8.9

Notes:

N/A: data not available.

^aRatio of annual public expenditure on pensions to current-year GDP. Public pensions include both transfers through social programs and pension payments to retired government employees. Privately sponsored pensions are not included, nor are tax expenditures granted to private and/or public plan savings.

^bOECD average represents the unweighted mean of available figures.

^cFigures are for 1984.

Source:

OECD (1990), Table 7, p. 33, and author's calculations. Figures for Germany refer to the former nation of West Germany.

**Table 2: Labor Force Participation Rates (%)
of Older Workers in OECD Countries**

Country	Men		Women	
	Age 55-64	Age 65+	Age 55-64	Age 65+
Australia				
1970	85.1	22.1	23.3	3.7
1975	78.8	16.7	23.7	3.9
1980	68.8	11.1	22.0	2.9
1985	60.4	8.9	19.3	2.0
1990	63.3	8.5	25.0	2.3
Austria*				
1970	47.2	9.7	14.9	3.4
1975	36.8	7.0	13.0	2.8
1980	34.5	4.4	14.5	3.0
1985	19.1	3.7	8.7	1.6
1990	N/A	N/A	N/A	N/A
Canada				
1970	84.2	22.6	29.8	5.0
1975	79.4	18.5	30.8	5.0
1980	76.2	14.7	33.7	3.3
1985	70.2	12.3	33.8	4.2
1990	64.9	11.4	35.7	3.9
Finland				
1970	71.1	19.0	46.3	4.4
1975	62.3	10.3	44.4	2.8
1980	57.3	17.0	43.0	6.0
1985	57.8	10.6	46.2	4.8
1990	45.4	7.9	39.7	2.9
France				
1970	75.4	19.5	40.0	8.6
1975	68.9	13.9	35.9	5.8
1980	68.5	7.5	39.7	3.3
1985	50.1	5.3	31.0	2.2
1990	45.8	3.7	31.3	1.5
Germany				
1970	82.2	19.9	29.9	6.5
1975	68.1	10.8	24.8	4.5
1980	65.5	7.0	27.2	3.1
1985	57.5	5.2	23.9	2.5
1990	N/A	N/A	N/A	N/A
Ireland				
1970	91.0	44.0	21.3	11.3
1975	83.8	28.2	20.9	7.2
1980	79.1	23.7	19.5	4.8
1985	77.7	19.0	18.3	3.6
1990	N/A	N/A	N/A	N/A

Table 2 (continued)

Country	Men		Women	
	Age 55-64	Age 65+	Age 55-64	Age 65+
Italy*				
1970	48.2	12.9	10.6	2.6
1975	42.4	10.4	8.5	2.1
1980	39.6	12.6	11.0	3.5
1985	38.2	8.9	10.5	2.1
1990	35.9	8.0	10.1	2.2
Japan				
1970	86.6	49.4	44.4	17.9
1975	86.0	44.4	43.7	15.3
1980	85.4	41.0	45.3	15.5
1985	83.0	37.0	45.3	15.5
1990	83.3	36.5	47.2	16.2
Netherlands				
1970	80.8	11.4	14.9	2.3
1975	73.0	8.0	14.3	1.8
1980	63.6	4.8	14.3	0.9
1985	56.5	4.2	15.8	1.0
1990	45.7	N/A	16.7	N/A
Norway**				
1970	N/A	58.7	N/A	24.9
1975	N/A	55.6	N/A	23.0
1980	N/A	53.3	N/A	24.7
1985	N/A	44.3	N/A	25.2
1990	N/A	N/A	N/A	N/A
Portugal				
1970	N/A	N/A	N/A	N/A
1975	78.3	36.3	32.3	11.1
1980	75.0	27.8	32.0	8.6
1985	68.6	23.0	33.2	8.2
1990	66.9	20.0	32.5	7.8
Spain				
1970	84.2	25.9	22.0	7.7
1975	79.8	18.8	23.0	6.3
1980	75.7	12.3	21.2	3.8
1985	66.3	5.9	20.0	2.1
1990	62.4	3.8	19.5	1.7
Sweden				
1970	85.4	28.9	44.5	8.7
1975	82.0	19.9	49.1	6.1
1980	78.7	14.2	55.3	3.7
1985	76.0	11.0	59.9	3.2
1990	75.4	12.3	66.3	5.1

Table 2 (continued)

<u>Country</u>	<u>Men</u>		<u>Women</u>	
	<u>Age 55-64</u>	<u>Age 65+</u>	<u>Age 55-64</u>	<u>Age 65 +</u>
United Kingdom				
— 1970	91.3	20.2	39.3	6.4
1975	87.8	15.8	40.3	4.9
1980	81.8	10.5	39.2	3.6
1985	66.4	7.6	34.1	3.2
1990	68.1	8.6	38.9	3.3
United States				
1970	80.7	25.7	42.2	9.0
1975	74.6	20.7	40.7	7.8
1980	71.2	18.3	41.0	7.6
1985	67.3	15.2	41.7	6.8
1990	67.1	15.8	45.0	8.1

Notes to Table 2:

N/A: data not available

* Age group is 60-64 for Italy and Austria

** Age group is 60 and over for Norway

Source: OECD (1990).

Data are not readily comparable for other OECD countries, including Belgium, Denmark, Greece, Iceland, Luxembourg, New Zealand, Switzerland, and Turkey. Figures listed under Germany are relevant to the former nation of West Germany.

Table 3.
Labor Force Participation Rates of Older Workers,
Selected Economies in Transition

	Age 55-59	Men Age 60-64	Age 65+	Age 55-59	Women Age 60-64	Age 65+
Bulgaria (1985)	80.9	39.2	15.2	32.0	16.5	4.3
Czechoslovakia (1980)	84.2	46.3	19.5	40.8	21.5	6.5
Hungary (1980)	72.2	13.2	3.9	18.8	8.7	3.2
Poland (1978)	81.5	62.4	34.9	57.9	37.4	19.4
(1988)	72.0	53.6	32.5	50.6	34.3	19.0
Romania (1977)	78.7	44.7	15.2	52.5	25.2	10.0

Source:
OECD (1991), Table A.3, p. 17.

Table 4: Retirement Ages in OECD Public and Private Pension Systems

Country	Public Pension Systems						Private Pension Systems			
	Normal Retirement Age		Early Retirement Age, Men		Early Retirement Age, Women		Normal Retirement Age		Early Retirement Age	
	Men	Women	Low	High	Low	High	Men	Women	Men	Women
Australia	65	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Austria	65	60	55	60	50	55	65	60	N/A	N/A
Belgium	65	60	55	64	55	55	65	60	60	55
Canada	65	65	60	64	60	64	N/A	N/A	N/A	N/A
Denmark	67	67	60	66	60	66	67	62	60	60
Finland	65	65	60	64	60	64	65	65	55	55
France	60	60	55	60	55	60	60	60	55	55
Germany	65	65	58	63	58	63	65	65	N/A	N/A
Greece	65	60	62	65	55	56	65	60	55	50
Iceland	67	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ireland	66	66	N/A	N/A	N/A	N/A	65	65	50	50
Italy	60	55	55	56	55	56	N/A	N/A	N/A	N/A
Japan	65	65	60	64	60	64	60	60	N/A	N/A
Luxembourg	65	65	60	60	60	60	65	60	N/A	N/A
Netherlands	65	65	60	62	60	62	65	65	N/A	N/A
New Zealand	60	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Norway	67	67	N/A	N/A	N/A	N/A	67	67	N/A	N/A
Portugal	65	62	55	60	55	60	N/A	N/A	N/A	N/A
Spain	65	65	64	64	64	64	65	65	N/A	N/A
Sweden	65	65	60	64	60	64	65	65	55	55
Switzerland	65	62	N/A	N/A	N/A	N/A	65	62	N/A	N/A
Turkey	55	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
United Kingdom	65	60	60	64	59	64	65	60	50	50
United States	65	65	62	62	62	62	65	65	55	55
Mean										
All OECD	64.25	62.54	58.88	62.47	58.12	61.12	64.65	59.72	55	53.89
Europe	64.71	62.88	58.50	62.29	57.57	60.64	64.93	62.73	55	53.75
North America	65	65	61	63	61	63	65	65	55	55
Oceania	62.50	60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other	62.33	60.67	60	64	60	64	60	60	N/A	N/A

Notes to Table 4:

N/A: data not available

*** Financing figures refer to the fraction of the private pension contributions paid for directly by the employer (Er) or the employee (Ee).**

Sources: Data Appendix available on request. Figures for Germany refer to the former nation of West Germany.

Table 5: Other Plan Characteristics of OECD Public and Private Pension Systems

Country	Public Pension Systems				Private Pension Systems		
	Replacement Rate (married)		Earnings ceiling*	Financing **	Replacement Rate	Financing *	
	(% Non-ag. pay)	(% Mfg. pay)				Employer %	Employee %
Australia	24	22.1	1	3	N/A	67	33
Austria	N/A	N/A	1	4	70	N/A	N/A
Belgium	37.5	37.5	1	4	65	N/A	N/A
Canada	44.7	37.8	1	6	N/A	72	28
Denmark	N/A	33	0	7	75	67	33
Finland	N/A	28.1	N/A	4	60	N/A	N/A
France	50	50	1	5	57	60	40
Germany	68	68.5	1	4	55	89	11
Greece	N/A	N/A	N/A	4	80	N/A	N/A
Iceland	28.5	N/A	N/A	0	N/A	N/A	N/A
Ireland	N/A	26.7	N/A	4	N/A	N/A	N/A
Italy	N/A	N/A	N/A	4	57	N/A	N/A
Japan	35.6	N/A	N/A	7	50	100	0
Luxembourg	72.7	72.7	1	4	N/A	N/A	N/A
Netherlands	25.1	27.5	0	10	N/A	74	26
New Zealand	29.6	30	N/A	3	N/A	N/A	N/A
Norway	N/A	50.7	1	4	52	N/A	N/A
Portugal	N/A	N/A	1	4	N/A	N/A	N/A
Spain	30.7	31.6	1	4	75	N/A	N/A
Sweden	N/A	63.6	1	0	N/A	100	0
Switzerland	21.6	21.6	1	4	60	58	42
Turkey	N/A	N/A	1	5	N/A	N/A	N/A
United Kingdom	20.5	21.4	1	4	40	73	27
United States	41.7	41.7	1	4	55	87	13
Mean							
All OECD	37.87	39.09	0.88		60.79	77	23
Europe	40.76	40.99	0.85		62.17	74.43	25.57
North America	43.20	39.75	1.00		55	79.50	20.50
Oceania	26.80	26.05	1.00		N/A	67	33
Other	32.05	N/A	1.00		50	100	0

Notes to Table 5:

N/A: data not available

*** Earnings ceiling used in computing tax base for payroll tax:**

1 = yes

0 = no

**** Financing and contributions:**

0 = government & employer

1 = employee only

2 = employer only

3 = government only

4 = all three

5 = employee & employer only

6 = government: universal pension; employee and employer: earnings related pension

7 = government & employee: universal pension; employee & employer: earnings related pension

10 = government & employee

Sources: Data Appendix available on request. Figures listed under Germany refer to the former nation of West Germany.

References

- Allen, S. G. and R. L. Clark, "Pensions and Firm Performance." In M. Kleiner, R. Block, M. Roomkin, and S. Salsburg, eds. Human Resources and Firm Performance. Madison, WI: IRRA, 1987: 195-242.
- Andrews, Emily S. "Private Pensions and Retirement Income: The U.S. Experience." Paper prepared for the Organisation for Economic Cooperation and Development, November 1990.
- Atkins, G. Lawrence, "Social Security and Pension Reform in Central Europe." Paper prepared for Meetings of the Institut für die Wissenschaften vom Menschen, Vienna, Austria, November 1991.
- Atkinson, Anthony B., "Income Maintenance and Social Insurance." In Auerbach, A.J. and M. Feldstein, eds. Handbook of Public Economics Vol. II. Elsevier Science Publishers B.V. (North-Holland), 1987.
- Atkinson, Anthony B., Poverty and Social Security. New York: Harvester Wheatsheaf, 1989.
- Atkinson, Anthony B., "Social Safety Nets and the Experience of Western Market Economies." Paris: Organisation for Economic Co-operation and Development, International Labour Office, 1991.
- Atkinson, Anthony B. and John Micklewright, "Unemployment Compensation and Labor Market Transitions: A Critical Review." Journal of Economic Literature 24: December 1991: 1679-1727.
- Auerbach, Alan J. and Laurence J. Kotlikoff, "The Impact of the Demographic Transition On Capital Formation." Pension Research Council Working Paper Series 9104. Philadelphia, PA: Pension Research Council, July 1991.
- Baily, Martin Neil, "Aging and the Ability to Work: Policy Issues and Recent Trends." In Gary Burtless, ed. Work, Health, and Income Among the Elderly. Washington, DC: Brookings Institution, 1987: 59-102.
- Baeza, Sergio, ed. Analisis de la Prevision en Chile. Chile: Centro de Estudios Publicos, 1986.
- Baeza, Sergio and Rodrigo Manubens, eds. Sistema Privado De Pensiones En Chile. Santiago, Chile: Centro de Estudios Publicos, 1988.
- Barr, Nicholas, "Economic Theory and the Welfare State: A Survey and Interpretation". Journal of Economic Literature 30 (June 1992): 741-803.
- Besley, Timothy, Stephen Coate, and Glenn Loury, "The Economics of Rotating Savings and Credit Associations". Princeton University Discussion Paper 157, January 1992.
- Bernheim, B. Douglas, "Social Security Benefits: An Empirical Study of Expectations and Realizations." In E. Lazear and R. Ricardo-Campbell, eds. Issues in Contemporary Retirement. Stanford, CA: Hoover Institute, 1988. pp. 312-48.
- Bodie, Zvi, "Federal Pension Insurance: Is It the S&L Crisis of the 1990's?" Paper presented at the IRRA Meetings, New Orleans, January 1992.

- Bodie, Zvi, "Pensions as Retirement Income Insurance." Journal of Economic Literature 28: March 1990: 28-49.
- Bodie, Zvi and Robert C. Merton, "Pension Reform and Privatization in International Perspective: The Case of Israel". Harvard Business School Working Paper 92-082, May 1992.
- Boswell, Scott S. and John J. Granato, "International Equity Market Integration: Efficiency and Predictability." Benefits Quarterly 8 (2): 1992: 78-89.
- Burkhauser, Richard V., "U.S. Policy toward Workers with Handicaps." In O.S. Mitchell, ed. As the Workforce Ages: Costs, Benefits, and Policy Challenges. Ithaca, NY: ILR Press, 1993.
- Cheyre, Hernán V., La Prevision en Chile Ayer Y Hoy. Santiago, Chile: Centrode Estudios Publicos, 1991.
- Clark, Robert L., Retirement Systems in Japan. Pension Research Council. Homewood, IL: Irwin, 1991.
- Clark, Robert L., "Trends in International Population and Work Rates of Older Persons." In O.S. Mitchell, ed. As the Workforce Ages: Costs, Benefits, and Policy Challenges. Ithaca, NY: ILR Press, forthcoming 1993.
- Commission of the European Communities, "Supplementary Social Security Schemes: The Role of Occupational Pension Schemes in the Social Protection of Workers and their Implications for Freedom of Movement." Communication from the Commission to the Council, July 1991.
- Commonwealth Fund, Americans Over 50 at Work Program: Research Reports I & 2. New York: The Commonwealth Fund, 1990.
- Dailey, Lorna M. and John A. Turner, "Paying for Pensions: An International Comparison." Benefits Quarterly, forthcoming.
- Deaton, Angus and Christina H. Paxson, "Patterns of Aging in Thailand and Côte d'Ivoire." In Topics in the Economics of Aging, NBER. Chicago, IL: University of Chicago Press, 1992: 163-206.
- Diamond, Peter, "Pension Reform in a Transition Economy: Notes on Poland and Chile". Paper presented at NBER conference on Industrial Restructuring in Eastern Europe, February 1992.
- Dilnot, Andrew, "Taxation and Private Pensions: Costs and Consequences". Paper presented at the OECD Conference of National Experts on Private Pensions and Public Policy, Paris July 1991.
- Dilnot, Andrew and Ian Walker, eds. The Economics of Social Security. New York: Oxford University Press, 1989.
- Esping-Anderson, Gosta and Harald Sonnberger, "The Demographics of Age in Labor Market Management." In J. Myles and J. Quadagno, eds. States, Labor Markets, and the Future of Old Age Policy. Philadelphia: Temple University Press, 1991: 227-49.

- European Economic Community, Comparative Tables of the Social Security Schemes in the Member States of the European Community, 15th edition. Luxembourg, July 1988.
- Feldstein, Martin, "Social Security and Saving: The Extended Life Cycle Theory." American Economic Review 66: May 1976: 77-86.
- Fields, Gary S. and Olivia S. Mitchell, "The Effects of Social Security Reforms on Retirement Ages and Retirement Incomes." Journal of Public Economics 25: November 1984: 143-59.[1984a]
- Fields, Gary S. and Olivia S. Mitchell, Retirement, Pensions and Social Security. Cambridge, Mass.: MIT Press, 1984 [1984b].
- Foster, Howard, ed. Employee Benefits In Europe and USA. Longman Group UK Ltd. Guildford, Surrey, UK: Biddles Ltd., 1990.
- Grosh, Margaret E., "Social Spending in Latin America." World Bank Discussion Paper, 1990.
- Gustman, Alan L., Olivia S. Mitchell, and Thomas Steinmeier, "The Role of Pensions in the Labor Market." Department of Labor Economics Working Paper, Cornell University. April 1992.
- Gustman, Alan and Thomas Steinmeier, "A Disaggregated Structural Analysis of Retirement By Race, Difficulty of Work and Health." Review of Economics and Statistics 67 (3): August 1986: 509-13.
- Hamermesh, Daniel S., "Entitlement Effects, Unemployment Insurance and Employment Decisions." Economic Inquiry 17 (3): July 1979: 317-32.
- Hamermesh, Daniel S., Labor Demand. Manuscript forthcoming, Fall 1992.
- Hamermesh, Daniel S., "Unemployment Insurance: Goals, Structure, Economic Impacts, and Transferability to Developing Countries." In this volume. 1993.
- Hannan, Timothy H. "Bank Commercial Loan Markets and the Role of Market Structure: Evidence from Surveys of Commercial Lending". Journal of Banking and Finance. 15 (1991): 133-149.
- Hart, Robert A., The Economics of Non Wage Labour Costs. London: George Allen and Unwin, 1984.
- Holzmann, Robert, "Adapting to Economic Change: Reconciling Social Protection with Market Economies." Paper prepared for Tripartite Symposium on the Future of Social Security in Industrialized Countries. Geneva: International Labour Office, 1991.
- Hurd, Michael D., "Research on the Elderly: Economic Status, Retirement, and Consumption and Saving." Journal of Economic Literature 27: June 1990: 565-637.
- Hutchens, Robert M., "Are Job Opportunities Restricted for the Older Worker?" In O.S. Mitchell, ed. As the Workforce Ages: Costs, Benefits, and Policy Challenges. Ithaca, NY: ILR Press, forthcoming 1993.
- International Labour Office, From Pyramid to Pillar. Geneva: International Labour Office, 1989.

- International Labour Organisation, Year Book of Labor Statistics 1991. Geneva: International Labour Office, 1991.
- Ippolito, Richard A., The Economics of Pension Insurance. Pension Research Council. Homewood, IL: Dow Jones Irwin, 1989.
- Ippolito, Richard A., Pensions, Economics and Public Policy. Homewood, IL: Dow Jones Irwin, 1986.
- Jacobs, Klaus, Martin Kohli, and Martin Rein, "Germany: The Diversity of Pathways." In M. Kohli et al., eds. Time for Retirement. Cambridge: Cambridge University Press, 1991 [1991a].
- Jacobs, Klaus, Martin Kohli, and Martin Rein, "Testing the Industry Mix Hypotheses of Early Exit." In M. Kohli et al., eds. Time for Retirement. Cambridge: Cambridge University Press, 1991[1991b].
- Kohli, Martin, Martin Rein, Anne-Marie Guillemard, and Herman van Gunsteren, eds. Time for Retirement: Comparative Studies of Early Exit from the Labor Force. New York: Cambridge University Press, 1991.
- Kotlikoff, Laurence J., "Economic Exchange and Support Within U.S. Families". NBER Working Paper 4080, May 1992.
- Kotlikoff, Laurence J., "Social Security and Equilibrium Capital Intensity." Quarterly Journal of Economics 93: May 1979: 233-53.
- Kotlikoff, Laurence J. and A. Spivak, "The Family as an Incomplete Annuities Market." Journal of Political Economy 89: April 1981: 372-91.
- Laczko, Frank and Chris Phillipson, "Great Britain: The Contradictions of Early Exit". In Kohli et al. eds. Time for Retirement: Comparative Studies of Early Exit from the Labor Force. New York: Cambridge University Press, 1991.
- Layard, Richard, Stephen Nickell, and Richard Jackman, Unemployment: Macroeconomic Performance and the Labor Market. Oxford: Oxford University Press, 1991.
- Lazear, Edward P., "Why Is There Mandatory Retirement?" Journal of Political Economy 87 (6): 1979: 1261-84.
- Leonesio, Michael V., "Social Security and Older Workers." In Olivia S. Mitchell, ed. As the Workforce Ages: Costs, Benefits, and Policy Challenges. Ithaca, NY: ILR Press, forthcoming 1993.
- Levine, Phillip, "Examining Labor Force Projections for the 21st Century." In Olivia S. Mitchell, ed. As the Workforce Ages: Costs, Benefits, and Policy Challenges. Ithaca, NY: ILR Press, forthcoming 1993.
- Levine, Phillip and Olivia S. Mitchell, "The Baby Boom's Legacy: Relative Wages in the Twenty-First Century." American Economic Review 78: May 1988: 66-9.
- Luzadis, Rebecca A. and Olivia S. Mitchell, "Explaining Pension Dynamics." Journal of Human Resources 26 (4): Fall 1991: 679-703.

- Marcel, Mario and Alberto Arenas, "Social Security Reform in Chile." Inter-American Development Bank, Occasional Papers No. 5, 1992.
- Marchand, M. and Pierre Pestieau, "Public Pensions: Choices for the Future." European Economic Review 35: 1991: 441-53.
- McCarthy, David and John Turner, "Pension Rates of Return in Large and Small Plans." In J. Turner and D. Beller, eds. Trends in Pensions. U.S. Department of Labor. Washington, DC: USGPO, 1989: 235-86.
- McGill, Dan M. and Donald S. Grubbs, Fundamentals of Private Pensions. Fifth Edition. Homewood, IL: Richard D. Irwin, Inc., 1989.
- McGreevey, William Paul, "Social Security in Latin America." World Bank Discussion Paper, 1990.
- Merton, Robert C. and Zvi Bodie. "Deposit Insurance Reform: A Functional Approach". Harvard Business School Working Paper 92-086, May 1992.
- Mesa-Lago, Carmelo, Ascent to Bankruptcy: Financing Social Security in Latin America. Pittsburgh, PA: University of Pittsburgh Press 1989.
- Mesa-Lago, Carmelo, "Portfolio Performance of Selected Social Security Institutes in Latin America." World Bank Discussion Paper No. 139, 1991.
- Mitchell, Olivia S., "Aging, Job Satisfaction and Job Performance." In I. Bluestone, R. Montgomery, and J. Owen, eds. An Aging Workforce. Detroit, MI: Wayne State University Press, 1990: 242-72.
- Mitchell, Olivia S., "The Effect of Mandatory Benefits Packages." In L. Bassi, D. Crawford, and R. Ehrenberg, eds. Research in Labor Economics. Greenwich, CT: JAI Press, 1991: 297-320 [1991a].
- Mitchell, Olivia S., "Social Security Reforms and Poverty Among Dual-Earner Couples." Journal of Population Economics 4, 1991: 281-93 [1991b].
- Mitchell, Olivia S., "Trends in Pension Benefit Formulas and Retirement Provisions." In J. Turner and D. Beller, eds. Trends in Pensions 1992. Washington, DC: U.S. Department of Labor, PWBA, 1992. pp. 177-216.
- Mitchell, Olivia S., "Worker Knowledge of Pension Provisions." Journal of Labor Economics 6: January 1988: 21-39 [1988a].
- Mitchell, Olivia S. and Robert S. Smith. "Public Sector Pensions: Benefits, Funding and Unionization". IRRA Proceedings. Madison, WI (forthcoming).
- Munnell, Alicia H., "The Impact of Public and Private Pension Schemes on Saving and Capital Formation." International Social Security Review 3/86, 1986: 243-57.
- Munnell, Alicia H. and C. Nicole Ernsberger, "Public Pension Surpluses and National Saving: Foreign Experience." New England Economic Review, March/April 1989: 16-38.
- Munnell, Alicia H. and Joseph B Grolnic, "Should the U.S. Government Issue Index Bonds?" New England Economic Review, September/October 1986.

- Munnell, Alicia H. and Frederick O. Yohn, "What Is the Impact of Pensions on Saving?" Pension Research Council Working Paper Series 90-3. Philadelphia, PA: Pension Research Council, June 1990.
- Myers, Robert J., "Early Retirement, Delayed Retirement Factors in Japanese Social Security System." The Actuary 27 (4): April 1991: 4-5.
- Myers, Robert J., "Privatization of Chile's Social Security Program." Benefits Quarterly 1(3): Third Quarter 1985: 26-35.
- Organisation for Economic Co-operation and Development, Labour Force Statistics: Statistiques de la Population Active, 1969-1989. Paris: OECD, 1990.
- Organisation for Economic Co-operation and Development, The Transition from Work to Retirement. Working Papers from the 10th Meeting of the Working Party on Social Policy, Paris. 1991.
- Pampel, Fred C. and Jane A. Weiss, "Economic Development, Pension Policies, and the Labor Force Participation of Aged Males: A Cross-national, Longitudinal Approach." American Journal of Sociology 89 (3): September 1983: 350-73.
- Pauly, Mark V., "The Rational Nonpurchase of Long-Term Care Insurance." Journal of Political Economy 98 (1): February 1990: 153-68.
- Pesando, James, "The Multiple Roles of Private Pensions: Effects on Savings, Capital Markets, and Labour Market Decisions". Paper presented at the OECD Conference of National Experts on Private Pensions and Public Policy, Paris July 1991.
- Pestieau, Pierre, "The distribution of Private Pension Benefits: How Fair Is It?" Paper prepared for "Private Pensions and Public Policy," Conference of National Experts, Paris, July 1991.
- Piachaud, D., "Disability, Retirement and Unemployment of Older Men." Journal of Social Policy 15 (2): April 1986: 145-62.
- Pozzebon, Sylvia and Olivia S. Mitchell, "Married Women's Retirement Behavior." Journal of Population Economics, Spring 1989: 39-53.
- Quinn, Joseph F., Richard Burkhauser, and Daniel A. Myers, Passing the Torch: The Influence of Economic Incentives on Work and Retirement. Kalamazoo, MI: WE Upjohn, 1990.
- Rebick, Marcus, "The Japanese Approach to Finding Jobs for Older Workers." In O.S. Mitchell, As the Workforce Ages: Costs, Benefits, and Policy Challenges. Ithaca, NY: ILR Press, forthcoming 1993.
- Sammartino, Frank J., "The Effect of Health on Retirement." Social Security Bulletin 50 (2): February 1987: 31-47.
- Schmähl, Winfried, ed. Redefining the Process of Retirement: An International Perspective. New York: Springer-Verlag, 1989.
- Szalai, Julia, "Hungary: Exit from the State Economy." In M. Kohli et al., eds. Time for Retirement. Cambridge: Cambridge University Press, 1991.

Takahashi, Kaz, "Technical Assistance to Poland in Developing Private Pension Fund Systems." John F. Kennedy School of Government: Harvard University, unpublished manuscript, April 1992.

Turner, John and Daniel Beller, eds. Trends in Pensions 1992. U.S. Department of Labor, Pensions and Welfare Benefits Administrations. Washington, DC: USGPO, 1992.

Turner, John and Lorna M. Dailey, eds. Pension Policy: An International Perspective. U.S. Department of Labor, Pension and Welfare Benefits Administration. Washington, DC: USGPO, 1991.

U.S. Department of Health and Human Services, Social Security Administration, Social Security Programs Throughout the World - 1989. Research Report #62, SSA Publications No. 13-11805. Washington, DC: USGPO, May 1990.

Wallich, Christine, "Savings Mobilization through Social Security: The Experience of Chile During 1916-77," World Bank Staff Working Paper Number 553. Washington, DC: The World Bank, 1983.

Young, Howard, "Levels and Forms of Private Pension Benefits: How Adequate Are They?" In OECD Conference of National Experts on Private Pensions and Public Policy. Paris, July 1991.

Zabalza, Anthony, Christopher Pissarides, and M. Barton, "Social Security and the Choice Between Full-Time Work, Part-Time Work and Retirement." Journal of Public Economics 14: October 1980: 245-76.

Zollner, Detlev, "Public Pensions, Demographic Change and Economic Constraints: Can Private Pensions Relieve the Pressure?" Paper presented at the OECD Conference of National Experts on Private Pensions and Public Policy, Paris July 1991.

Zweimüller, Josef, "Earnings, Social Security Legislation and Retirement Decisions: the Austrian Experience." Applied Economics 23 (5): May 1991: 851-59.