



International Social Security  
Association

THE SOCIAL SECURITY REFORM DEBATE  
In Search of a New Consensus  
*A Summary*

## RESTRUCTURING PUBLIC PENSION PROGRAMS

Based on an issue brief by Larry Thompson, Senior Fellow of the  
Urban Institute, Washington, D.C.

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# Table of Contents

OVERVIEW AND POLICY OBSERVATIONS . . . . .	2
REASONS FOR CREATING MANDATORY RETIREMENT PROGRAMS . . . . .	6
THE ECONOMIC COST OF SUPPORTING THE RETIRED . . . . .	11
THE EFFECT OF PENSIONS ON SAVINGS AND INVESTMENT . . . . .	16
THE EFFECT OF PENSIONS ON LABOUR SUPPLY . . . . .	20
PUBLIC PENSIONS AND INTERNATIONAL COMPETITIVENESS . . . . .	24
SETTING PENSION CONTRIBUTION RATES . . . . .	29
CHOICES OF PENSION APPROACHES AND TRANSITIONS BETWEEN APPROACHES . . . . .	35
RISKS OF MID-CAREER ECONOMIC AND DEMOGRAPHIC CHANGES . . . . .	42
ASSURING INCOME ADEQUACY THROUGHOUT RETIREMENT . . . . .	48



# Overview and Policy Observations

## INTRODUCTION

For the past 15 years, debate about the nature and scope of public pension systems has been growing at unprecedented levels throughout the world. It is occurring in both developed and developing countries.

The debate is being driven by the need or desire to:

- restructure economic systems;
- reinvigorate ineffective pension institutions; or
- improve social protection in concert with improving economic conditions.

It is fuelled by the hope that alternative pension structures will:

- improve macroeconomic performance;
- help deal with changing demographics; or
- reflect changes in social philosophy about the relative importance of individual and collective provision for retirement.

For decades since pension programs were introduced, there has been consensus that pay-as-you-go public pension programs, the primary means of providing retirement income in many industrialized countries, were valuable both economically and socially. Today, they are criticized as: costing too much, reflecting outmoded social philosophies, and having undesirable consequences for the economy.

The debate is increasingly polarized. Organizations that are members of the International Social Security Association (ISSA) determined that the Association should lead a search for a new consensus. The review will examine:

- the economic and social impacts of various pension approaches;
- the effectiveness of various approaches in assuring adequate retirement incomes in an uncertain world; and
- identify the role and impact of cultural, social and political traditions.

A series of nine Issue Briefs has been developed for this first review. Their focus is economic, since it is the economic imperatives of various pension arrangements that are criticized most and appear to form the impetus for the desire for change. Future volumes will examine the social, cultural, and political determinants that affect the success and/or failure of public pension systems.

## BACKGROUND

Pension programs exist in most countries. These mandatory retirement savings programs were established to ensure that workers would not face poverty in their retirement years and to ensure that governments were not faced with large social welfare costs if myopic workers did not save for retirement when they were working. They were a direct intervention in the free market. However, the desire to alleviate poverty in retirement does not explain the size, scope and structure of the pension institutions that have emerged. Analysts have suggested that governments instituted pension plans to deal with worker myopia, to protect the prudent, and as insurance for market failures.

Primarily, there are two types of government-mandated pension plans:

- 1) Pay-as-you-go (PAYG) pension plans which are defined benefit plans paid for by workers and employers. In these plans current workers pay for the benefits of those who are retired.
- 2) Advance-funded, defined contribution plans in which an individual or group of workers pay into plans and accumulate assets. In these plans, benefits are paid to retirees from their accumulated assets.

In many countries, where the PAYG plans form the basis of the retirement income system, privately managed advance-funded systems also exist. These advance-funded systems are of two types: forced individual savings plans like employer-sponsored pension plans; and voluntary plans like registered retirement savings plans, both of which are supported by governments through the tax system. The current debate is focused on the economic viability of these different types of plans and the vulnerability of workers/retirees under each type of pension program.

*Pension plans were established by governments to:*

- deal with worker myopia;
- protect those who were prudent; and
- insure against market failures and uncertainty.

## THE NINE ISSUE BRIEFS

- 1) *Reasons for Creating Mandatory Retirement Programs*
- 2) *The Economic Cost of Supporting the Retired*
- 3) *The Effect of Pensions on Savings and Investment*
- 4) *The Effect of Pensions on Labour Supply*
- 5) *Public Pensions and International Competitiveness*
- 6) *Setting Pension Contribution Rates*
- 7) *Choices of Pension Approaches and Transitions Between Approaches*
- 8) *Risks of Mid-Career Economic and Demographic Changes*
- 9) *Assuring Income Adequacy Throughout Retirement*

Summaries of all nine Issue Briefs are available from ISSA.



## GENERAL OBSERVATIONS ABOUT POLICY IMPLICATIONS OF REVIEW

### **Economic criticism of pay-as-you-go plans exaggerated**

Critics of the PAYG pension programs argue that advance-funded plans improve economic performance and give workers a better return on investment. The review suggests that advance-funded plans may yield economic benefits if pursued as one part of a plan for developing efficient financial markets. However, there is little evidence that advance funding increases a nation's savings rate and there are no indicators that suggest that they would reduce the economic cost of dealing with an aging society.

### **Pension costs in an aging society do not depend on the financing method**

Changing the way pensions are financed is unlikely to change the magnitude of the costs associated with an aging society. However, it may change the distribution of those costs. If an aging society is causing pension costs to rise to undesirable levels, the evidence points to two ways to solve the dependency ratio problem: raise the retirement age, and/or reduce retirement benefits.

### **Facts do not support arguments of negative effects on international competitiveness**

Evidence suggests that well-designed social security programs may actually increase international competitiveness. Those countries with better-than-average international competitiveness numbers also have substantial pension programs. The evidence indicates that the real cost of pensions is borne by workers in the form of lower wages. However, if higher-than-average charges are levied against employers, and there is a significant lag in the flow-through effect to workers, international competitiveness may be negatively affected for a short time.

### **Little concrete evidence to indicate that pension plans negatively affect labour supply**

Workers who are not the primary earner in the family may reduce work effort to avoid paying premiums particularly if the pension plan is viewed as a tax. However, the magnitude of this effect cannot be measured with the data that is currently available. There is some indication that there is less evasion if benefits are closely tied to contributions. A loose link between contributions and benefits can also cause financing problems for the pension plan. There is no evidence to suggest that the type of financing of a pension plan alters the degree to which labour supply is reduced or tax cheating is encouraged.

## Advance-funded defined contribution pension plans have several market shortcomings

In comparing the defined benefit model with the defined contribution model, the following market shortcomings of the defined contribution model are apparent. The size of the retirement income stream produced is less predictable and keeping benefits up-to-date with prevailing wage and price trends is more difficult. Individual defined contribution plans are more expensive to administer which artificially increases the cost of the retirement income system. In a political system that exercises self-discipline, the PAYG defined benefit plan provides a more predictable source of retirement income administered at a lower cost.

## Excessive political promises can jeopardize PAYG systems

If the political system is not responsible and allows benefit promises to rise above levels that citizens are willing or able to pay, serious fiscal problems will occur. Where this type of problem exists, the defined contribution approach becomes an attractive alternative because it is more effectively insulated from political interference. However, politicians are not the only people who are prone to promise more than they can deliver. The defined contribution model requires sophisticated oversight and regulation to ensure that one set of problems resulting from public sector political dynamics is not simply traded for a different set of problems derived from the dynamics of private sector operations.

## CONCLUSION

Public pensions are critical to a significant portion of the population of many countries in the world. They are destined to become even more important as the full effects of changing demographics, the aging population and increased life expectancy are felt. It is important to examine the social, political and cultural dimensions of pension reform as well as the economic and financial aspects. If all such dimensions are carefully considered, the debate over how these institutions should be structured will lead to a new consensus about the role and shape of public pension programs. The emergence of a new consensus will help to ensure that changes introduced in the name of reform will strengthen these programs and make them better for the many millions who rely on them all over the world.

## Next Steps

*ISSA will examine other issues that affect public pension reform decisions: the social, political and institutional dimensions which are as important as the economic dimensions.*

# Reasons for Creating Mandatory Retirement Programs

## INTRODUCTION

Most countries have some form of retirement program in place where contributions are mandatory. At a minimum, these programs apply to the wage and salary workers in the public sector and major transportation and export industries. In most developed countries, they have been extended to cover virtually all workers, and they are often supplemented by subsidies to encourage additional private retirement programs.

As economies mature, public pension programs grow to be among the largest fiscal institutions in their societies. Workers and/or employers are usually required to contribute more than 10 percent of gross earnings to these programs. Their financial flows can grow to represent some five to ten percent of the country's gross domestic product, dwarfing virtually every other government activity. For this reason, public pension programs tend to be scrutinized and proposals for reform to improve the system are often suggested.

Initially created to alleviate poverty in retirement, many public pension programs now provide benefits well above the poverty level.

This paper looks at the following aspects of "forcing individual provision for retirement":

- 1) How can one explain such a widespread practice of imposing a substantial financial burden on a large fraction of the working population?
- 2) Why do governments subsidize private sector retirement programs?
- 3) Why were these programs created and what problems were they intended to address?



## GOVERNMENT'S ROLE IN A MARKET ECONOMY

In a free market, which operates independently and without government intervention, key social objectives may be lost — objectives like ensuring a decent standard of living for retired workers. However, these pension programs have grown well beyond the level needed to assure a socially acceptable minimum income suggesting that the reasons for creating them go beyond the minimum income motivation.

Governments use both regulations and/or direct provision of services to address failures in the market for retirement incomes.

In the case of retirement incomes, contributions can be made mandatory and proper use of funds ensured under government-operated pension programs. Intervention, however, must be well designed and properly carried out in order to achieve the desired results. Even the best designed government intervention is likely to combine intended desirable effects with additional unintended and/or undesirable effects.

These undesirable effects might involve extra costs in assuring compliance and/or artificial changes in the behaviour of workers and investors caused by the introduction of new taxes. If the undesirable effects are minor when compared to the problem governments are trying to address, they may be a small price to pay. If, however, they introduce serious distortions into the market, society may be worse off than if the government had never acted at all.

*Government intervention in a market economy is warranted when:*

- *the reasons for market failure are clear;*
- *the results of inaction would be serious;*
- *a high success rate is expected; and*
- *any adverse effects are acceptable.*

## THE GROWTH OF CONTRIBUTORY PENSION PLANS

For years governments have assumed responsibility for assuring a minimum standard of living for the aged and infirm in their societies. The desire to alleviate poverty is one of the reasons governments are involved with retirement programs, however, this does not explain the size, scope and structure of the institutions that have emerged. In all cases, governments are intervening to generate retirement benefits well above the poverty level and contributions are mandatory for workers and/or employers.

## THE NEED FOR INTERVENTION

The near universality of government intervention in the area of pensions suggests a general consensus that individual workers and totally free markets can not be counted on to provide adequate savings for retirement. Analysts have suggested the following reasons: worker myopia; protection of the prudent; income redistribution; and insurance for market failures.



# 1

**Worker myopia**, or lack of foresight, occurs because people give too little consideration to their future economic needs when making decisions about saving for retirement. By the time they recognize they may have a problem when they retire, it is usually too late to fix. Government intervention can help people set aside a greater portion of their earnings when they are working so that they have an adequate income when they retire. Without forced contributions for retirement, myopic workers would not save enough to ensure an adequate retirement income and poverty would result.

**Protection of the prudent** is required so that those who do save for the future (the prudent) are protected from those who don't (the myopic and the non-prudent). When societies set a minimal level of consumption for their members, some workers will rely on this level and never set aside additional savings for retirement. Other more prudent earners end up paying for both their own and others' retirement. Government intervention ensures that contributions are made across the board. These interventions would be considered successful if very few of those who had adequate incomes during their working years ended up relying on the social minimum in their retirement years.

**Income redistribution** occurs because societies make a collective judgement to alter market-produced income distribution to promote greater social solidarity and produce a more just society. Pension programs, which are designed to favour those with lower lifetime earnings, are one of the mechanisms used to alter market-generated income distribution. Compared to a government assistance program, a pension program preserves the dignity of the elderly because many societies find pension payments more socially acceptable. If the pension amount is kept relatively modest, it may also generate fewer savings disincentives than an assistance program would.

**Retirement insurance** for market failures occurs because those saving for retirement are forced to decide on contribution levels based on guess work and unknown variables. These variables include: the rate of future economic growth and investment performance; future trends in average mortality; changes in purchasing power after retirement; and the life span of an individual, particularly if the person lives longer than the average.

The risks associated with the first two factors (economic growth and cohort mortality) are one of the major differences between "defined contribution" retirement programs and "defined benefit" retirement programs. Defined contribution programs leave all the risk with the worker, whereas defined benefit programs, like those often provided by private employers, share the risk between workers and other members of society. Universal access to defined benefit arrangements requires government intervention.

The third risk factor (unanticipated inflation) can only be insured by an institution (usually the government) whose resources automatically adjust to price fluctuations. In practice, where such insurance (indexation) is offered by the private sector, it is backed by indexed government securities.

The fourth risk factor (individual mortality) can be addressed, to a limited extent, through individual purchases of annuities at retirement. However, most of these suffer from serious adverse selection problems.

This data suggests the following roles for government intervention:

- 1) Assuring universal access to defined benefit arrangements requires government intervention. Assuring access to defined contribution arrangements does not.
- 2) Provision of insurance against unanticipated inflation which only government can provide.
- 3) Regulation of the annuities market to improve inefficiencies. In principle, private markets can supply individual annuities to hedge against life expectancy; in practice these markets exhibit significant inefficiencies.

## THE IMPLICATIONS FOR GOVERNMENT INTERVENTION

The data provide some insight into how government involvement in retirement programs might be structured.

### Scope of coverage

There appears to be agreement that mandatory contributions are necessary to achieve the retirement savings results that people need to have an adequate standard of living in their retirement years. If this is true, then a public pension must be beneficial to all workers, with some level of compulsory participation in all sectors.

### Degree of compulsion

Addressing the market failures outlined above suggests that there is a need for a government mandate that forces workers to participate in pension programs. They also imply that there is a need for limitations on benefit payouts pre- and/or post-retirement, and some individual responsibility for the maintenance of living standards, especially for higher wage earners.



# 1

## Relative size of the mandatory element

None of the market failures suggest that a government-imposed solution needs to deal with all of the retirement income needs of the aged. Dealing with the problem only requires a mandate large enough to guarantee a retirement benefit equal to or greater than the minimum income guarantee for the aged.

The level of intervention also depends on social and political factors, such as the strength and stability of private- and public-sector institutions, and the degree of differences within the population.

## Impacts on retirement behaviour

By ensuring adequate provisions for retirement for all workers and offsetting worker myopia, successful public pension programs should result in higher incomes for the aged as well as a lower age of retirement. In addition, measures to improve the operation of insurance markets should make it easier and less costly for workers to finance their own retirement.

## Impacts on personal savings

If the aged are left to deal with the risk factors outlined above — inflation, living past life expectancy averages, and the potential for costly extended care — the prudent will accumulate additional savings as a precaution. Government programs that reduce these risks are likely to lead to some reduction in savings.

## Implications for program structure

The larger a mandatory program is the higher the risk of serious negative (unintended) reactions to intervention from both the public and the market. The size and structure of public pension programs is currently a point of debate, centered on how programs should be managed, i.e., private versus public management; and the pros and cons of the defined benefit model or the defined contribution model.

## SUMMARY

Totally free markets can fail to produce a socially desirable pattern of savings for retirement. The rationales for government intervention apply to both the working years and retirement years. The logic that says that workers should be forced to set aside part of their incomes for retirement also suggests that they should be prevented from drawing down their accumulated benefits too rapidly.

# The Economic Cost of Supporting the Retired

## 2

### INTRODUCTION

Societies have a number of mechanisms for supporting the retired and ensuring that adequate resources are available for this purpose. This paper examines the cost of supporting the retired from the viewpoint of society as a whole. First, it examines the mechanisms that are used to ensure an adequate standard of living for the retired population. Next, it examines the factors that determine the total amount of resources that will be used in any given year to support the retired and how that amount can be changed. Finally, it examines the possible impacts of the total support for the aged of:

- i) shifting costs from the public to private sector, and
- ii) an acceleration in the rate of growth of the economy.

### MECHANISMS FOR SUPPORTING THE RETIRED POPULATION

A society's economic activities are comprised of goods and services available for private consumption, investment, export, or use by government in collective consumption or investment. This economic production generates incomes for participants in the process, which they use to consume goods and services. The total income generated is equal to the total amount produced by that economy.

Since retirees do not earn labour income, their consumption must be supported by other means. While some may realize returns on capital investments, the majority rely on transfers of resources from those who continue to work.

Three mechanisms are used to transfer purchasing power from the working age population to the retired:

- 1) *Informal, intra-family transfers*: Traditionally, this mechanism involves the voluntary transfer of resources by those who are working in a multi-generational family to support both the young and the aged. The shift to a more urban society has



caused a breakdown of multi-generational households and the traditional responsibilities of these households. This, combined with declining birth rates in most developed countries, has resulted in a growing reliance on mechanisms directed by the state.

- 2) *Mandatory contribution and benefit programs*: Government-sponsored transfer programs take one of two forms: contributory (often earnings-related) pensions; or non-contributory, universal pensions (or old-age assistance programs). Under contributory pension programs, the transfer comes from the income of current workers. Universal pensions are typically financed by more broadly based taxes so that the transfer comes out of both labour and capital income.
- 3) *Asset swaps*: Typically asset swaps occur as retirees sell assets to workers who in turn use these assets to save for their retirement. The act of selling or purchasing the asset transfers purchasing power from the worker to the retiree.

The essential process of resource transfer is the same in all three cases. However, none of these processes increases the total assets of a society, they merely re-distribute wealth and consumption across generations.

### THE ECONOMIC COST OF SUPPORTING THE RETIRED POPULATION

The cost of supporting retirees is calculated according to the goods and services they consume, because these resources are not available for other uses, such as private investment, collective investment or consumption by either government or workers.

The most useful measure of this cost is the consumption of the retired expressed as a fraction of the *total amount of production* available to that society.

This fraction itself can be expressed as the product of three other ratios, shown below.

$$\begin{aligned}
 \text{Cost of Supporting the Retired} = & \frac{\text{Consumption of the Retired}}{\text{Total National Product}} \\
 & \times (\text{times}) \frac{\text{Number of Retirees}}{\text{Total Population}} \\
 & \times (\text{times}) \frac{\text{Average Consumption of Retirees}}{\text{Average Consumption of Total Population}}
 \end{aligned}$$

It can also be expressed as the product of three different economic and demographic ratios:

1. The *aggregate consumption ratio*, which is the fraction of total economic activity devoted solely to consumption;
2. The *retiree dependency ratio*, which is the fraction of the population that is retired; and
3. The *living standards ratio*, which compares the average consumption of retirees to that of all individuals.

The fundamental factors that determine the cost of supporting the aged in any society are found primarily in the **second and third ratios**. The second ratio reflects the combination of the underlying **age structure of the population** and the social policies and practices governing the **age of retirement**. The third ratio reflects the social and economic conventions that govern the relationship between the **living standards of retirees** and those of the **population as a whole**.

The relationships are simple and direct. A change to any one ratio will directly affect the cost of supporting the aged. For example, if the number of retirees grows by 10% then the cost of supporting them will also grow by 10%. No society can alter the cost of supporting its retirees without pursuing **policies that change at least one of the three ratios**.

*There are three mechanisms for transferring purchasing power from workers to retirees:*

- *informal, intra-family transfers;*
- *mandatory contribution and benefit programs; and*
- *asset swaps.*

*All three are found in most societies. The relevant importance of each varies across cultures and stages of economic development.*

## POLICIES TO ALTER THE COST OF SUPPORTING THE RETIRED

Longer life spans and declining birth rates (which both increase the retiree dependency ratio) have spurred growing debate over retirement policy. Governments are increasingly concerned about the impact of projected increases to the cost of supporting the aged. Few countries have addressed the implications beyond its effects on financing public, pay-as-you-go pension plans. Debate and action to date have centred on changes to the age of retirement, reduction of benefit levels and shifting the cost of support from governments to the private sector.

**Raising the age of retirement** keeps people in the workplace longer, thereby decreasing the dependency ratio. This alone does not provide a practical solution to the issue of aging populations and the cost of supporting the retired. Declining birth rates work against this principle to the extent that retirement ages would have to be set quite high — up to nine years past the current retirement age — to effectively reduce costs.





**Decreasing net benefit levels** through mechanisms like increasing taxes on pension income, reduced indexation, delaying scheduled increases to benefits, reduced accrual rates for future benefits and adjustments to the age when “normal” benefits are paid, can lower the cost of supporting the retired. However, the mechanism used must also reduce the ratio of retiree living standards in comparison to that of the entire population in order to actually reduce costs. For example, if the number of retirees increases, worker contributions must rise to cover the costs. Workers then have less to spend on consumption of goods and services. If benefit amounts are not adjusted down, the standard of living for retirees could exceed that of the population at large.

**Shifting costs** to the private sector can reduce the impact of aging on government budgets. This shift of costs from government to the private sector involves shifting from pay-as-you-go pension plans to advance-funded plans.

### THE IMPACT OF MOVING FROM PAY-AS-YOU-GO TO ADVANCE FUNDING

Projections about the impact an aging population will have on public pay-as-you-go (PAYG) systems has increased interest in moving these pension responsibilities to advance-funded approaches, which are frequently managed by the private sector.

The impact of a shift from a PAYG system to an advance funding system will depend on the effect this has on one of the three ratios outlined earlier.

*Possible cost-reducing factors:* Shifting the costs to the private sector can help reduce costs if it facilitates changes in benefit levels or retirement ages which are difficult for governments to implement. In Latin American countries where this has been done, supporters believe that the new approaches create institutional arrangements that will be more effective than government in preventing unsustainable expansion in future benefits.

*Possible cost-increasing factors:* A shift to the private sector may mean a more even distribution amongst the population of the cost of supporting the retired, but it can also hide a portion of that cost. For example, if workers opt for better benefits through higher contributions, the amount of a society’s total production used for consumption by retirees will also increase.

### INCREASING THE RATE OF GROWTH OF THE ECONOMY

Some institutional changes to pension programs may increase the total income available to support the retired. Whether those changes facilitate capital formation by increasing savings, by encouraging the development of more efficient capital markets, or removing distortions in the labour market, the permanency of their



impact on economic growth rates is unknown. Any increase in the growth rate, however, will increase the total goods and services available within a society at the time of that growth. How this affects the share of total production going to support the retired is unclear.

If increased economic growth affects one or more of the ratios outlined earlier, it will also change how the total production is distributed among workers and retirees. In this environment, factors affecting the three ratios include: increased savings rates (which reduce the amount of economic activity devoted to consumption); decreased living standards for retirees in relation to the general population (which would reduce the share of output to retirees); and increased living standards for workers (which could prompt an increase in early retirement, and, in turn, increase the dependency ratio).

## SUMMARY

Supporting the elderly involves the transfer of income from workers to retirees. While voluntary, intra-family transfers still occur within households, mandated contribution programs and the exchange of assets from retirees to workers have taken over as the predominant means of creating this transfer. In any case, workers consume less so that retirees can consume more than if they were left to support themselves.

The cost of supporting the retired is the product of three economic and demographic ratios: the aggregate consumption ratio; the retiree dependency ratio; and the living standards ratio. The second and third ratios have the most impact on this cost. Changes to the cost of support are always reflected in changes to at least one of the ratios.

Since most developed countries have growing numbers of retirees and decreasing birth rates, much of the current debate over pension policy centres on managing the increased costs associated with these phenomena. Factors such as increasing the age of retirement, reducing retirement benefits, shifting responsibilities to the private sector and the impact of accelerating economic growth are all considerations, although the impact of each can be difficult to predict.



# *The Effect of Pensions on Savings and Investment*

## INTRODUCTION

One of the most hotly debated topics in pension policy is the impact on national savings of government intervention in pension systems. There are two fundamental questions:

- 1) Have national pension programs reduced national savings below what would have prevailed in the absence of a pension program?
- 2) Are government actions to promote pension savings to improve retirement incomes distorting other aspects of the savings/investment economy?

These questions are important to governments because economists have already proven direct links between national savings, investment and long-term economic stability.

## HOW PENSIONS AFFECT PERSONAL SAVINGS — PREDICTIONS FROM ECONOMIC THEORY

Economic theory offers no clear predictions, but does suggest some factors to consider.

**The life-cycle theory of consumption** holds that people save while employed and spend those savings after retirement. This theory predicts that, in the absence of government intervention, a nation's accumulated stock of savings (its aggregate wealth) at any given time will be determined largely by its retirement patterns. A society's total wealth depends on the ratio of saving workers versus spending retirees. In a mature economy in the past, this ratio has been almost even. However, imbalances between the two, stemming from population changes (demographics), economic growth or non-growth and retirement preferences (e.g. early vs. late), can significantly change the nation's aggregate wealth and future economic capacity.

Other reasons for consumer saving can impact the life-cycle theory as well. For example, some individuals may save solely for the purpose of leaving money to their heirs, while others may increase their savings because they are uncertain about the future — how long they will live, how long will their savings last, how much will health care cost them, or how much will long-term care cost them if needed.

### Potential impact of introducing a national pension plan

The impact of the national pension plan depends on how workers change their savings behaviour as a result of the plan. Economists assume that workers who are asked to make mandatory contributions to a pension program will view these contributions as a substitute for some of their own personal savings and subsequent future benefits. If workers then adjust their savings accordingly, pension plans should have no effect on total savings. However, certain conditions must be present to achieve this effect, and most pension plans are designed to intentionally depart intentionally from one or more of these conditions.

### The effect of higher mandatory contributions

Mandatory contributions often force lower income workers to contribute more than they would have saved on their own. With less disposable income, they spend less and increase national savings. This can be offset, though, if they incur debts to maintain their consumption levels. Other workers may plan to retire earlier with more income than would have been possible if operating independently. These people may increase private savings to supplement public retirement benefits, and therefore increase national savings.

### The effect of the relationship between benefits and contributions

Most national pension plans offer some workers higher benefits than they would have been able to obtain on their own in the private market. Typically, these are lower paid workers and those in the workforce when the plan was established. Those workers in higher paid jobs and industries, can expect to receive less benefits than they would have earned in the private market. In many mature national pension plans, the majority of workers entering the workforce now can expect to find themselves earning less than they could on their own. Workers' behaviour in these two situations differs. Those in the lower income group increase their consumption in anticipation of increased pension income, while those in higher income jobs tend to save more to offset the loss of benefits they will get by being forced to participate in the public retirement income system.

### Pension plans do not affect society's total savings if:

- *mandatory contributions are less than or equal to amounts workers would have saved if no pension plan existed;*
- *the relationship between benefits paid vs. workers' contributions equals that of the private market;*
- *the pension plan accumulates and invests assets in the same way individual workers would have; and*
- *the creation of the plan does not have a negative effect on the public's desire to save for future uncertainties.*



The net effect of differences between benefits and contributions will depend on the relative strength of the offsetting reactions of these two groups. In countries with mature systems, the net effect should be an increase in national savings due to the large-size and higher incomes of the group seeing returns below private-sector levels. The net effect is likely to be a net reduction in savings where the national pension system is new, and most participants expect above-market returns.

### The effect of differing asset accumulation patterns

National pension plans usually operate on a pay-as-you-go basis, whereas the private savings plans are, by definition, advance-funded. In advance-funded plans, during the start-up phase, almost no benefits are paid as contributions are made to finance the accumulation of wealth. Only after the system matures are retirees able to draw down their accumulated retirement assets. In the pay-as-you-go plan, early contributions are collected at a lower rate and are used to finance higher benefit payments to initial retirees, and as the system matures, the contribution rates rise and may exceed the contribution rates under advance funding. In principle, the advance-funded approach should generate additional savings during the start-up phase through two mechanisms: higher initial contribution rates for workers; and lower benefits paid to retirees.

### The effect on incentive to save for uncertainties

National social welfare systems often reduce the uncertainties that workers face. National pension plans are indexed and paid as annuities, eliminating the uncertainty of pension income regardless of how long a person lives. National health-care systems reduce concerns about future health-care needs and some systems also provide for long-term care of frail seniors. These policies reduce uncertainty and threat, and therefore reduce incentives to save for contingencies.

## HOW PENSIONS AFFECT PERSONAL SAVINGS: STATISTICAL EVIDENCE

Attempts to measure the impact of pay-as-you-go and advance-funded pension plans on savings behaviour have failed — statistical evidence is difficult to measure due to the number of variables, and measures of trends in national savings are not clear.

However, there is some agreement that studies do not support the idea that national savings rates have dropped from the introduction of pay-as-you-go pensions. And while advanced-funded pensions seem to have a more positive impact on national savings rates at start-up, statistics do not provide sufficient evidence to clearly state their net impact on the economy.

## Growth in Private Pension Assets Relative to Gross National Savings, 1971-91

Country	Gross Saving (% of GDP)		Pension Assets (% of GDP)				
	1971-80	1981-88	1970	1980	Change (1979-80)	1991	Change (1980-91)
Canada	23.1	20.3	14.2	18.7	4.5	35.0	16.3
Denmark	20.3	15.0	18.8	26.3	7.5	60.0	33.7
Germany	23.7	22.2	2.6	2.6	0.0	4.0	1.4
Japan	34.4	31.4	0.0	3.2	3.2	8.0	4.8
Netherlands	23.9	22.3	29.0	46.0	17.0	76.0	30.0
Switzerland	28.0	28.4	38.0	51.0	13.0	70.0	19.0
United Kingdom	17.7	16.8	20.7	28.1	7.4	73.0	44.9
United States	19.5	16.1	29.3	40.7	11.4	66.0	25.3
France	25.4	19.8	0.0	1.0	1.0	3.0	2.0

Source: Dean, Durand, Fallon and Hoeller, "Saving Trends and Behaviour in OECD Countries", OECD Economic Studies, No. 14, Spring 1990, Table 1, p. 14; Averting The Old Age Crisis, World Bank, 1994, Table 5.2, p. 174.

Recent experience in Organization for Economic Cooperation and Development (OECD) countries further fail to establish a concise relationship between accumulated assets in pension funds and national savings rates. In a widespread review of OECD savings patterns, growth of public pensions was only one factor among many that may impact savings. Furthermore, these pension policies may affect national savings through government budgets as much as through changes they cause in private savings rates.

### SUMMARY

This review suggests that no single pension approach can be statistically justified over another solely to increase national savings rates. Economic reasoning can not be relied upon to conclude that a national pension system will have a particular impact on the national savings rate.

Studies suggest that pension policy is only one of many factors influencing national savings rates. Policy changes intended to increase the national savings rate will need to consider a variety of factors, including: tax and fiscal policies; internal structure; financing and credit market policies; as well as the benefits to the system of retirement income and security.

One of a series of nine Summary Papers prepared for the Stockholm Initiative project, The Social Security Reform Debate: In Search of a New Consensus.



# The Effect of Pensions on Labour Supply

## INTRODUCTION

Pension programs can affect individual labour supply decisions through both the benefits they provide and the contributions levied to finance those benefits. Both the benefits and the need to contribute may reduce people's willingness to work. At the same time, people may choose to evade pension contributions by working in sectors where enforcement of contributions is lax and productivity is lower. These types of behaviours artificially increase the cost of supporting the retired population by reducing the productivity in the economy.

There are two kinds of challenges in trying to assess the impact of public pensions on labour supply:

*The challenge for governments is to find the contribution/benefit formula that has the least impact on the economy and people's willingness to work.*

- 1) Limitations in data, statistical techniques and behavioural theories that make it difficult to understand the links between public pension programs and worker behaviour; and
- 2) The need to determine which impacts are intentional and desirable, and which are unintentional and undesirable.

Mandatory pension programs are created by governments to change the way labour markets operate. They force workers to save for retirement during their working years and allow them to retire earlier and/or with higher incomes than if the pension programs were not in place. If a pension program achieves this result with no other impact on labour markets, then any reduction in labour supply that it causes must be viewed as producing an increase in the general social welfare. If, however, changes in contribution rates or benefits produce an unintended change in worker behaviour, this would be an economic cost.

This paper examines:

- 1) The current understanding of the link between pension programs and labour supply;
- 2) The statistical evidence available; and
- 3) The policy implications.

## PREDICTIONS FROM ECONOMIC THEORY

As with saving behaviour, it is not possible to predict in advance how the creation of a mandatory system will affect labour supply.

### Unrelated taxes and payments

The deduction of pension contributions from a worker's pay essentially reduces the worker's hourly wage and requires him/her to work longer hours for the same take-home pay. This could, therefore, increase the incentive to work. However, this could also create a disincentive to work since the net gain the worker gets from working more may not create enough additional income to warrant the extra effort. The presence of these pension plan deductions can also produce incentives for workers to work in sectors where mandatory contributions are non-existent or poorly enforced.

The impact of benefit payments is less ambiguous. They increase the income of recipients allowing them to retire without losing as much take-home pay. The benefit payment structure usually encourages certain types of behaviours and is, therefore predictable. For example, if benefits are not paid to those who have earnings above a certain level, people will keep their incomes below that level. Work effort is discouraged in both these cases, but the result of decisions are predictable.

### Benefits and contributions linked

When people view pension plan contributions as a method of forced savings, it is unlikely to change their work behaviour. They view the pension plan in the same way they view savings for retirement. When workers view the pension program in this way they are also unlikely to seek work in areas where contributions can be avoided. At the same time, this view of the pension program should have no effect on retirement decisions. As workers approach retirement age, the prospect of collecting benefits should encourage them to retire.

### Strengthening the contribution-benefit link

When people can see the direct link between contributions and benefits, they are more likely to view the pension system in positive terms and relate contributions to a forced savings model. However, if the link between pension savings and benefits is not clear to them, or the plan does not appear to relate work effort to benefits, they are more likely to see the pension program as a tax and, therefore, a mandatory burden. If they see the plan as a tax, and particularly if they cannot see the relationship between work effort and potential benefits, they are more likely to reduce their work effort or shift out of the formal labour market.

*The impact of public pension programs on labour supply depends on:*

- *The time horizon people use to make decisions;*
- *The structure of the pension plan;*
- *Popular perceptions about how the plan is managed and financed;*
- *Social norms; and*
- *Views about whether the plan is a forced savings system or a government tax and benefits system.*



## ANALYSIS OF LABOUR SUPPLY EFFECTS

Few studies exist that probe how perceptions about the pension system shape worker behaviour and, therefore, the labour market impact of different pension approaches. The link between pension plan structure and compliance rates is discussed often, but little has been done to validate with research. It is believed that a closer benefit-contribution link would increase compliance incentives, but no one knows whether this would improve it a great deal or a little.

The studies that have been done fall into two groups:

- 1) Examinations of the impact of income and employment taxes on labour supply of working-aged people. They examine the combined impact of both pension contributions and all other taxes that rely on individual earnings and most are not able to distinguish between them.
- 2) Examinations of the factors influencing retirement behaviour. These usually focus on how workers respond to changes in benefit amounts and changes to how benefits will be paid. Most of these studies rely on data from a limited number of developed countries. They are not able to assess whether worker behaviours would be the same if no pension program existed.

### Tax impact

Studies have found that among people whose work provides the main source of support for themselves and their families, employment taxes have little or no impact on work effort. However, employment taxes are likely to cause a reduction in work effort of workers who are not the primary earners. The degree of work reduction ranges from 2-10% in response to a 10% reduction in net earnings. Although these reductions are not large, they do represent a social welfare loss which needs to be weighed against the welfare gains produced by pension systems and other social welfare programs.

### Retirement behaviour

Studies of the factors that influence older workers to retire have demonstrated that the decision process is complex.

These studies suggest:

- Social norms: the age people are expected to retire and when benefits are first available appear to have the most impact on when people retire. Changes to the amounts in benefit payments seem to have less of an impact. It would appear that the age of eligibility/entitlement is a social signal for many people.
- A combination of higher benefits and deteriorating health is a particularly powerful combination that encourages retirement. Increased benefits on their own have a much more modest effect.
- Estimates from the United States and Japan suggest that raising the age of retirement eligibility by a couple of years would only change actual retirement age by a few months.

*Pension contributions are more likely to be perceived as a burden if the rate of return is seen as substantially lower than the rate of return they could have gained from private investments. When the pension program tries to address things like low lifetime earnings, periods of unemployment, child care responsibilities etc., workers are more likely to view the system as a tax.*



- Where private pensions play a major role in the retirement income system, their availability and generosity appear to exert an independent impact on retirement behaviour. As private pension systems mature, they become a more powerful influence on retirement decisions than the public pension system.
- Where countries limit the amount people can earn and still draw their maximum benefit, the limit appears to provide a fairly significant work disincentive. Many pensioners appear to reduce work effort to avoid losing pension benefits.

*What determines decisions to retire:*

- Age;
- Availability of retirement benefits;
- Health;
- Level of retirement benefits the worker expects;
- Other sources of income; and
- Any earnings limitations imposed as a condition for receiving benefits.

## SUMMARY OF POLICY IMPLICATIONS

A careful review of what is known about the impact of public pensions on labour supply raises as many questions as it answers.

Pension programs are created in part to correct market failures. The assumption is that many workers would not save enough during their working years to adequately pay for their retirement. It should then be expected that the creation of a pension program will reduce work effort as a person reaches retirement age. The evidence suggests that this is indeed the case. However, such programs also have unintended effects on work decisions.

Other effects of pension programs on labour supply decisions include the following considerations:

- A combination of higher benefits and deteriorating health is a particularly powerful combination that encourages retirement. Increased benefits on their own have a much more modest effect.
- Mandatory contributions have little impact on the work decisions of primary earners; but do discourage work among secondary earners.
- Mandatory contributions may create an incentive to evade contributions by moving to the less formal economy.
- Making strong links between contributions and benefits may offset work disincentive effects, but no one is able to say by how much.

As populations age and retirees live longer, the economic cost of supporting retirees will increase. This cost increase will likely have to be offset by a combination of increases to the age of retirement and/or reductions in the standard of living of retirees in comparison to the working age population.

If countries hope to achieve this fiscal adjustment through a change in retirement age, they will need to seriously consider changing the age at which benefits first become available.

Provisions in benefit systems that condition benefits on earning less than a certain amount also discourage work among those approaching retirement. Removing them is likely to increase work effort among those reaching retirement age.



# *Public Pensions and International Competitiveness*

## INTRODUCTION

Recently there has been a great deal of concern about the impact of high social security pension costs on international competitiveness. Put simply, the fear is that high social security contributions cause high labour costs, which force the prices charged by domestic manufacturers to rise above those charged by foreign manufacturers. The result would be a loss of export markets, an increase in the volume of imports, a movement of domestic plants abroad, lower domestic wages and higher domestic unemployment.

This summary paper explores the institutional and economic factors which might lead to a link between pension contribution rates and international competitiveness. It examines:

- the relationship between pension contributions and employers' costs; and
- the link between domestic employer costs and international competitiveness.

## SOCIAL SECURITY AND INTERNATIONAL COMPETITIVENESS

### What is international competitiveness?

Societies grow, develop new products, expand trade and enrich the lives of their citizens at various rates. Although the term is rarely defined with precision, those who worry about international competitiveness seem to be concerned that a lack of competitiveness will lead initially to a decline in the number of highly skilled, high wage jobs and, eventually, to declines in living standards relative to other more competitive countries.

There are a number of explanations for growth and development. The relationship between pension contribution costs and international competitiveness seems to follow classical analysis, which maintains that trade patterns mirror the labour costs of different industries in different countries. But this analysis assumed a static world in which products and technologies changed very slowly, if at all. This analysis was not able to explain many of the international differences in rates of growth and development. It is evident that other factors must also be involved.

The Institute for Management Development in Lausanne, Switzerland analyses competitiveness using eight factors:

1. The robustness of each nation's domestic economy;
2. The quality of its basic and technological infrastructure;
3. International trade and financial transactions;
4. Quality of private-sector management;
5. Government fiscal policies;
6. Domestic research and science activities;
7. The cost of capital; and
8. The size and quality of the workforce.

Labour costs clearly influence international competitiveness, but they are only one of many such influences.

### *Employees Pay for Increases to Social Insurance Contribution Rates*

*In a free market economy increases to social insurance rates are born by employees in the form of lower real wages.*

*Employers pass on these costs to employees by lowering real wages, they increase prices or they do both.*

## LABOUR COSTS AND SOCIAL INSURANCE CONTRIBUTION RATES

### Adjustments in a free market economy

In a free market economy, traditional analysis holds that increases to social insurance contribution rates are born primarily by employees in the form of lower real wages. This means that, in a free market economy, social insurance charges have no significant impact on either employer costs or employer demand for labour. Study of the Chilean reform has demonstrated that employees bore the entire burden both before and after the reform.

The reason that employees bear the cost is because the supply of labour rarely changes in response to changes in take-home pay. The supply of capital does shift and taxes could not easily be shifted onto owners of capital under any circumstances.



In a free market economy, if pension contributions collected from employers increase, that cost is slowly passed on to employees who experience a loss in real wages. If workers resist this slowdown, employment costs will rise, at least temporarily. This then pushes employers into reducing employment which, in turn, causes unemployment to rise. At the same time, employers may introduce price increases which result in reduced consumer demand, which also increases unemployment. In both cases, the increase in unemployment slows down the growth of wages until employer costs are brought back to the level they would have been if contribution rates had not changed. If employers have introduced higher product costs to offset the increase in social security pension contributions, when relative prices are restored the general price level will be somewhat higher.

### Impact of barriers to adjustment

Governments can interfere with the free market adjustment process. Two potential sources of such interference are minimum wage provisions and effective anti-inflation policies.

Minimum wage levels, provide protection to low wage earners and reduce the employer's ability to pass through the increased costs. Since the pay of those working at minimum wage cannot be reduced, the cost of employing these workers goes up, driving up unit labour costs. Employers may, however, cut back on the number of minimum wage workers they employ to offset the increased labour costs. Minimum wage regulations do nothing to change the effect of increased social security costs on the real wages of other workers.

*Effective anti-inflationary policies* can slow the free market adjustment process, leaving employers with higher costs for a longer period of time. These higher costs are also likely to result in higher unemployment.

### LABOUR COSTS, FLEXIBLE EXCHANGE RATES AND INTERNATIONAL TRADE

The classical model maintains that even if pension contribution rates cause increased labour costs, international competitiveness and manufacturing locations would remain unchanged. This is because the model assumes that a currency's exchange rate is determined by supply and demand for that currency. At the same time, the model maintains that supply and demand is primarily determined by trade flows. Any increase to a country's general price level would be offset by a lower exchange rate for its currency, leaving trade patterns, export markets, and manufacturing location decisions unaffected.

The relationships of the classic model probably still hold true over the long-term. Differences in domestic inflation rates and in rates of growth of labour productivity seem to be reflected in the exchange rates prevailing between different currencies. But it is increasingly clear that the influence of these factors can be overshadowed during relatively long (a decade or more) short-run periods. International movements of capital in and out of currency markets can interfere with

exchange rates, causing manufacturing costs to fluctuate independently of labour unit costs. These movements can be so significant, in fact, that changes to pension contributions are completely overshadowed by other factors. To date, explanations for these movements remain unclear.

### Labour costs when exchange rates are fixed

Some countries interfere with foreign exchange markets by establishing fixed rates for their currency. Currently many countries in the European Union are attempting to maintain a type of fixed exchange system amongst themselves and, to create the ultimate fixed system, a single currency. In other countries, currency values can be tied to another country's currency value — typically the French franc or the U.S. dollar.

When exchange rates are fixed, adjustments to offset trade flow imbalances do not occur. In addition, participating countries are forced to merge inflation rates, and significant cost differentials can lead to the only adjustment mechanism – through policies aimed directly at those cost differentials.

*Economists suggest the following may influence international competitiveness:*

- *The role of the socio-economic environment in encouraging economic development;*
- *the role of entrepreneurship; and*
- *the importance of technical advancement and know-how.*

### SUMMARY

A variety of factors contribute to determining a country's competitiveness. Relative business production costs are one of these factors. Where costs differentials are not great, they may not be an important factor. If the cost differential is substantial, it will likely have an impact on international competitiveness owing to their impact on relative business production costs.

In a free market economy, pension contribution rates are unlikely to have any particular relationship with international competitiveness.

Increases to pension contributions can adversely affect international competitiveness if they occur in the presence of three other government policies:

1. Labour market policies that interfere with downward wage adjustments;
2. Price level policies which interferes with upward price adjustments; and
3. Foreign exchange policies that fix the value of a country's currency to that of its important trading partners or competitors.

Statistical correlations relating one set of international competitiveness scores to measures of social security spending and employer contribution rates suggest both positive influences from spending and negative influences from employer contributions. If these results are reliable indicators, both mindless cutbacks in social security spending and an attempt to shift too much of their costs onto employers may be detrimental to international competitiveness.



### Comparison of International Scores with Social Security Spending And Employer Tax Rates, OECD Countries

Country	Score	Social Security As Percent of GDP	Employer Contribution Rate
United States	100.00	15.20	13.35
Finland	70.80	38.97	22.00
Norway	70.61	19.93	14.20
Netherlands	70.29	31.70	10.75
Switzerland	69.80	20.53	7.74
Japan	68.71	17.88	14.38
Canada	67.76	22.84	8.40
United Kingdom	67.26	21.60	10.20
Luxembourg	66.40	29.92	13.00
New Zealand	66.17	18.89	1.85
Germany	64.45	26.33	17.99
Sweden	59.56	40.05	30.96
Australia	58.59	11.75	0.00
France	58.37	24.12	34.31
Austria	57.63	25.65	25.30
Iceland	55.20	7.15	15.75
Spain	48.75	22.60	32.00
Portugal	35.12	14.84	26.75
Italy	34.67	12.40	47.62
Greece	33.14	19.79	23.90
Turkey	32.78	5.11	19.50

*Source and Concepts:*

*International competitiveness scores are from World Competitiveness Yearbook, 1997, International Institute for Management Development (IMD), Lausanne, Switzerland, 1997, <http://www.imd.ch/wcy/factors/overall.html>. The calculation of the competitiveness index used to generate country scores was based on 220 indicators of international competitiveness. All indicators are listed and defined on IMD's web pages.*

*Social security as a percent of GDP data are from The Cost of Social Security: Fifteenth International Inquiry, 1990-1993, International Labour Organisation, 1997, <http://www.ilo.org/public/english/110secso/css/cssindex.htm>.*

*Employer Contribution Rates are from Social Security Programs Throughout the World, 1995, US Social Security Administration, July 1995, Table 3, p. xliii.*

# Setting Pension Contribution Rates

## INTRODUCTION

One of the more confusing aspects of debates over the structure of public pension plans involves the relationship between pension financing strategies and their associated contribution rates. This paper focuses on various economic, demographic and institutional factors influencing contribution rates. The analysis looks at the contribution rates produced in different economic and demographic situations.

The strategies used to set pension contribution rates differ in two important ways:

- i) whether the calculation focuses on the contributions and benefits for a group of workers or for each worker individually; and
- ii) whether the calculation seeks to balance income and outgo at a particular point in time, or seeks balance over a period of time.

This paper focuses on the factors affecting contribution rate differences between various pension system approaches. There are three approaches to pension system management:

- 1) **Advance funded individual savings plan**, referred to as “defined contribution” plans (DC plans) because the plan specifies a contribution rate but not a pension amount. Under these plans, contribution rates are calculated to ensure that **each worker** will contribute enough over his lifetime to **finance his own pension**. The focus is the individual and the time period of that individual’s life span.
- 2) **Pay-as-you-go, defined benefit group pension plans** (PAYG plans) are those in which the benefits are defined but not the contribution rates. Under these plans, contribution rates are calculated so that **workers as a group** will contribute enough each year to finance the pensions of **current retirees as a group** in that same year. The focus is the group and the time period is the current year.
- 3) **Advance-funded, defined benefit group pension plans** (DB plans), commonly found in occupational pension plans, mix elements of the two. Benefits are defined as they are with the PAYG plan, but assets used to finance pensions are collected in advance. Under these plans, employers and workers have to calculate what **workers as a group** would have to contribute over the **lifetime of the group** to finance the **group’s own pensions**. In practice, the calculations are usually adjusted to smooth out differences in rates between various groups. The focus is on the group and the time period is the lifetime of the group.



Various economic, demographic and institutional factors influence pension contribution rates.

## THE SIMPLE MODEL

In order to understand how factors influence the contribution rates in each of these approaches, we have to start with a simple model. It assumes:

- all people start working on their 22<sup>nd</sup> birthday, work full time for 43 years, and retire on their 65<sup>th</sup> birthday;
- retirees receive an annual pension for 17 years and die on their 82<sup>nd</sup> birthday;
- everyone who works earns the same amount every year;
- retirement benefits = one half of workers' wages (any changes to wage levels is also reflected in retirement benefits);
- pensions are financed entirely through contributions (and, where applicable interest earnings); and
- there is no inflation.

This model also assumes that:

- i) wage levels do not change;
- ii) the interest rate is zero; and
- iii) the population is constant (i.e., the number of people born each year equals the number of people who die each year).

## THE CALCULATION IN THIS SIMPLE MODEL:

### For the Defined Contribution Plan:

An individual making \$10,000 per year will have to save \$85,000 (1/2 of \$10,000 x 17 years) to finance his own retirement. Based on the earlier assumption that everyone works for 43 years, that means \$1,976.74 (\$85,000/43 years) or **19.8% of a worker's salary** must be set aside each year.

A system based on this kind of advanced savings will not reach maturity for a number of years. In the model outlined here, it would be 60 years before the first group would have spent their entire life times under the system. Once the system reaches maturity, this simple system can continue to function indefinitely in a completely balanced manner. The pensions are being financed entirely through the transfer of assets from retirees to workers, and the volume of assets being sold each year by retirees exactly matches the volume being purchased by workers.

### For the PAYG Plan:

Assuming 1,000 births per year, workers (43 years x 1,000 births per year = 43,000 workers) will have to contribute a portion of their salary to finance benefits for all those retired (17 years x 1,000 births = 17,000 retirees). That works out to (17,000 x \$5,000/43,000 contributors = \$1,976.74) 19.8% of each worker's salary.



Under this system, soon after the plan is started full pensions can be paid to either newly retiring workers or to the entire aged population. However, no financial assets are accumulated during the start-up phase of the plan.

*Under this very simple model, contribution rates for government-mandated individual savings plans are equal to contribution rates for PAYG plans.*

*Changes to wage rates and interest rates are the most important variables affecting defined pension contribution plans.*

## THE IMPACT OF ECONOMIC AND DEMOGRAPHIC VARIATIONS

Changes to economic and demographic assumptions cause dramatic but different changes to the contribution rates under the different types of plans.

Contribution rates under **PAYG plans** are sensitive to changes in the **birth rate**, but as long as benefits are updated to reflect prevailing wage levels, are not sensitive to the growth in wage rates or interest rates.

When the birth rate goes up, there are more workers in relation to retirees, and contribution rates for workers go down. When birth rates decline, contribution rates for workers have to go up to ensure that the pensions for the increased number of seniors being supported by the plan can be paid.

**In contrast**, contribution rates under government-mandated **individual savings plans** are sensitive to changes in **interest rates and/or wage growth rates**, but are not sensitive to changes in the birth rate.

If interest rates go up, individuals will be earning higher interest on their savings for retirement and this can reduce the amount they need to contribute. If wage levels go up, individuals have to increase their contribution rate to ensure they still have the equivalent of half their salary to live on after retirement. When the higher pensions, caused by wage-level increases, must be paid from accumulated savings, the effect of wage increases can be offset only by increasing the required contribution rate. In this model, as interest rates go up, asset accumulation goes down.

The contribution rates required for both **individual savings plans and advance funded group occupational pension plans** are controlled by the interaction of wage growth rates and interest rates, but are not affected by the birth rate.

*The important variable driving the pay-as-you-go contribution rate is the birth rate and, to some extent, the death rate.*

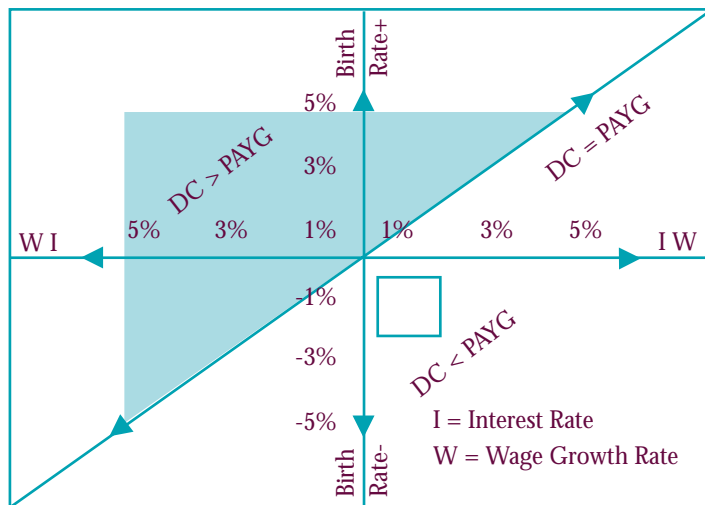
## CONTRIBUTION RATE COMPARISONS

Factoring economic and demographic changes into the simple model, contribution rates for government-mandated individual savings plans will only equal contribution rates for PAYG plans when the rate of growth of births is the same as the ratio of interest rates to wage growth rates.

Since birth rates have fallen in most Organization for Economic Cooperation and Development (OECD) countries over the last 30 years and wage levels have slowed, PAYG plan contributors are now facing higher contribution rates than those paying into Defined Benefit/Individual Savings Plans.



**CHART 1: Interaction of Contribution Rate Variables**



These trends provide part of the explanation for increased interest in making greater use of the advance-funded approaches to financing pensions.

The interaction of these variables is demonstrated in Chart 1.

### OTHER FACTORS THAT INFLUENCE CONTRIBUTION RATES

There are many differences between the simple model and the real world. For example, interest rates fluctuate constantly, people die before retirement (or long after), and there are administrative costs tied to the various pension plan options.

### Mortality

When workers die at any stage in a DC program, they have accumulated assets that become part of their estate. In PAYG programs, early deaths mean benefits go back into the system and help reduce the contribution rates for others. In the advance-funded, defined benefit group pension plans, the amount returned to offset the contribution rate of the plan depends on the details of the plan. Often, these plans give the surviving spouse 50% of the asset and the remainder is returned to the plan.

For the most part, however, early deaths are not as much of an issue in today's environment as longer life spans. Retirees who are expected to live longer require benefits for longer periods of time, which results in higher contribution rates. This is true for defined benefit individual savings plans, PAYG plans, and advance-funded, defined benefit group plans.

### Administrative expenses

Pension system administrative expenses vary widely from one country to another, and from one institution to another within a particular country, making generalizations risky.

However, the data suggest that administrative costs are generally higher for decentralized systems of individual financial accounts than for large group pensions plans. At the same time, there is evidence that it costs more to administer group pension plans when managing investment portfolios are part of the plan.

Administrative costs for PAYG plans in most OECD countries are roughly 0.7% of contributions and this is lower than it is in most developing countries.

Administrative costs for advance funded plans is usually expressed as a ratio to assets managed. In the United States, this is about 0.5% of assets. In comparison, the administrative costs of individual mutual fund accounts are about 1.0% of assets. Even the largest of the Chilean pension funds has administrative expenses in excess of 1% of assets, and average management fees in the system as a whole are probably above 2% of assets.

### Cost of individual annuities

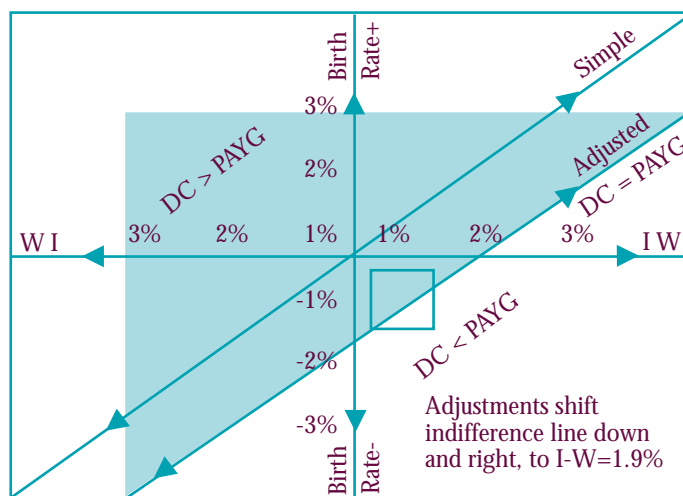
PAYG plans pay benefits in the form of annuities as do most advance-funded group pension plans. Practices vary regarding government-mandated individual retirement savings plans.

In the United Kingdom, holders of government-mandated individual savings plans are required to annuitize at least part of their assets. In contrast, the individual plans being constructed in Latin America tend not to require that benefits be taken in the form of life annuities, though they may offer that option. Private sector sellers of individual annuities must charge more for these annuities than is charged by the PAYG plans due to the effects of adverse selection, as discussed in the Summary Paper “Maintaining Adequate Incomes During Retirement”. The difference between the pure annuity figure and the amount the individual pays on the single premium annuity market may be as much as 25%.

### ADJUSTING THE SIMPLE MODEL RESULTS

Table 1 and Chart 2 show the effect of plausible adjustments for each of the factors identified. For these purposes, pay-as-you-go pension system administrative costs were assumed to be up to four times higher than the US/Japanese/Swiss experience, while those of advance-funded group and individual plans were assumed to be substantially below the UK or Chilean experience, instead mirroring US private sector experience and ignoring security trading costs. Individual annuities purchased under the individual savings approach were assumed to cost 0.15% of assets.

**CHART 2: Interaction of Contribution Rate Variables After Adjusting For Mortality and Administrative Costs**



When taken together, the adjustments discussed in this section have a measurable impact on some of the contribution rate differences seen in the simple model as shown in Table 1.

**SUMMARY**

Contribution rates under all pension plan approaches examined in this document are sensitive to their particular determining economic and demographic variables. The important variable driving the pay-as-you-go contribution rate is the birth rate and to some extent the death rate. Changes to wage rates and interest rates are the most important variables affecting defined benefit pension savings plans and advance-funded group pension plans. Changes to wage rates and interest rates are significantly more volatile than birth rates. Administration costs and the pooling of pre-retirement mortality reduce the contribution rates required under either of the group approaches relative to the individual savings approach.

**TABLE 1: Adjusting Contribution Rates for Realistic Mortality Assumptions, Program Administrative Expenses and Adverse Selection Costs**

Assumptions: Birth Rate is constant; Wage Growth Rate = 0; All persons die at age 82

	INTEREST RATE = 0.0%	1.0%	2.0%
<b>Base Scenario</b>			
PAYG	19.77%	19.77%	19.77%
DC	19.77%	14.57%	10.64%
Advance DB	19.77%	14.57%	10.64%
<b>Above Plus Administrative Costs</b> (3% of contribution for PAYG; 1% of assets for DC; 0.5% of assets for DB)			
PAYG	20.36%	20.36%	20.36%
DC	26.55%	19.77%	14.57%
Advance DB	22.94%	16.99%	12.47%
<b>Above Plus Plus Annuity Fee</b> (0.15% of assets for DC only; 0 for PAYG, Advance DB)			
PAYG	20.36%	20.36%	20.36%
DC	31.23%	23.26%	17.14%
Advance DB	22.94%	16.99%	12.47%
<b>Above Plus Early Mortality</b>			
PAYG	17.86%	17.86%	17.86%
DC	32.87%	23.83%	17.16%
Advance DB	*	*	*

Source: Author's Calculations

\* Depends on how plan treats pre-retirement death



# Choices of Pension Approaches and Transitions between Approaches

## INTRODUCTION

Government-mandated pension plans exist, first and foremost, to provide some assurance of adequate incomes for citizens in retirement. Government-mandated retirement schemes have typically chosen one of three approaches:

- **universal pension programs** – offering benefits to all seniors which may or may not be income tested;
- **contributory, defined benefit pension plans** – offering benefits only to those who contributed/worked; and
- **defined contribution plans** – usually sponsored by employers or individual workers and offering benefits based on contribution and investment returns.

Each approach has advantages and disadvantages. The approach chosen in a particular nation usually is determined by the country's social and economic goals.

The debate over the structure of social security pensions involves concerns about the most desirable structure for the long-term and the issues involved in transitions from one approach to another. This brief looks at the issues involved in:

- i) selecting an initial approach; and
- ii) the transition from a pay-as-you-go approach to an advanced-funded approach.

## SELECTING AMONG THE BASIC APPROACHES

To establish a new public retirement program requires governments to select an option best suited to their society's social and economic needs.



## Factors determining selection

The decisions around the selection of an approach usually depends on the following five elements:

- 1) Social attitudes toward issues like the relative importance of group cohesiveness and individual choice; the desirability of a close link between past contributions and current benefits; and the acceptability of application of income testing to a large portion of the population.
- 2) The society's views on the desirable pace for phasing in both benefits and the mechanisms for raising the required revenues, whether from worker and/or employer contributions, the general budget or other private sector sources.
- 3) Opinions about the wisdom and potential value of using pension institutions to achieve other social goals, such as infrastructure investment, increased national savings rates, or the development of financial markets.
- 4) Assessments of the likely relationship between pension arrangements and future tax or contribution rates, especially whether or not advance-funded pensions are likely to involve lower taxes or contributions.
- 5) The degree of trust the public is willing to put in the government, on the one hand, and private financial market institutions on the other.

**Initial decisions** are more likely to reflect the society's social philosophy, practical issues involving the pace of implementation and, in some cases, the need to assemble resources for infrastructure investment. No matter which approach is taken initially, these decisions are likely to be revisited some years later because of changes in social philosophy or greater weight being assigned to other potential objectives.

## The start-up phase

The three approaches discussed in this paper differ significantly in terms of how quickly pensions are phased in for retirees and the pace at which contribution rates rise to their maximum. Chart 1 shows these differences.

The **universal approach** allows immediate full benefit payments to all those over the statutory retirement age when the system starts. This type of system matures instantly. The tax rate required to finance the system also jumps immediately to its ultimate level. Benefits are usually lower for these plans than they are for contributory plans.

A **contributory pay-as-you-go approach** does not pay benefits to those who have already retired when the system starts. Usually, newly retiring workers are given full credit for previous employment. The result is that pension payments begin shortly after the system is started and rise steadily thereafter. Both contributions and benefits rise at the same pace when this approach is used. Payments reach 90% of their ultimate value some 26 years after the system begins.

When using the **defined contribution, individual savings approach**, benefits are only paid to those who have made contributions. There is no compensation, however, for prior employment, and those who retire shortly after the plan's inception receive smaller benefits to reflect their brief contribution period.

Contributions are set at their ultimate level as soon as the plan is started, but benefit payments will not reach half their ultimate level until 25 years or more after the program starts, even though 90% of retirees will be collecting some benefits. Using this approach, countries build an immediate asset pool, but there is a substantial delay between plan start-up and adequate benefits for retirees. It takes more than 50 years into the plan for pension benefits to reach maximum payout.

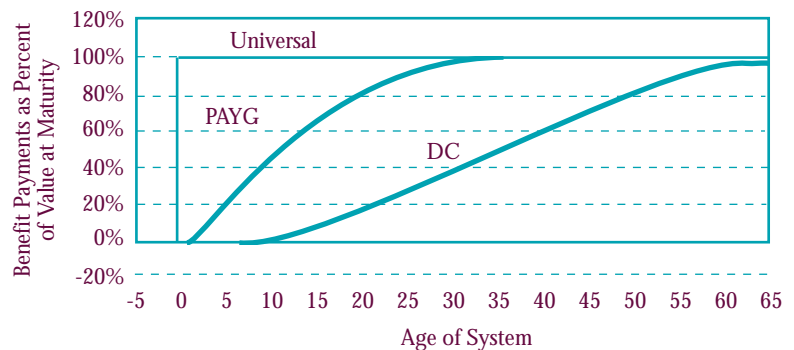
Neither of the contributory approaches are effective in dealing with the income needs of the current elderly. The pay-as-you-go approaches can be phased-in quickly, but the costs to current workers may be high if the ratio of seniors to workers is high. Under the individual savings approach, contribution rates are likely to be even higher at the outset owing to the need for asset accumulation.

### Evolution of different approaches

Variations of these three approaches have been applied in all countries with pension systems in place. Over time, amendments have been introduced to respond to changing economic and social conditions. Many countries now encourage private supplementation of public pension programs — usually through tax

incentives — especially if public pension benefits are modest. Other countries have made private supplementation mandatory, either through a group approach or, more recently, an individual approach. Most of these supplementary approaches are advance-funded plans. Historically, some national pension schemes involved some degree of advance-funding even though they were essentially pay-as-you-go approaches. These plans were started with contribution rates set somewhat higher and benefits phased in slower than pure pay-as-you-go systems in order to accumulate assets to allow for a partial reserve. However, most have since evolved to pure

**CHART 1: Maturation of Retirement Benefits**



*The current debate around pension plan structures centres on the problems associated with an aging workforce and the fact that there will be fewer workers than pensioners. In this situation, the pay-as-you-go approach faces more difficulties than defined contributions/defined benefit plans.*



*Some economists are now suggesting that establishing sustainable contribution rates under existing pay-as-you-go systems may be preferable, since the costs involved are considerably less than those incurred by a complete shift to a new, advance-funded individual accounts system.*

pay-as-you-go plans because benefit costs were allowed to rise without the corresponding increases in contribution rates, or because accumulated assets were lost due to war, economic collapse, hyper inflation, mismanagement or fraud.

### Public policy debate

Public policy debates on pension plans have focused on a wide variety of issues over the years. In almost all instances, philosophical differences about the proper role of government are a feature of the debate.

In the past, the debate was focused on finding the best way of assuring adequate incomes for the retired. Today, however, the debate is focused on the cost implications of an aging population, particularly in an environment of slower economic growth in the developed economies. In addition, today's debate focuses on encouraging greater individual responsibility and less system dependency.

In the current debate, the kind of structural change being discussed involves, most commonly, a move away from government-managed pay-as-you-go pension plans to privately-managed, defined contribution retirement savings plans. This polarization of thinking reflects a variety of concerns and competing objectives which involve the differences between:

- advance-funding versus pay-as-you-go;
- defined-benefit group pension plans versus individual defined-contribution accounts; and
- a preference for private management over public management.

Advance-funding advocates seek a pension system that can aid economic growth and development through the acquisition of additional capital. That, in turn, can help create efficient, advanced capital markets. Eventually, lower contribution rates could also be anticipated.

Those who favour a move to individual accounts want to encourage greater self-reliance among individuals to provide for their own retirement. This necessitates downplaying the use of pensions to promote social stability, while advocating the possibility that individual account systems can counterbalance disincentives to work. Individual accounts also provide a clearer link between past contributions and future benefits.



Advocates of privately-managed plans over government-managed plans are philosophically inclined to assume greater trust of private sector management because they are concerned that publicly-managed systems are not disciplined enough to accumulate and oversee a sufficient stock of assets.

## TRANSITION TO ADVANCE-FUNDED, INDIVIDUAL ACCOUNTS

### Making a change

*Individual accounts:* Switching from a defined-benefit group plan to a centrally-managed individual accounts retirement plan is not that difficult. It requires developing a new benefit accrual formula and a strategy for shifting smoothly over time from the old approach to the new.

*Advance funding:* Contributory pension plans can be pay-as-you-go or advance-funded. The usual approach used to shift to an advance-funded approach is to compute the contribution rate needed to finance the benefits of workers newly entering employment by the plan and add to it an amount calculated to allow amortizing the unfunded liabilities associated with all workers already in the plan over a fixed period of time, commonly 20 to 30 years. The contribution rate required to cover benefits for new workers entering employment is then added to the first figure.

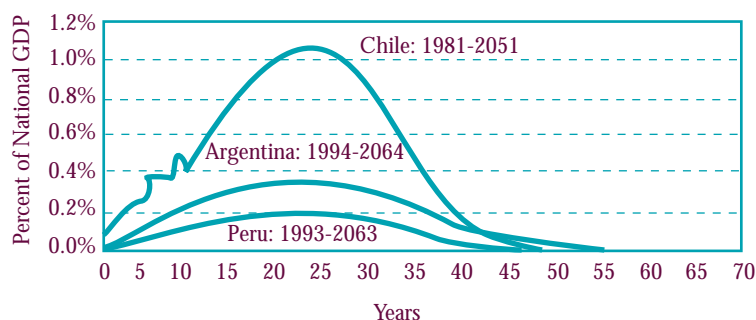
*Decentralized, individual accounts:* The shift to a decentralized system of privately-managed, individual accounts can be more complicated. Existing retirees are left in the old system, new workers join the new system and everyone else can choose between the two. Those who switch to the new system either leave the old system entirely (and are issued a recognition bond which comes due upon their retirement to cover past contributions) or become the shared responsibility of the two systems.

### The fiscal challenge

When workers move to a new individual accounts system it creates a liability for the old system. Past contributions are removed from the system and can no longer be counted on to provide financing for current payments or future benefits already earned. If all workers currently under a pay-as-you-go public pension program in major industrial countries transferred immediately to a new system of individual accounts, the liability to the old systems has been estimated at 1.5 times the 1995 GDP of those countries. Even though all liabilities would not be due at the same time, these liabilities would have to be covered from other revenue sources.



**CHART 2: Projected Costs of Recognition Bonds (and Related Compensation Payments in Argentina) as a Percent of GDP**



Financing benefit payments to those already retired would present the initial challenge but liabilities associated with that group would drop off as members died. Liabilities for all other workers could conceivably continue for upwards of 75 years until the last worker who contributed to the program died.

### Methods of financing

As with any other government expenditure, financing these liabilities could come from reduced spending in other areas, tax increases or borrowing. The appropriateness of using borrowing to finance these liabilities depends on the objectives of the reform. If the pension reform is being carried out in order to generate additional capital, transition liabilities should be financed through tax increases or reduced spending. Savings will not increase if the liabilities are financed through increased borrowing.

On the other hand, many of the other objectives of pension reform advocates (such as the development of more advanced capital markets, decentralizing control over the pension system and improving the link between contributions and benefits) can be achieved no matter what method is used for transition liabilities financing.

Under the right economic and demographic conditions, the move to an individual account system may even result in lower contribution rates over time. A lower tax burden may result but only if the transition was not financed by borrowing. Financing the transition liabilities through borrowing will cause substantial increases to the outstanding public debt and the new taxes required to service that debt will offset any contribution savings.

A recent study by economists Sheetal K. Chand and Albert Jaeger found that the cost to government of shifting from a pay-as-you-go system to individual accounts would be greater than simply establishing sustainable contribution rates under the old system. And, while other estimates of economic gains resulting from the shift generally indicate an increase in GDP, there is no indication that such a shift would result in a net positive impact on government savings.

### *Public or Private?*

*Any pension system can rely on individual accounts to closely link contributions whether it is pay-as-you-go or advance-funded. Likewise, at least in principle, a system can be advance-funded whether it is operated by the private sector or the public sector.*

## SUMMARY

While public pension programs are initially established to ensure adequate incomes for a society's retired workers — and in some cases all elderly citizens — they usually evolve over time to reflect changes in economic, demographic and social conditions. Much debate currently exists over a shift from government-run, pay-as-you-go systems with defined benefits to privately-run, individual systems with defined contributions.

Such a shift does promote self-reliance, provides a strong link between past contributions and future benefits, and may generate additional capital in certain conditions. An increase in capital stock could promote substantial economic growth, improvements in labour markets, wage growth and an increased GDP. But the shift is also difficult to implement and does not provide any short-term fiscal improvements for governments.

Other benefits, like lower contribution rates, are only achievable in certain economic conditions if liabilities from old systems are financed through increased taxes or spending cuts, creating a burden on the general population as well as the government. Regardless of financing, some degree of increased fiscal pressure is inevitable.

# Risks of Mid-Career Economic and Demographic Changes

## INTRODUCTION

A previous summary paper in this series, *The Setting of Contribution Rates*, concluded that the contribution rates needed to finance a given pension are determined by the economic and demographic environment; but the particular way in which that environment influences pension contributions depends on the type of pension plan. The paper also concluded that changes to economic and demographic variables cause dramatic, but different changes to the contribution rates under the different types of plans.

The examination revealed that:

- i) Contribution rates under PAYG plans are sensitive to changes in birth rates.
- ii) Contribution rates under government- mandated individual savings plans are sensitive to the relationship between the rate of growth of wages and the interest rate, but not the birth rate.
- iii) Both are sensitive to changes in life expectancy at retirement.
- iv) Changes to wage rates and interest rates are significantly more volatile than birth rates.

This summary paper examines how changes in economic and demographic variables occurring in the middle of a working career can cause differences between benefit expectations at the beginning of a work career and benefit receipt at retirement. Mismatches between scheduled contribution rates and intended benefit levels have different implications under the two different systems.

- Under the individual savings approach, any mismatch in contribution rates causes a mismatch between actual asset accumulation and target accumulation. If an individual contributes too much, they will overshoot the target and enjoy higher than anticipated retirement income; if they undershoot the target accumulation, they will have a lower- than- expected retirement income.

- Under the PAYG approach, mismatches have to be addressed by changing either, or both, the contribution rates and retirement benefits. Changes to the future retirement benefits of current workers will upset the original benefit expectations of these workers, while changes to contribution rates will not, since they spread the rise in rates across the entire workforce. In essence, the PAYG is a form of social insurance in that the pattern of changes will be determined on an ad hoc basis by the political process.

The goals of the analysis in this paper are:

- i) to understand the role that changing economic and demographic conditions can play in preventing the realization of worker benefit expectations; and
- ii) to develop a sense of the quantitative importance of these risks based on the past 40 years in the Organization for Economic Cooperation and Development (OECD) countries.

*Contribution rates under PAYG plans are sensitive to changes in birth rates.*

*Contribution rates under government-mandated individual savings plans are sensitive to changes in the relationship between the rate of growth of wages and the interest rate.*

## ANALYSIS

### General approach

First, we examine the historical data to determine how the wage/interest rate relationship, the rate of population growth, and mortality rates might change during a worker's career. The basic assumption is that significant changes can re-occur and that economic conditions can also reverse their historic trends.

The historical evidence from 1953 to 1995 for Japan, Germany, the United Kingdom and the United States shows that over the earlier years, wages grew rapidly and real interest rates were fairly low. In the later years, wage growth slowed and real interest rates rose. Over the entire period, the rate of population growth slowed (except in the U.K. after 1970). Significant life expectancy increases were seen in all these economies.

To keep the analysis simple, the same basic model is applied that was used in addressing the mathematics of contribution rates. That is, the calculations are based on the assumptions that workers all enter the labour force at 22; they work for 43 years and earn an average wage every year; all workers retire at 65; and they all die on their 82nd birthday. The target pension used in the calculations equals half of the average wage, indexed after retirement to reflect changes in prevailing wage levels. Administrative costs are ignored.

Table 1 shows the contribution rates needed to produce the target pension in individual savings approaches under the actual conditions experienced by the four OECD countries outlined above. It demonstrates that the contribution rates needed to meet the target pension are extraordinarily sensitive to the economic environment.



**TABLE 1: Individual Account Contribution Rates Required in the Simple Model Under Different Combinations of Real Wage Growth and Interest Rates**

Periods	GERMANY			JAPAN			UNITED KINGDOM			UNITED STATES		
	Wage Growth	Interest Rate	Contribution Rate	Wage Growth	Interest Rate	Contribution Rate	Wage Growth	Interest Rate	Contribution Rate	Wage Growth	Interest Rate	Contribution Rate
1st 10 yrs. (1953-62)	8.40%	3.79%	64.57%	9.61%	5.38%	58.45%	5.86%	1.01%	70.40%	2.75%	1.42%	28.89%
2nd 10 yrs. (1963-72)	6.10%	3.87%	36.32%	8.03%	4.33%	52.05%	5.25%	2.49%	41.87%	1.86%	-0.56%	39.18%
3rd 10 yrs. (1973-82)	3.45%	2.99%	22.57%	2.27%	2.84%	16.68%	1.36%	-1.17%	40.48%	-1.20%	2.98%	5.12%
4th 10 yrs. (1983-92)	2.67%	4.96%	9.87%	1.26%	3.50%	9.92%	2.69%	4.07%	13.10%	1.03%	4.97%	5.70%
First 21 yrs. (1953-74)	7.17%	3.75%	48.93%	8.71%	4.64%	56.73%	5.46%	1.73%	53.58%	2.20%	0.33%	33.60%
Next 22 yrs. (1974-95)	2.58%	3.99%	12.98%	1.84%	2.99%	14.02%	1.80%	1.99%	18.70%	-0.11%	4.15%	5.06%
Full 43 yrs. (1953-95)	4.83%	3.87%	25.85%	5.20%	3.79%	29.25%	3.59%	1.86%	32.11%	1.02%	2.29%	13.46%

Source: Author's calculations based on data from *International Yearbook of Financial Statistics, 1996*, International Monetary Fund; and the Bureau of Labor Statistics web page.

### Impact of variations in the economic environment

Estimates of the impact of the economic variables on the pensions of participating workers were simulated using plausible public policy scenarios.

Table 2 presents data simulations that:

- i) employ the actual wage and interest rate experience of the countries shown; and
- ii) employ the same data, but assume that the sequence is exactly the reverse of the actual history.

These simulations provide insight into the impact on a worker when wage growth slows and interest rates rise during their career (actual historical pattern); and also the impact on a worker if wage growth increases and interest rates fall during their career.

In each of the result sets, Row 1 reports on a simulation in which the contribution rate for the entire period is based on the average wage and interest rate behaviour over the entire period. This would assume that people could know in 1953 what the wage and interest rates would be for the whole period. The simulation shows that pension fund accumulations produced by assuming a constant average growth rate can differ significantly from those produced by the kind of year-to-year fluctuations experienced in reality. Clearly, knowing in advance how the economy would progress on average over an individual's work life would not be sufficient information to establish the contribution rate necessary to produce the target pension amount.

Rows 2 and 3 show the impact of setting contribution rates at the level indicated by the wage growth and interest rate experience, on average, during either the first half or the last half of the period. This part of the Table demonstrates that when contribution rates are not adjusted to reflect the changes in the economic environment, the systems can significantly overshoot contribution goals when interest rates rise and significantly undershoot contribution goals when interest rates fall.

Row 4 simulates the assets workers would accumulate if contribution rates were changed every 10 years to reflect changes in wage growth and interest rates based on the previous 10 years actual experience. The 10-year lagged adjustment rule used in this scenario produces dramatic overshooting of contribution goals when simulated against actual historical performance; however, this model is less prone to undershooting when simulated in the reverse sequence.

*All pension plans involve risk. On balance, it appears that the risk is greater under the defined contributions (individual savings) approach.*

**TABLE 2: Workers' Asset Levels and Prospects for Overshooting or Undershooting The Amount Needed to Reach the Target Pension**

(Individual Account Approach Under Different Economic Conditions)

Country Whose Economic Environment is Simulated	Contribution Rate Based on Average from:	Expected Assets	Actual Economic Sequence		Reverse Economic Sequence	
			Actual Assets	Over/Undershoot 100%	Actual Assets	Over/Undershoot 100%
GERMANY	(1) 1953-95	9.2	12.8	138.3%	7.0	75.7%
	(2) 1953-73	—	24.2	261.7%	13.2	143.3%
	(3) 1974-95	—	6.4	69.4%	3.5	38.0%
	(4) 10-Year Lagged	—	17.1	184.1%	6.7	72.6%
JAPAN	(1) 1953-95	9.6	13.0	135.6%	7.6	78.8%
	(2) 1953-73	—	25.3	263.0%	14.7	152.9%
	(3) 1974-95	—	6.2	65.0%	3.6	37.8%
	(4) 10-Year Lagged	—	16.2	168.8%	6.0	62.3%
UNITED KINGDOM	(1) 1953-95	9.9	13.9	139.8%	7.3	73.1%
	(2) 1953-73	—	23.1	233.2%	12.1	122.0%
	(3) 1974-95	—	8.1	81.4%	4.2	42.6%
	(4) 10-Year Lagged	—	18.0	181.8%	6.9	70.0%
UNITED STATES	(1) 1953-95	7.6	10.5	137.8%	5.7	75.5%
	(2) 1953-73	—	26.2	344.0%	14.3	188.4%
	(3) 1974-95	—	3.9	51.8%	2.2	28.4%
	(4) 10-Year Lagged	—	18.2	239.0%	6.4	83.9%

Source: Author's calculations based on wage growth and interest rate data from the International Monetary Fund and the U.S. Bureau of Labor Statistics web page (<http://stats.bls.gov/>)



**TABLE 3: Changes in Contribution and Pension Rates Resulting from Changing Population Growth**

(Population growth changes, life expectancy remains constant)						
Country Whose Population Rate is Simulated	Period	(1) Average Population Growth (% per Year)	(2) PAYG CR Required to Maintain Target Replacement Rate of 50%	(3) Change in Replacement Rate If CR Frozen at Level Implied by 1950-59 Experience	(4) Resulting CR and Replacement Rate if Burden Shared Equally	(5) CR and Pension
GERMANY	1950-59	0.66%	16.18%	50.00%	16.18%	50.00%
	1960-69	1.29%	13.31%	60.77%	14.75%	55.38%
	1970-79	1.50%	12.47%	64.90%	14.28%	57.27%
	1980-89	-0.10%	20.37%	39.72%	18.80%	46.16%
	1990-99	-0.22%	21.11%	38.33%	19.15%	45.35%
	2030-39	-0.72%	24.47%	33.06%	16.18%	42.18%
JAPAN	1950-59	1.11%	14.08%	50.00%	14.08%	50.00%
	1960-69	1.14%	13.95%	50.47%	14.02%	50.23%
	1970-79	1.13%	14.00%	50.31%	14.04%	50.16%
	1980-89	0.48%	17.10%	41.19%	15.59%	45.61%
	1990-99	0.37%	17.68%	39.83%	15.86%	44.86%
	2030-39	-0.18%	20.86%	33.75%	17.27%	41.39%
UNITED KINGDOM	1950-59	0.39%	17.57%	50.00%	17.57%	50.00%
	1960-69	0.60%	16.48%	53.31%	17.03%	51.65%
	1970-79	0.07%	19.36%	45.39%	18.51%	47.82%
	1980-89	0.08%	19.30%	45.53%	18.48%	47.89%
	1990-99	0.12%	19.07%	46.08%	18.37%	48.18%
	2030-39	-0.16%	20.74%	42.37%	19.17%	46.23%
UNITED STATES	1950-59	1.73%	11.59%	50.00%	11.59%	50.00%
	1960-69	1.27%	13.40%	43.27%	12.50%	46.63%
	1970-79	1.06%	14.30%	40.53%	12.92%	45.16%
	1980-89	0.88%	15.12%	38.33%	13.29%	43.93%
	1990-99	0.66%	16.18%	35.82%	13.75%	42.50%
	2030-39	0.19%	18.67%	31.05%	14.78%	39.59%

Source: Author's calculations based on actual and projected population growth rates from Robert P. Hagemann and Giuseppe Nicoletti, "Population Ageing: Economic Effects and Some Policy Implications for Financing Public Pensions", OECD Economic Studies, number 12, (Spring 1989), Table 1, p. 54.



## DEMOGRAPHIC VARIABLES

### Impact of changes in mortality

As demonstrated in the summary paper, *Setting of Pension Contribution Rates*, the impact of a change in mortality is essentially the same under the two pension financing approaches.

### Impact of changes in birth rates

Pay-as-you-go (PAYG) systems are most sensitive to changes in population growth rates. Table 3 shows how variations in the population growth rates of the magnitude observed in the post-war years would affect PAYG contribution rates in each of the countries modelled. Closing the financing gap in the PAYG plans requires adjustments either to contribution rates or to benefits, or adjustments to both at the same time. The last two columns in Table 3 show how contribution rates and benefit levels would be adjusted if each was to be used to close half the financing gap.

## SUMMARY

The various rules for setting individual savings contribution rates can easily produce 40 to 100 percent higher pensions than were intended when simulated against actual history; and 25 to 35 percent less than intended when simulated against the reverse sequence of history. This demonstrates the extreme sensitivity to economic conditions of government-mandated individual savings pension plans.

In a PAYG system, if adjustments to offset the actual changes in population rates between 1953 and 1995 were made entirely by reductions in pension benefits, retirees would receive 25 percent less than they expected when they started their working life. If increases to contribution rates and reduction in benefits were used equally to offset the population growth rates, then retirees would receive some 12 to 15 percent less than they expected.

All pension plans involve risk. On balance, it appears that the risk is greater under the defined contributions (individual savings) approach. The uncertainty associated with future economic developments appears to exert a stronger influence on individual savings pension plans, than the uncertainty of demographic changes on defined-benefit (PAYG) plans. As well, under the individual savings plan the risk is borne by the individual, whereas in the PAYG plan the risk is shared by society as a whole.



# Assuring Income Adequacy Throughout Retirement

## INTRODUCTION

Most *public pension plans* provide income support in retirement through monthly benefits which will continue to be paid over the lifetime of the worker and will be adjusted from time to time to keep up with prevailing wage or price levels. These adjustments offer retirees a degree of assurance that retirement incomes which are adequate at the time they retire will remain adequate throughout their retirement years.

*Individual retirement savings plans* — defined benefit plans — produce financial assets from which the retiree must withdraw income to support himself for the rest of his life. Converting these financial assets into a regular income stream creates **two important public policy issues**:

- 1) People need a strategy for dealing with two sources of uncertainty: uncertainty about life expectancy; and uncertainty about the course of the economy during the rest of their lifetime.
- 2) To the extent that these assets were accumulated under a mandatory retirement savings program, the government will want to be sure that the public purpose of the mandate is achieved by preventing premature exhaustion of retirement assets resulting in excessive drains on social security systems.

This paper explores the nature of the inflation and life-span risks, and approaches that can be taken for dealing with them. All approaches pre-suppose the existence of fairly sophisticated financial markets. Where these do not exist, they would have to be created to make any of these approaches viable.

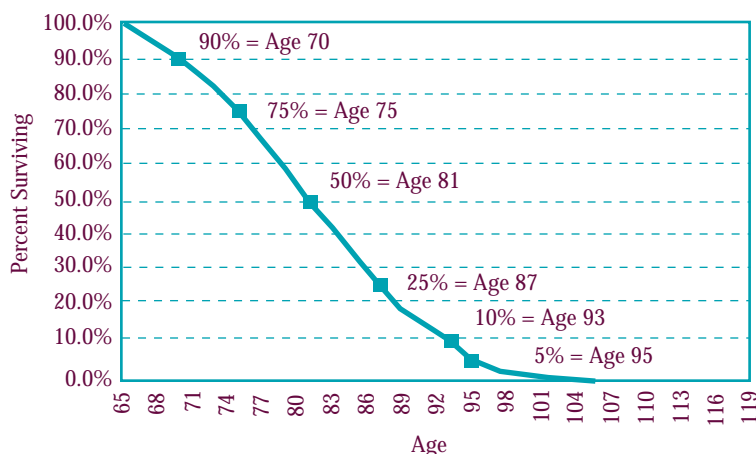
## UNCERTAIN LIFE SPAN

Chart 1 shows the expected distribution of remaining life spans for a representative group of people entering retirement at age 65 in the year 2000.

The chart shows that approximately 10 percent of workers can expect to die within five years of retirement. Five percent will live for more than 30 years. Most people fall somewhere in between, but accurately predicting someone's life span is, in most cases, next to impossible.

Most public pensions and privately-managed occupational pensions pay a life annuity benefit. This means retirees receive a guaranteed monthly income for life. For those who must live off their savings, however, life expectancy is a major issue. To reduce the risk of spending too much, too fast, several strategy options can be considered. Similar concerns arise in the management of government-mandated savings plans. Just as governments mandate forced retirement savings plans to offset worker myopia and prevent excess reliance on social safety net programs, the same logic suggests that governments need to restrict the pace at which assets, accumulated under government-mandated retirement savings plans, can be withdrawn during retirement years.

**CHART 1: Percent Surviving to a Given Age (U.K. Combined Male-Female Cohort Born 1937)**



*To ensure adequate income during retirement, pension plans and those saving for retirement must address the issues of:*

- uncertain life spans;*
- inflation; and*
- the risk of spending too much too fast.*

## UNCERTAIN PRICE AND WAGE DEVELOPMENTS

Because retirement can last a long time, eventually even relatively modest rates of inflation will seriously erode the purchasing power of a fixed monthly benefit during the average retirement spans in many Organization for Economic Cooperation and Development (OECD) countries.

Chart 2 traces the declining purchasing power of a fixed benefit at different rates of inflation.

Because of the power of compounding even modest inflation rates over relatively long retirement periods, effective income retirement systems need to incorporate some mechanisms for adjusting the purchasing power of retirement benefits, should subsequent economic developments make it both necessary and feasible.

## DEALING WITH INFLATION AFTER RETIREMENT

### Pay-as-you-go pensions

Adequately financed pay-as-you-go public pension plans can easily be adjusted periodically to reflect changes in the average wage level of contributors. Adjusting benefits in line with wages ensures an equal simultaneous change in pension benefits. These plans can similarly be adjusted for changes in prices, which usually parallel changes in wages, under normal economic conditions.



Periodic adjustments to pay-as-you-go pension plans are essential to ensure:

- the plan remains adequately financed; and
- contributions are adjusted to reflect real wages and prices.

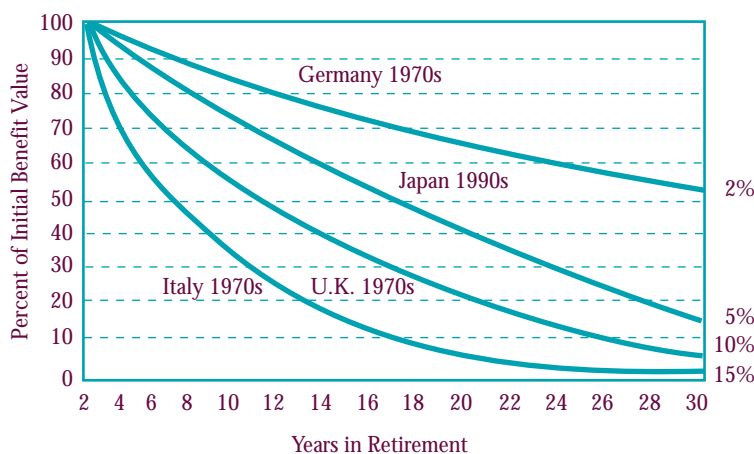
When the wage/price relationship does not hold for extended periods, that is, during periods of real wage declines, then governments have to decide how to address the issue. In the case of a temporary price spike, the **public policy decision** may be to maintain the real value of the pension benefits for several years to see if real wage levels recover fairly quickly. In such a case, contribution income would not fully fund the pension adjustment and extra funds would have to come from the government budget or reserves from the system. Alternatively, and particularly if the decline in real wages is to be prolonged, **public policy** may be to allow the real value of retirement benefits to decline in line with the decline in real wages.

### Individual accounts

Adjustments in the amounts drawn down from individual accounts depend on strategies that involve the use of financial markets. In a well-functioning financial market, prevailing interest rates typically reflect the market estimate of future inflation. If inflation rates were regular and predictable, financial markets would immediately adjust interest rates to reflect them and it would be easy for an individual to adjust his financial affairs accordingly. However, the real market does not operate that way and the inflation premium built into the interest rate by the market may be too high or too low. The retiree basing his/her decisions on market interest rates may, therefore, experience windfall gains or unexpected losses that are unrecoverable when in retirement.

To help offset the unpredictability of the markets, governments in several countries have begun issuing indexed bonds where the principle and interest are explicitly indexed to the domestic consumer price index. This provides both retirees and those saving for retirement with a measure of protection against future inflation rates.

**CHART 2: The Real Decline in Benefit Value at Different Inflation Rates Over Time**



Indexed bonds in the United Kingdom have yielded between 3.5-5.0%, those in Chile averaged 6.7% and those in Canada yield about 4.5%. The first issue of such bonds in the United States guarantees 3.4% a real return.

While indexed bonds help to protect individuals, there are two important implications for governments: 1) a substantial portion of the financial assets held in individual retirement programs would have to be liabilities of the government; and 2) as with many pay-as-you-go pension arrangements, the government would be guaranteeing the purchasing power of retiree assets in all economic circumstances.

The result is that government debt cannot be allowed to fall below the level of these guarantees. The volume of government debt that must remain outstanding simply to allow for the smooth functioning of the retirement income system may well exceed the Maastricht criteria.

Commitments to index instruments that have already been issued may prove more difficult to alter than legislation providing for the automatic adjustment of the pay-as-you-go retirement benefits. For this reason, in a period of serious or prolonged economic distress, these bonds may prove to be more effective in protecting retiree purchasing power than pay-as-you-go pension programs. However, the government's fiscal problems may become worse as a result.

*To protect against future inflation many governments have begun issuing indexed bonds tied to the consumer price index.*

## DEALING WITH UNCERTAIN LIFE SPANS

### Defined benefit pensions – PAYG or advanced-funded

Most defined benefit systems pay benefits in the form of life annuities. The benefit of this is that all workers are guaranteed that, after retirement, their monthly income will continue for as long as they live. This protects their economic status and minimizes social safety net expenditures. The assets of the pay-as-you-go plan are common so that those who live longer actually receive the benefits of those who die sooner through a system of transfers.

It is this system of transfers that accounts for the major disadvantage of life annuities. If a person knows they are unlikely to live a long time, they are unlikely to convert their savings into annuities. These individuals are prevented from drawing a higher benefit in the few years remaining under a system of life annuities, and they cannot leave the unused portion of the annuity to their heirs. In the life annuities business there is, therefore, a process of adverse selection – people who opt to use them tend to live longer than those who do not. This tends to make these plans more expensive for the retiree opting to use them. The retiree pays for the additional administration costs and risks caused by adverse selection.



## Individual accounts

Several approaches or strategies can be used by the retiree to minimize his/her risk of outliving his assets. Each approach has its advantages and disadvantages.

*Live off the interest:* Retirees can draw an amount equal to the interest being earned on their portfolio each year. That way, they never outlive their nest egg, and can pass along their accumulated assets to their heirs. The amount of money needed to generate a decent annual income, however, makes this option prohibitive for most.

*Adopt a rule of thumb:* The rate at which retirees can draw down their savings can be formulated by studying historical economic patterns. Other considerations — like portfolio composition and level of acceptable risk — must also be factored in. An aggressive rule of thumb is only acceptable in countries with fairly stable financial markets, where workers are also receiving life annuities from another source or will draw government benefits should their income fall below a certain level.

*Programmed withdrawals:* In Chile, workers have privately-managed individual retirement accounts. At retirement, they can choose to purchase an indexed life annuity. If they do not do so, regulations are in place governing how quickly retirees can withdraw from their savings. Those who draw the maximum amount each year see their annual maximum draw reduced in subsequent years (i.e. the more you take and the longer you live, the less you get).

*Buy an annuity:* Although individuals can buy life annuities themselves, rates of return are lower and administrative fees high as explained earlier. Adverse selection problems are less severe if all participants in a mandatory savings program are forced to buy annuities. There is no adjustment, however, for wage and price levels.

*Buy indexed annuities:* These provide the best protection for the individual, but may be difficult for governments wanting to substantially reduce their debt loads. These programs involve adjustments in periodic payments to reflect changes in wage and price levels.

## SUMMARY

Both uncertain life spans and unknown economic conditions introduce a certain level of risk to those saving for retirement. Public pension programs deal with these risks by providing retirees with monthly benefits which adjust to fluctuating economic conditions. For those who finance their retirement with individual savings, the risks are more difficult to manage. Even in well-functioning financial markets, strategies to help retirees pace their asset withdrawals may require some type of government intervention if demands on government social security systems are to be kept to a minimum. If governments force the purchase of annuities, those retiring in a period of depressed economic activity could face severe disadvantages because their assets are depressed at the time of retirement; while those retiring during an asset upswing will gain and have access to increased monthly earnings. The challenge for governments is to find a way to balance the risks for people entering retirement to ensure income adequacy throughout retirement.

