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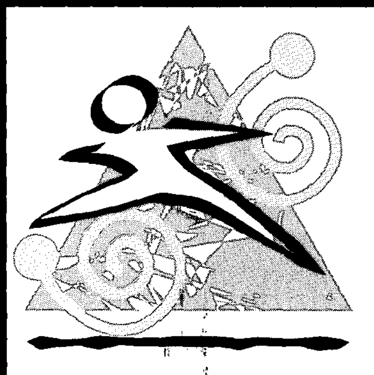

Taking Stock of Pension Reforms Around the World

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I. Pension Reform Around the World

Systems providing financial security for the old are under increasing strain throughout the world. Over the next 35 years, the proportion of the world's population that is over 60 will almost double, from 9 percent to 16 percent. Populations are aging rapidly due to rising life expectancies and declining fertility rates. This puts added strain on extended families and other traditional ways of supporting the old which are already weakening under the pressure of urbanization, industrialization, and increased mobility. At the same time, public systems of old age security are themselves in need of reform. Most existing systems are very costly even though they provide inadequate protection for the old.

Pension reform is not easy, however. Issues involved are complex and can be controversial; meaningful reform efforts face political hurdles. Nevertheless, reform is inevitable, since the longer it is delayed, the more urgent and difficult it becomes. More and more countries are confronting this problem. Figure 1 shows that many countries around the world have undertaken some type of reform of their pension system in recent years. The World Bank has been quite active in providing policy advice and technical assistance to governments contemplating pension reform. In virtually every country in Latin America, Eastern Europe, Central Asia, and in many African and Asian countries the Bank has engaged in extensive discussions, formal and informal, on pension reform (see Figure 2).

The purpose of this paper is to provide a brief summary and evaluation of recent pension reforms around the world.[1] The next section briefly discusses why so many countries had to reform in recent years. Section 3 describes different types of potential reform options. Section 4 provides statistics on which reform options the countries are choosing. Section 5 provides an evaluation of different reform options taking into account fiscal, intergenerational and political economy costs. The last section concludes.

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[1] The period covered is 1992-1998. Sources include Social Security Programs Around the World, Social Security Administration, various years; Developments and Trends in Social Security, 1993-95, Report of the Secretary General, International Social Security Association; various issues of International Social Security Review; staff files at the U.S. Social Security Library; World Bank staff files. All information included in the data sets has been verified by at least 2 sources.

II. Why are Countries Reforming?

Old age security systems have three major objectives -- saving, redistribution, and insurance. Most formal systems of old age security are publicly managed schemes that are financed by payroll taxes on a largely pay-as-you-go basis, so that today's workers pay the pensions of those who have retired. These systems not only affect the welfare of the old, but also that of the young, who must, directly or indirectly shoulder the cost of providing for the old. Therefore, a good pension system should not only protect the old, but it should also promote, or at least not hinder, economic growth.

However, most existing systems fail to provide adequately for the old since benefits are not always indexed. Furthermore, they frequently cause perverse redistribution, for example from poor young families to comfortable retirees. Most importantly, as these systems mature, they may actually hinder growth. In maturing systems, providing a constant level of benefits to a growing number of retirees requires high wage taxes, which cause widespread evasion and push labor into the less efficient informal sector. This increases the burden on the public treasury and can lead to deficit spending that fuels inflation. Rising fiscal deficits can also squeeze out growth-promoting public spending, such as investments in infrastructure, education, or in health services for the young. Also, some economists believe that existing systems have induced people to save less than they otherwise would, leading to lower levels of national savings and growth. So these government-run systems hurt the economy while they also fail to protect the old.

Moreover, current systems are also fiscally unsustainable. While most public plans accumulate a cash surplus in their early years, as the systems mature, these reserves disappear and the plans shift into deficit. Therefore, the initial cash surplus is an illusion, since it is only a partial offset to the implicit pension debt that is building up.[2] Figure 3 plots pension system surplus or deficits as a share of total revenues for a sample of countries in 1986. While most countries with young populations, such as Egypt, Korea, Jordan and Tunisia, had systems with surpluses, most industrialized

[2] Estimates of implicit pension liabilities for OECD countries can be found in Van Der Nood, P. and Herd, R., "Estimating Pension Liabilities - A Methodological Framework," OECD Economic Studies 23 (1994), 131-66. Estimates of implicit pension liabilities for developing countries can be found in Kane, C. and Palacios, R., "The Implicit Pension Debt," Finance and Development, June 1996, 36-38.

countries and older Latin American and Eastern European countries faced deficits, forcing them to rely primarily on pay-as-you-go finance, supplemented by growing payments from the national treasury. As populations continue to age, deficits become much greater than can be covered by current tax rates. This requires a cut in pension benefits or other government spending, or alternatively a rise in taxes.

Given all these pressures to change the existing systems, it is not surprising that so many countries around the world are undertaking pension reform. However, not all reforms provide a permanent solution to the above problems. Most are merely designed to delay the impending crisis for a few more years. The next section discusses different reform options governments have in dealing with their old age security problems.

III. Typology of Reform: What are Possible Reform Options?

Pension systems can be classified by three criteria: how benefits are calculated and the party which covers shortfalls, how benefits are financed, and who manages the system. Benefit calculation can be based on replacing some income level, defined as what an individual earned over some period of time and/or the economy-wide average wage. Such systems are known as defined benefit systems, where the individual knows that the pension depends on years of service, and the average wage rate earned in the last X years, as determined by the benefit formula. The revenues of such systems are less certain, since they depend on demographic changes, the rate of wage growth, and the rate of return on investments should a fund be accumulated. Any shortfall in revenues relative to expenditures is covered by an entity other than the beneficiary, the government in the case of a public plan, and an employer in the case of a private occupational plan. Depending on how such a benefit is defined, in theory, there may be some residual risk to the individual arising from fluctuations in an individual's work history, but this would be the only risk borne by the individual. In practice, as the following sections will show, the parameters of such systems are changed very often so that an individual who begins work and begins contributing under some pension rules rarely retires under the same set of pension rules.

Alternatively, benefits can be based on what individuals contribute to the system, allowing some rate of return, compounded annually. This type of system is

known as a defined contribution system. In this system, the benefits are considered less defined, because they depend on an individual's complete work history and the accumulated rate of return. The individual receives what is in his account upon retirement, so there is no possibility of shortfalls. All risks are borne by the individual in the form of higher or lower pensions.

Defined benefits can be financed either through pay as you go financing or through full funding. Under pure pay as you go financing, current workers' contributions are used immediately to pay benefits to current retirees, resulting in no positive impact on savings and perhaps a negative impact, although some economists have found unambiguously negative effects. Under full funding, current workers' contributions are accumulated in pension funds and invested, resulting in some positive impact on savings, particularly if people are forced to save more than they would have voluntarily. However, the degree of actual funding is based on projected interest rate and earnings paths. Should the projected deviate from the actual, shortfalls may occur even in fully funded, defined benefit plans and require additional contributions from the guarantor.

Defined contribution systems, by definition, are always fully funded.[3] People receive only what they have accumulated, resulting in no shortfalls, although there may be public costs associated with any minimum pension or rate of return guarantees, if offered.

Similarly, the funds, whether reserves accumulate in a partially funded PAYG or under full funding, can be managed either privately or publicly. While public or private management could relate to the entire administrative apparatus of the system, the critical feature appears to be the management of the funds. Private management of the funds allows the funds to be separated from the political process so that the funds are managed for the retiree's best interest rather than being forced to fulfill other political objectives.

The three classifications generally coincide. Defined benefit systems, on the national level, are all funded through pay as you go financing, although in some cases

[3] The Swedish notional account system is sometimes referred to as a PAYG, defined contribution system, but since the potential for revenue shortfall exists and the resulting risk is borne by the government, such a system in fact is merely a variant of a defined benefit system and should be labeled as such.

small funds have been accumulated to partially delay the impact of ageing. These systems are generally publicly administered and since there are few funds to manage, fund management usually ends up with the public administration as well. Defined contribution systems are by definition financed by full funding. While these systems are often privately managed, the large national provident funds common in Asia and Africa are publicly managed, defined contribution, fully funded schemes.

We classify potential reform options into two principal categories: minor adjustments and major reforms (see Table 1). Minor adjustments are changes made to the existing public schemes primarily to delay fiscal problems, but sometimes to correct existing inequities. These can take many different forms. Governments can alter the eligibility criteria for receiving pensions, the contribution structure, the benefit structure, or the adminstration of the scheme, or do a combination of several adjustments. Unfortunately most of these reforms are not sufficient to address the underlying problems of public pension plans, but do succeed in temporarily postponing the fiscal crisis.

We define major reforms as those which substantively change the system of pension provision from defined benefit to defined contribution, or vice versa, or from pay as you go to full funding, or vice versa. Starting up a new system is also classified as a major reform since it is a substantive change from before. Substantive PAYG reforms with new mandatory defined contribution components are also included as major reforms.

While many countries are reforming their pension systems, only about 25 percent of those reforms can be classified as major reforms (see Figure 4). A third of those major reforms are either switches from funded to pay-as-you-go systems or setting up of a new pay-as-you-go system. Most other reforms take the form of minor adjustments to the existing pay-as-you-go systems. A list of countries and the different types of pension reforms they have adopted are given in Table 2.

Figure 5 shows the frequency of different adjustments countries made to their existing systems. Changing the contribution rate is the most popular adjustment followed by changes in pension formula. However, an increasing number of countries has undertaken a major reform, with the number exceeding those who raised the retirement age. Other reforms include changes in the number of years of service

required before receipt of a pension, indexation of the pension once received, and the wage base on which the contributions to the pension system are calculated.

Regional Differences

Figure 6 reports the breakdown of reforms by region. The rate of reform is highest in countries which face the worst demographic pressures. Former socialist countries were the top reformers, followed by industrialized countries and Latin American countries. The relatively younger populations of Sub-Saharan Africa, Asia, and the Middle East clearly have not felt the urgency of reform as strongly as the older countries. Reform efforts in the Former Soviet Union were also spurred by the necessity of the newly independent countries to establish their own pension systems.

The type of reforms adopted by countries in different regions also varies significantly. Quite a few Latin American countries, such as Argentina, Bolivia, Colombia, Mexico, Uruguay, Peru, and El Salvador, undertook major reforms, switching from government-run pay-as-you-go pension systems to multi-pillar systems with a defined-benefit private component. While there are many factors that contributed to this preference for major reform, Chile's success with its pension reform in the 1980s seems to have had a positive demonstration effect in this region.

This reform has also now spread to Eastern Europe where Poland, Hungary, Látvia, and Kazakstan have undertaken major reforms amid the abundance of minor reforms in the region.

Another region that has undertaken a significant number of major reforms is Sub-Saharan Africa. However, these numbers are deceptive since the major reforms in Africa are very different than those in Latin America. With the exception of Seychelles, the African countries either switched from provident funds to pay-as-you-go systems (Nigeria) or set up completely new pay-as-you-go systems.

In industrialized countries, most of the reforms were in the form of changes made to the existing public system. Exceptions are Australia, the United Kingdom, and Sweden. In the case of Australia, a fully funded, defined contribution second pillar was added to a general revenue-funded means-tested universal pension. In the case of Sweden, a public pay-as-you-go financed, defined benefit system is being

converted to a pay as you go financed, notional account system, with a small funded, defined contribution pillar. In the U.K., individuals have been given the option of substituting an occupational or personal pension for the publicly provided earnings-related benefit.

In general there were few reforms in Asia and the Middle East. The major reforms in this region took the form of either establishment of new pay-as-you-go systems or switches to such public schemes.

In summary, while the nature and frequency of major reforms varied across regions, adjustments to the existing public pensions were still the predominant type of reform in all regions, although the number of major reforms is rising. Next, we discuss individual reforms in greater detail.

Minor Reforms

Adjustment to public systems, the minor reforms, involve changes in eligibility criteria, the contribution structure and the benefit structure of the systems.

Changes in eligibility criteria-- Eligibility criteria for pensions can be changed by altering the *retirement age* or the *service years* required to qualify for a pension. Both types of reforms occurred although changes in retirement age were more common. Figures 7 and 8 report the retirement age changes for men and women, respectively. For all countries, other than Greece, there have been increases in retirement age, consistent with rising life expectancies. While there is still a tendency to set a lower retirement age for women, this gap has been declining. Some countries also changed the number of required service years for full entitlement (see Figure 9), in all cases increasing the number of years required.

Changes in contribution structure -- Countries changed the contribution structure of their pensions by changing the *contribution rates* and the *contribution base* on which the contributions are calculated. Among these reforms, the change in the *contribution rates* was the most commonly adopted one across countries. Contributions to a pay-as-you-go system can be made by the employees, the employers, or the government, as a percentage of wages. Figures 10 and 11 show the changes the countries made in contribution rates for the employers and employees, respectively. More countries have opted to change the contribution rates of

employers rather than that of employees. About 75 percent of these changes have been increases. However, there have also been declines, especially where the contribution rates were initially high, such as those in the Czech Republic, Slovakia, Latvia, Lithuania, and Estonia, or where the payment was shifted from employer to employee during a major reform, as in the case of Bolivia and Uruguay. Fewer countries changed contributions of their employees. Again, almost 80 percent of these changes have been increases. Some of the largest increases were made by transitional countries, such as Albania, Bulgaria, and Czech Republic which previously had zero contribution rates for their employees. The declines have been few and small in magnitude. Changes in government contributions have been few, only made in six countries.[4] Among those, only Libya and Taiwan, decreased the government's contribution rate.

Change in the contribution base is another type of reform similarly aimed at changing the contribution structure of the pension system. Generally, contribution base changes were less common than changes in the contribution rate. Mostly these took the form of abolishing minimum income limits or increasing the maximum income limits on which the contributions are made, to maximize the total amount of contributions collected. (See Table 3).

Changes in benefit structure -- Many countries reformed their benefit structure through changes in *pension formula* and in *indexation*. Changing the *pension formula* was a common type of reform. Countries with older populations (such as Portugal and Switzerland) decreased accrual rates or increased the number of years used to calculate the pensionable salary (which decreases it) leading to lower replacement rates. However younger countries (such as Senegal and Sudan) modified their pension formulas (through higher accrual rates, higher pensionable salary or higher percent of replacement) such that they increased their benefits (see Table 4). Another type of reform is changing the way benefits are indexed to inflation (see Table 5). Most important improvements were for those countries that replaced their ad hoc inflation adjustment with a structured adjustment, whether they tied these adjustments to price or wage changes.

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[4] These are Bolivia (1% to 1.5%), Mexico (.3% to .42%), Cyprus (3.5% to 4%), Israel (1.49% to 2.05%), Libya (3.40% to .53%), and Taiwan (2.8% to 0%).

Major Reforms

PAYG-Defined Benefit to Fully Funded-Defined Contribution

Countries undertaking major reforms of their pension system were fewer compared to those making adjustments to their existing systems. Table 6 provides summary reform features of countries that switched from exclusively pay-as-you-go defined benefit systems to systems which are at least partially fully funded, defined contribution. We include the case of Chile for comparison, which reformed prior to the period of study, but since it was the first reform of this type often serves as the basis for comparison for the other reforms. While the principles underlying these reforms are similar each country has adopted the basic design to suit its own political and economic structure.

Major reform involves many of the challenges of minor reform, but also additional ones.[5] The role of the fully funded, defined contribution pillar needs to be defined. In the case of Chile, the first reformer of this type, this pillar is the primary pension provider. Subsequent reforms, including those in Mexico, Bolivia, El Salvador, and Kazakhstan, have followed this example of using the fully funded, defined contribution system as the primary system. Other countries, such as Colombia and Peru, have also made the fully-funded defined-contribution (FF-DC) the primary system, but have given workers the choice of a pay-as-you-go defined-benefit (PAYG-DB) as the primary system if they prefer. Argentina and Hungary have retained a PAYG-DB for the primary system, but have opted for giving workers a choice between a PAYG-DB and a FF-DC for a mandatory supplementary system. Uruguay has retained a PAYG-DB for the primary system as well, but has made the FF-DC a mandatory second pillar for those of moderate income and optional, but subsidized, for those of low incomes. Poland and Latvia have converted their PAYG-DB schemes into notional accounts PAYG schemes with a mandatory second pillar that is FF-DC.[6] Australia has instituted a FF-DC pillar as a complement to a general revenue-financed means-tested pension. While currently serving as a complement to

[5] Most countries reform their public pension plan before introducing new structure. Examples are Argentina, Colombia, Peru.

[6] Latvia's mandatory FF-DC pillar is contemplated, but not yet legislated.

the main system, eventually it will be the main system, particularly for the third of the population which receives nothing from the means-tested system.

Countries also have to decide how to provide a social safety net for those who were lifetime poor or had uneven working histories. In Chile, this is provided through a minimum pension guarantee and minimum rate of return requirements, as is the case in Colombia, El Salvador, and Mexico also. In the case of Argentina, Uruguay, Poland, Hungary, and Latvia, the first pillar pensions serve as the social safety net. Peru chose no safety net provision, aside from general social assistance, reasoning that since there was no safety net in the previous system, providing a safety net should not be considered part of the major reform, but additional reform to be considered later. Australia, as noted before, has a means-tested safety net for all elderly.

This type of major reform also entails decisions on transition mechanisms. In pay as you go financing, current workers' contributions are used to pay benefits for current retirees. When the system reforms toward a FF-DC system, current workers' contributions are diverted into their own pension accounts, forcing the government to cover current retirees' pensions. In addition, workers who contributed to the old system will have less in their individual accounts than those who work the same number of years, but always under the new system. To maintain equity, some transition mechanism needs to be provided which recognizes and rewards an individual's acquired rights in the old system. Typical transition mechanisms, used in Chile, Colombia, and Peru, are to issue recognition bonds to workers, in recognition of what they are owed on the basis of their accrued rights under the old system, which become payable at retirement age. Upon retirement, individuals will convert to an annuity both their own accrued funds, plus the principal plus interest from these recognition bonds. The mechanisms for calculating the value of these recognition bonds and the interest rate paid on the bonds both vary from country to country. In Argentina and Hungary, by contrast, individuals receive a pension from the old system in direct proportion to years served under the old system. In Uruguay, all years served, under either system, are used to qualify a person for a first-pillar pension. Mexico has the most unique mechanism for recognizing acquired rights. Workers with contributions to the old system have the right to the benefits they would have been entitled to under the old system or what has been accrued under the new

system, whichever is higher.

Related to this issue is the status of the old, PAYG-DB system. In some countries all new workers must enter the new system, as in Chile, Mexico, El Salvador, Bolivia, Poland, Hungary, and Kazakstan. However, a few countries found it politically difficult to mandate FF-DC accounts, even as second pillars, for new workers. In these countries, Argentina, Colombia, Uruguay and Peru, the old PAYG systems were reformed, but new workers have the choice of a purely PAYG-DB pension system.[7]

Another set of problems involves the government's regulatory capacity or the extent of development of the domestic capital markets. In Chile an elaborate system of government regulations and guarantees was constructed to permit the safe and sound functioning of the new pension funds. For the first few years, investments were mostly in bank and government debt. A short supply of government bonds, the absence of a secondary market for government debt, and the lack of alternative investment opportunities in domestic markets (such as corporate bonds or stocks) generally raise concerns about where the new pension funds can be invested. Imperfections in domestic capital markets can be avoided through international diversification, but reforming countries generally limit that option due to political reasons. Pension fund management expertise is also quite limited in many countries, although there are a number of foreign firms that have been willing to enter many of these markets and offer these services. The size of the market is also a consideration, as there are strong economies of scale in pension fund administration. Bolivia, for these reasons, chose to limit the available pension funds to two, and to assign individuals to one or the other in the short term, allowing change after a period of 2 ½ years, and with new pension funds allowed to enter the market after 5 years. The pension funds were chosen in an international bidding process and their investment practices are regulated by the Financial Sector Superintendency. The pension funds are required by law to invest at least 10 percent of assets abroad.

[7] In Uruguay, even new workers earning above a certain salary (5000 May 1995 pesos) must pay a portion of the contribution rate paid on the salary above 5000 pesos into a fully funded DC account.

PAYG-Defined Benefit to PAYG Notional Account with Fully Funded Second Pillar

The Latvian, Swedish, Italian, and Polish reforms take a different approach. They assign individuals notional individual accounts which are credited with contributions made by individuals. Governments can also provide credit for years spent in military service, higher education, raising children, or other worthwhile causes by making contributions directly to these accounts. However, this money cannot tangibly be found in any account or in any investment portfolio. It is in fact being used by the government to pay pensions for the current elderly, precluding the government's need for financing the transition to a fully funded-defined contribution system. Each year the individual's account is also credited with notional interest payments earned on the notional accumulation. This interest rate is legislated and varies in the countries undertaking this type of reform; Sweden is using the growth of nominal wages, Latvia the growth of the social insurance contribution wage base, Poland inflation plus 75% of the growth of the social insurance contribution wage base and Italy, which has undertaken this type of reform without adding a second pillar, the growth of nominal GDP.

The advantages of this type of reform, although continuing to be PAYG-financed are primarily threefold. First, by tying benefits to contributions rather than to income, individuals have stronger incentives to make contributions and fewer incentives to evade and distort labor market provision. Second, the pension provided depends on both the accumulated sum in one's notional account and on the average life expectancy at the age at which the pension is started. As life expectancy increases due to health improvements, the pension if taken at the same age will fall, encouraging individuals to delay retirement if their objective is to reach a target pension level. Thus, from a fiscal standpoint, the individuals collectively bear the cohort-specific longevity risk rather than the government bearing the risk as in the conventional PAYG-defined benefit systems. Third, the transition issues of financing the payments to current pensioners when current contributions are diverted to individual funded accounts do not arise since the contributions are not actually diverted.

However, in comparison, with fully funded-defined contribution systems, these systems do have some drawbacks. First, there are no additional savings generated in

the economy to stimulate investment and growth. Second, from a fiscal standpoint, the government still holds an unfunded liability. And, the liability, the acquired right, is clearly defined; in the traditional defined-benefit systems, as we have shown, features such as benefit formulas change frequently, allowing the governments to reduce the implicit pension liabilities. Since most individuals are only vaguely aware of the monetary equivalent of their acquired rights, reducing them is politically feasible. However, once they become clearly defined, with explicit monetary equivalents, reducing them will be more difficult. It becomes then the burden of the government to accurately prepare for all future contingencies when adopting such a system, since subsequent changes will be much more difficult. Third, while trying the benefit to contributions helps, making transparent the PAYG implicit interest rate, which will be below market interest rates, may not reduce inflation much.

Fully Funded Defined Contribution to PAYG, Defined-Benefit

A few countries have made the reverse reform from a fully-funded, defined contribution system to a PAYG-defined benefit system. The funds in the old systems were held by provident funds, all publicly managed and administered, or more accurately, publicly mismanaged. Given a history of gross abuses of these funds, some African and Asian countries have turned to PAYG systems, reasoning that if the public authorities have no fund accumulations to manage, the abuses will be fewer. Having seen abuses in both types of systems in Latin America and given the fiscal concerns involved with PAYG programs, our experience suggests an alternative: private management of fully-funded defined contribution systems. However, these reforms are clearly major reforms and are cataloged as such here.

V. Evaluation of Different Reform Options

Sections II-IV suggest that countries have taken widely differing approaches to pension reform, although the various reforms can be categorized into broad categories. Which approaches are best? Before evaluating the different reform options, we need to define the objectives of a pension system to see which reforms are more consistent with the initial objectives. Pension systems first and foremost are meant to provide workers with the means to sustain themselves when they become too

old to work, complemented by redistributing towards the poorest elderly. Whether the pension system provides the means to sustain workers in old age critically depends on the rate of return it provides workers on their contributions. But given the conflicting needs on the government's coffers, the pension system has to be designed in such a way as to be fiscally sustainable in the long run. It should also work to enhance economic efficiency by minimizing labor market distortions, enhancing capital market development, and generating savings.

Long Run Fiscal Sustainability

Most of the reforms taking place, aside from those in the youngest countries, were in response to fiscal problems. Given the political cost of pension reform, it would be preferable to undertake a reform which fixes the problem, precluding the need for yet another reform in five years' time. Which of the reforms discussed above perform best in achieving long run fiscal sustainability?

Figure 12 takes the hypothetical case of one potentially reforming country, Costa Rica, and looks at the current system, and different types of minor reforms which could be undertaken. The minor reforms are calibrated to mimic what countries who actually undertook such reforms did on average. Taking the most easily quantifiable reforms, raising the retirement age, lowering benefits, and raising contribution rates, we find that countries on average raised retirement age by 4.3 years, and raised contribution rates by 3 percentage points. Benefit rates are harder to measure since benefits often depend on years of service and changes in the pension base which affect the benefit rate are harder to compare across countries. For illustration, we assume a 20% reduction in benefits. Figure 12 shows the impact of such minor reforms on the required outlay by the government over time, assuming that any deficits in the system will be automatically picked up by the government. While each of the reforms improves the fiscal situation in the medium term and is certainly superior to the no-reform option, none is sufficient in the long term. By 2020, the reform which reduces benefit rates begins to require significant government funding. By 2030, all the minor reforms require considerable government funding. Further pension system reforms will be required unless the government is flush enough with revenue to be willing to cover deficits indefinitely.

By contrast, a major reform toward a fully-funded, defined contribution system is shown in the last bar in Figure 12. The reform illustrated is a complete switch from the current defined benefits, PAYG system to a fully-funded, defined contribution system, with all current pensioners continuing to receive benefits, which would now be funded by the government and current workers receiving bonds which value the prorated liabilities that the current workers are owed. Note that no countries have actually done such a drastic switch. Current contributors are always given the choice of remaining within the old system, albeit a reformed version of the old system. However, Figure 12 illustrates the worst case scenario, where an immediate and involuntary switch was dictated.

While the reform is costly in the short run, since the contributions from workers can no longer be used to fund pensions for current retirees, in the longer run, the reform is fully sustainable, with only minimum input from the government depending on the government's generosity in providing a social safety net for the poor. In the very short term, in the year 2000, the major reform is even more costly than the option of doing no reform. However, by 2020, one of the minor reforms, the benefit reduction, is already more expensive. By 2030, all of the minor reforms are more expensive. After 2040, the costs to the government of the major reform disappear, as obligations to pensioners existing at the time of the reform are fulfilled and obligations to workers with contributions to the old system disappear. The small initial cost more than compensates for the later savings. The cost of providing a social safety net will have to be added to the costs of the DC reform, but given the enormous savings in the future, there is ample opportunity to provide a modest safety net, even at government expense.

Impact of Repeated Minor Reforms

A major distinction, then, between the minor and major reforms is that minor reform efforts will have to be repeated periodically. Aside from the political difficulties and inconvenience of perpetual reform, are there any concrete reasons to avoid repeated minor reforms? One issue that arises is that repeated minor reforms undermine the view that the pension system provides security or certainty in terms of

retirement benefits.[8] While defined benefit systems are called defined benefit systems, they are being continually redefined, leading to a certain amount of uncertainty on the part of workers.

Furthermore, all of the minor reforms used by countries tend to reduce the implicit rate of return that younger, future generations receive from the pension system. As contribution rates are raised, younger generations pay more for the same benefits, lowering their rate of return on contributions. Similarly, if benefits are reduced, younger generations receive fewer benefits for the same contributions, again, lowering their rate of return. And finally, raising retirement ages forces workers to contribute longer, and therefore more, and to receive benefits for a shorter period, and therefore less than previous generations.

Figure 13 shows the impact of raising contribution rates and lowering benefits to maintain fiscal sustainability in Costa Rica in lieu of letting the government cover future deficits on the rate of return received by future cohorts. Contribution rates would have to be raised to 35% percent from the current 7.5% if the entire adjustment were covered through changes in contribution rates, while benefit rates would have to fall from 68% of average wage to 14.6 percent if the entire adjustment were covered through changes in benefit rates. As a result, in both cases of minor reform, by the year 2015, the rate of return from pension contributions falls below the rates available in the market, and continues to fall indefinitely. By contrast, the defined contribution reform continues to show a market rate of return, and keeps the expected rate of return constant for all future cohorts.

Returning to the objectives of a pension system, if the objective is to give workers a way to maintain an adequate living standard when they become too old to earn a living, forcing them to participate in a system which provides them a far lower rate of return than if they had simply saved the money themselves seems counterproductive. The only way to maintain the central role a pension system can play in the lives of workers and retirees is to reform it in such a way that they will always receive what the market would have provided on average, with some

[8] An analysis of the impact of recent changes and the effect on the individual are included in McHale, The Risk of Social Security Benefit Rule Changes: Some International Evidence, NBER Working Paper 7031, 1999.

redistribution toward the poor to ensure against extreme poverty among the elderly.

Economic Efficiency Gains from a Major Reform

Furthermore, a major reform toward a fully-funded, defined contribution system that is competitively managed will also lead to greater economic efficiency by reducing labor market distortions, enhancing capital market development, and potentially generating additional savings for the economy.

Labor market distortions exist in PAYG, defined benefit systems because benefits are not closely linked to contributions. As a result, individuals have incentives to evade contributions by joining the informal sector and contributing only enough to qualify for a pension. Individuals also have an incentive to withdraw from the labor force early, as early retirement rarely carries actuarially fair reductions in pension benefits. Similarly, postponement of retirement rarely generates actuarially fair increments to pension benefits. Finally, high contribution rates with below-market rates of return also lead to higher evasion, as individuals rightfully calculate their losses from joining the system, or conversely lead to higher labor costs if employers are asked to pay high taxes for benefits their employees do not value.

Fully funded, defined contribution systems, with sufficient, but not overly generous safety nets, on the other hand, tie contributions to benefits. Employees are more likely to see these contributions as deferred compensation rather than labor market taxes because the employees will see all their money returned to them in the future with interest at market rates. Competitive management insures that the participants will receive rates of return not markedly different from market returns on their contributions.

Similarly, fully-funded, defined contribution systems can lead to capital market development by providing a supply of long term investible funds. Institutional investors have contributed heavily to the deepening and strengthening of capital markets in developed countries. Evidence of this deepening has been noted in countries which have undertaken these reforms.[9]

Finally, these reforms can be growth-enhancing by also increasing savings.

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[9] See, for example, R. Holzman, "Pension Reform, Financial Market Development, and Economic Growth: Preliminary Evidence from Chile", IMF Staff Paper (Vol. 44: 149-78, June 1997).

While there is concern that these systems will not generate additional savings, but will merely crowd out previous voluntary savings, the limited evidence from developed countries shows that when mandatory savings plans are instituted, there is indeed crowding out among higher income individuals who were previously saving. However, there is new saving generated among lower-income individuals, indicating a net positive impact from mandating a savings system.

VI. Conclusions

To conclude, countries around the world are reforming their pension systems. Most are reforming to reduce the fiscal costs of their existing pension systems. A few young countries are establishing new systems or are increasing the generosity of their current systems, although perhaps not always taking into account the future fiscal costs entailed in the increased generosity.

The majority of the pension reforms are tinkering with an existing pay-as-you-go defined benefit system, rather than reform of the overall system of pension provision. However, while these reforms alleviate some of the fiscal burden, fiscal problems reappear in the long term. The only way to effectively solve the pension system issue on a permanent basis is to move toward the fully-funded defined contribution reforms currently underway in Latin America, Australia, Poland and Kazakhstan under consideration in a variety of other countries.

Table 1: Framework for Assessing Pension Reform Measures

Status	Type of Reform	Measure of Change
Minor	Eligibility Criteria	Retirement age
		Service years
	Contribution Structure	Coverage
		Contribution rate
		Contribution base
		Source
		Taxation of contributors
	Benefit Structure	Benefit formula
		Pension base
		Indexation
		Minimum pension
		Payment form
		Taxation of benefits
	Administration	Ministerial authority
		Investment policy
Major	PAYG to Defined Contribution	Public/Private mix
		Minimum pension
		Other guarantees
		Transition period
		Transition mechanism
	Conventional PAYG to Notional accounts PAYG	Minimum pension
		Other guarantees
		Transition period
		Transition mechanism
	Provident Fund to PAYG	Contribution rate changes
		Benefit formula
		Pension base
		Indexation of benefits
		Transition mechanism
	New System	Coverage
		Contribution rate
		Contribution base
		Benefit formula
		Pension base
		Indexation of pensions
		Transition mechanism

Table 2: Different Types of Pension Reforms

MINOR REFORMS			
	Eligibility Criteria	Retirement Age	New Zealand (2) Nigeria Zaire Czech Republic Estonia Hungary Lithuania Costa Rica Panama Peru Lebanon Greece Ireland Italy Portugal Argentina Australia Latvia
		Service Years	Lithuania Brazil Greece Portugal Bermuda Italy Latvia Mexico Paraguay Uruguay
	Contribution Structure	Contribution Rate	Indonesia Japan Korea Malaysia Taiwan Algeria Benin Burundi Gabon Guinea Morocco Nigeria Senegal Sudan Albania Armenia Azerbaijan Belarus Bulgaria Czech Republic Estonia Georgia Kazakhstan Kyrgyzstan Latvia

			Lithuania Moldova Poland Russian Federation Slovakia Slovenia Turkmenistan Ukraine Uzbekistan Barbados Bolivia Colombia Mexico Nicaragua Cyprus Israel Libya Malta France Canada Germany (2) Greece Italy Netherlands Norway Portugal Sweden Bolivia Cuba Czech Republic El Salvador Italy Latvia Mexico Sudan Uruguay
		Contribution Base	Nigeria Sudan Barbados Colombia Costa Rica Dominica France
	Benefit Structure	Pension Formula	Iran Congo Senegal Sudan Armenia Belarus Estonia Hungary Kazakhstan Kyrgyzstan Latvia (2) Lithuania Poland

			Colombia Ecuador Panama Denmark Finland France (2) Greece Italy (2) Norway Portugal Czech Republic Mexico Paraguay Peru Uruguay
		Indexation	Belarus Poland Russia Ecuador Malta France Germany
MAJOR REFORMS			
	PAYG to Defined Contribution		Argentina Bolivia Colombia El Salvador Mexico Peru Seychelles Uruguay Australia Hungary Poland Latvia Sweden Kazakstan
	Provident Fund to PAYG		Indonesia Nigeria
	New System - PAYG or other		Mozambique Zimbabwe Oman Angola Guatemala

Table 3: Old/New Contribution Base

Country	Old Contribution Base	New Contribution Base
Barbados	Maximum: B$600/week	Maximum: B$750/week
Dominica	Maximum: EC$36,000/year	Maximum: EC$60,000/year
France	Maximum: 11,340 francs/month	Maximum: 13,720 francs/month
Nigeria		Maximum: 48,000 naira/year
Sudan	Minimum: 34 pounds/ month; Maximum: 100 pounds/ month	

Table 4: Old/New Benefit Structure

Country	Old Benefit Structure	New Benefit Structure
Armenia	55% of assessed wage for 25/20 years of service male/female and 1% for each additional year; assessed wage is 100% of the average of the best 5 years of the last 15 if earnings are up to 4 minimum wages and as low as 15% of the average if earnings are as high as 10 times minimum wage	60% of the average of any consecutive 5 of the last 15 years for 25/20 years of service male/female and 1% for each additional year
Belarus	55% of assessed wage for 25/20 years of service male/female and 1% for each additional year; assessed wage is 100% of the average of the best 5 years of the last 15 if earnings are up to 4 minimum wages and as low as 15% of the average if earnings are as high as 10 times minimum wage	55% of the average of any consecutive 5 of the last 15 years for 25/20 years of service male/female and 1% for each additional year
Congo	30% of the average of the last 3 or last 5 years for 20 years of service and 2% for each additional year	40% of the average of the last 3 or last 5 years for 20 years of service and 2% for each additional year
Czech Republic	50% of the best 5 of the last 10 years for 25 years of service and 1% for each additional year up to 35 years	Basic flat rate plus 1.5% of average indexed earnings for each year of insurance after 1985 with 4% increase for each year worked beyond retirement age
Denmark	Maximum on employment related: 22,700; Maximum on income-tested supplement: 3,534	Maximum on employment related: 13,500; Maximum on income-tested supplement: 3,709
Ecuador	50% of the average of the best 5 years for 5 years of service and 1.25% for each additional year	75% of the average of the best 5 years for 30 years of service and 1.25% for each additional year
Estonia	55% of assessed wage for 25/20 years of service male/female and 1% for each additional year; assessed wage is 100% of the average of the best 5 years of the last 15 if earnings are up to 4 minimum wages and as low as 15% of the average if earnings are as high as 10 times minimum wage	410 EEK plus 3.2% for every year covered from 15-19 years, 3.3% for every year covered from 20-24 years, 3.4% for 25-29 years, 3.7% for 30-34 years, 3.8% for 35-39 years, and 4% for 40 or more years
Finland	412 marks per month plus 1.5% of	1.5% of average earnings from

Country	Old Benefit Structure	New Benefit Structure
	average of the middle 2 earning years of the last 4	1991, but no more than 10 years, eliminating highest and lowest years, for every year of service, with 2.5% for every service year above the age of 60
France	50% of the average of the best 10 years since 1947	25-50% of the average of the best 25 years since 1947, depending on age and length of service
Greece	Minimum pension: 64,860 drachmas per month increased by 1% for each dependent	Minimum pension: 86,940 drachmas per month increased by 1% for each dependent
Iran	2.9% per year of service of the average of the last 2 years	3.3% per year of service of the average of the last 2 years
Kyrgyz Republic	55% of assessed wage for 25/20 years of service male/female and 1% for each additional year; assessed wage is 100% of the average of the best 5 years of the last 15 if earnings are up to 4 minimum wages and as low as 15% of the average if earnings are as high as 10 times minimum wage	55% of the average of any 5 consecutive of the last 15 years for 25/20 years of service male/female and 1% for each additional year
Lithuania	55% of assessed wage for 25/20 years of service male/female and 1% for each additional year; assessed wage is 100% of the average of the best 5 years of the last 15 if earnings are up to 4 minimum wages and as low as 15% of the average if earnings are as high as 10 times minimum wage	Basic pension no less than 110% of poverty level and supplemental pension based on years of coverage and ratio of individual earnings to national average
Norway	45% of the current base amount x the average number of pension points in the best 20 years, with the maximum of 8 1/3 points per year	42% of the current base amount x the average number of pension points in the best 20 years, with the maximum of 7 points per year
Panama	60% of the average of the best 3 of the last 15 for 15 years of service plus 1.25% for each additional year between 10 and 20, 1.5% for each additional year above 20, and 2% for each year above pensionable age	60% of the average of the best 7 of the last 15 for 15 years of service plus 1.25% for each additional year, and 2% for each year above pensionable age
Portugal	2.2% of the average of the best 5 of the last 10 years for each year of	2.0% of the average of the best 10 of the last 15 years for each year of

Country	Old Benefit Structure	New Benefit Structure
	service	service
Senegal	1.05% of base earnings for each year of service	1.33% of base earnings for each year of service
Sudan	1.67% of last monthly earnings for each year of service	2% of last year's salary for each year of service

Table 5: Old/New Pension Indexation

Country	Old Pension Indexation	New Pension Indexation
Belarus	Periodic adjustments for wage and price changes	Adjustments when average wage increases more than 15%
Ecuador	Adjusted annually for price increases	Periodic adjustments for increases in legal minimum wage and inflation
France	Semiannual adjustment for changes in national average wage	Adjustment for changes in cost of living
Germany	Adjusted annually for changes in wages	Adjusted annually for changes in real value of pensions compared to changes in earnings
Malta	Adjusted annually for changes in wages starting at age 63	Adjusted for increases in wages and prices
Russia	Periodic adjustments for wage and price changes	Quarterly adjustment based on cost of living changes in the form of fixed amount or proportional increase of all pensions

Table 6: Major Reforms Defined Contribution Systems

Country	Funded Pillar, Privately Managed	Safety Net	Status of Old System	Transition Mechanism
Argentina	Optional second pillar	First pillar flat pension	Reformed, but open to new workers	Compensatory pension for previous years of service
Australia	Mandatory second pillar	Means-tested first pillar	Fully functional	Not needed; second pillar added to first
Bolivia	Primary system	Annual pension benefit for those at least 21 years of age in 1995 out of shares in state-owned firms	Closed to new workers and those below age 35	Compensatory pension
Chile	Primary System	Minimum Pension Guarantee	Closed to new workers	Recognition Bonds payable at time of retirement
Colombia	Optional primary system	Minimum pension guarantee	Slightly reformed, but open to new workers	Recognition bonds
El Salvador	Primary system	Minimum pension guarantee	Closed to new workers and those under the age of 35	Recognition bonds
Hungary	Optional second pillar	Earnings-related first pillar	Closed to new entrants	Compensatory pension
Kazakhstan	Primary system	Minimum pension guarantee	Closed completely	Compensatory pension
Mexico	Primary system	Minimum pension guarantee	Closed completely	Current workers retain rights to state pension if higher
Peru	Optional primary system	None	Open to new workers	Recognition bonds at time of retirement
Poland	Mandatory second pillar	Notional accounts first pillar	Closed to new entrants and workers under the age of 30	Notional initial capital
Sweden	Mandatory second pillar	Notional accounts first pillar	Conventional DB closed	Compensatory pension in transition to notional accounts
United Kingdom	Optional second pillar	Flat first pillar	Open to all	Compensatory pension calculated based on last contribution
Uruguay	Optional second pillar	Earnings-related first pillar, but with ceiling	Reformed, but open to new workers	Years of service recognized for those under 40, but under new formula; older cohorts get reformed benefits, phased in

Figure 1: Pension Reforms Around the World

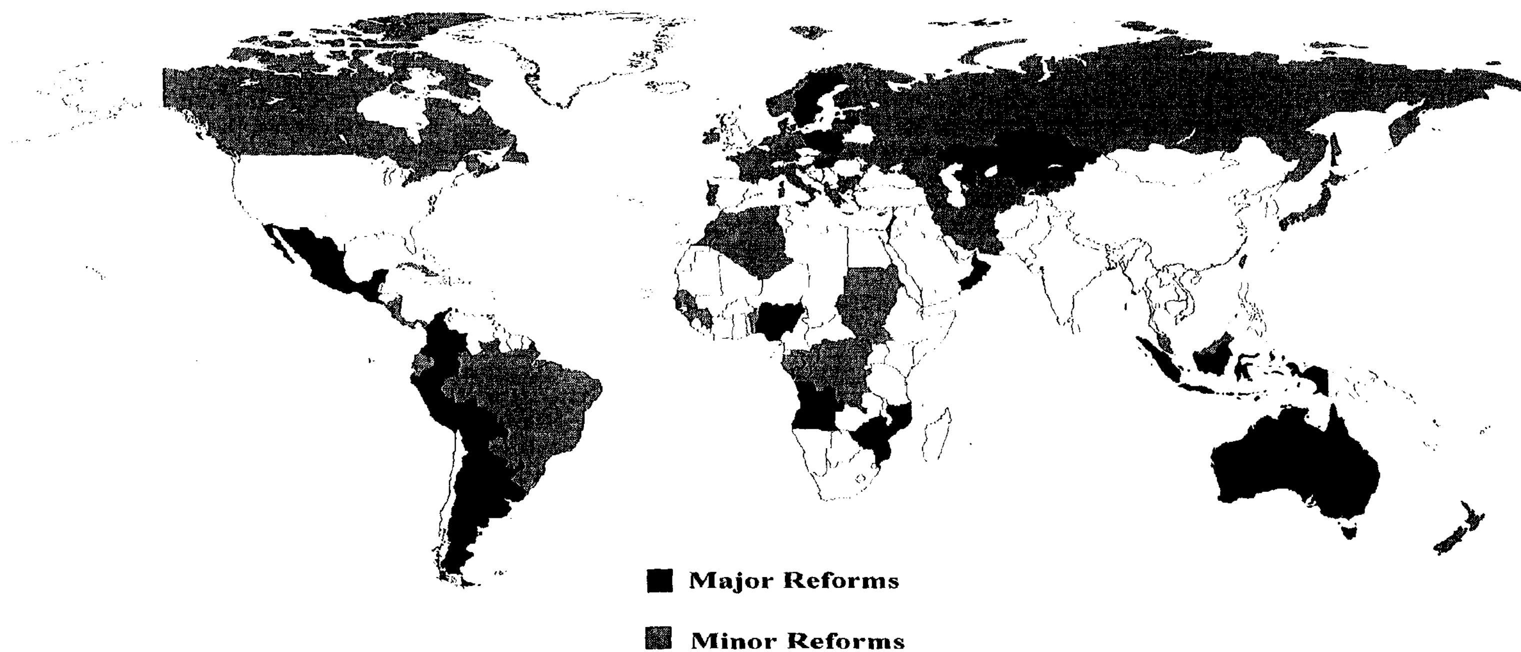


Figure 2: Countries Which Received Advice from the World Bank on Pension Reform

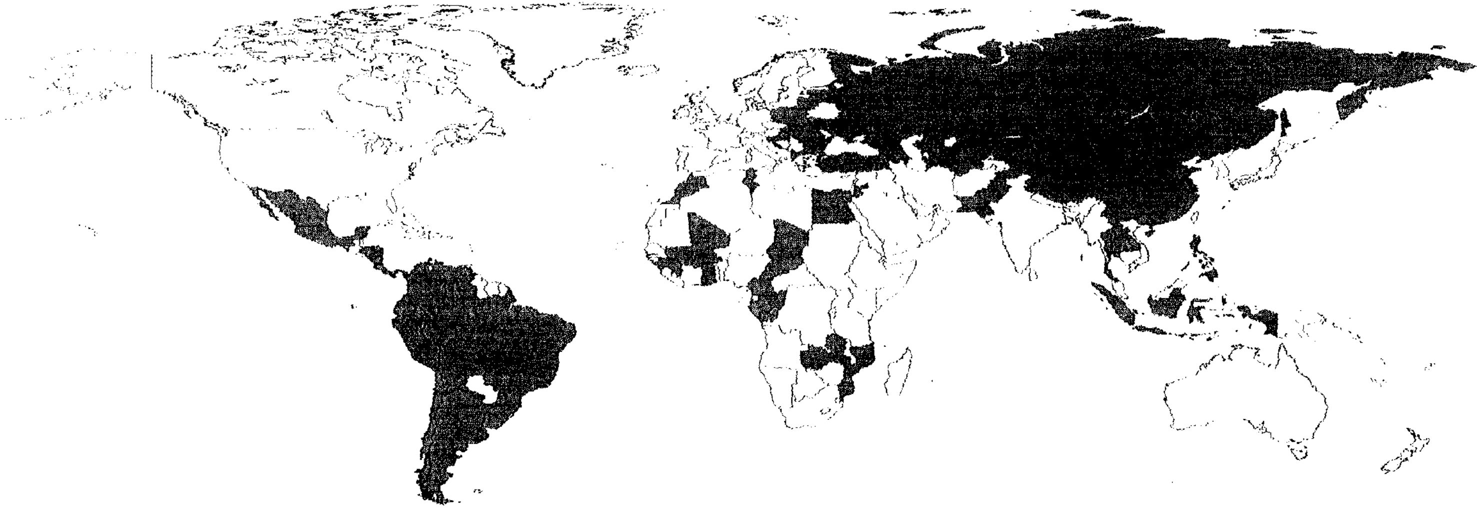


Figure 3: Pension System Surplus or Deficit as Share of System Revenues (1986 and Old Age Dependency Ratio 1990)

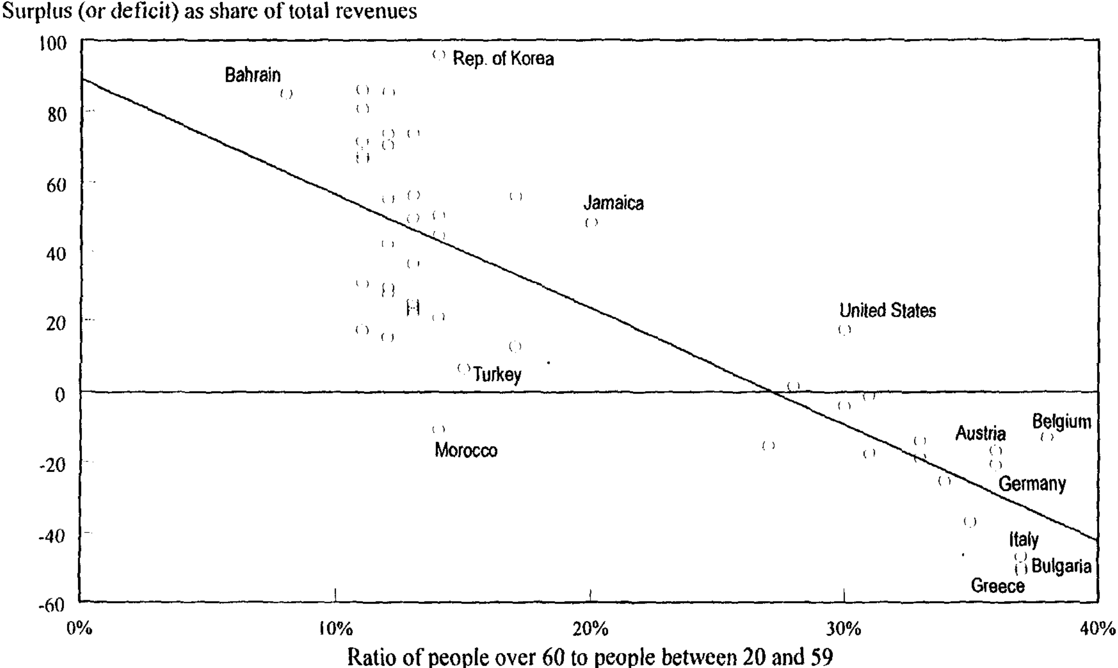


Figure 4: Major Reforms vs. Minor Adjustments

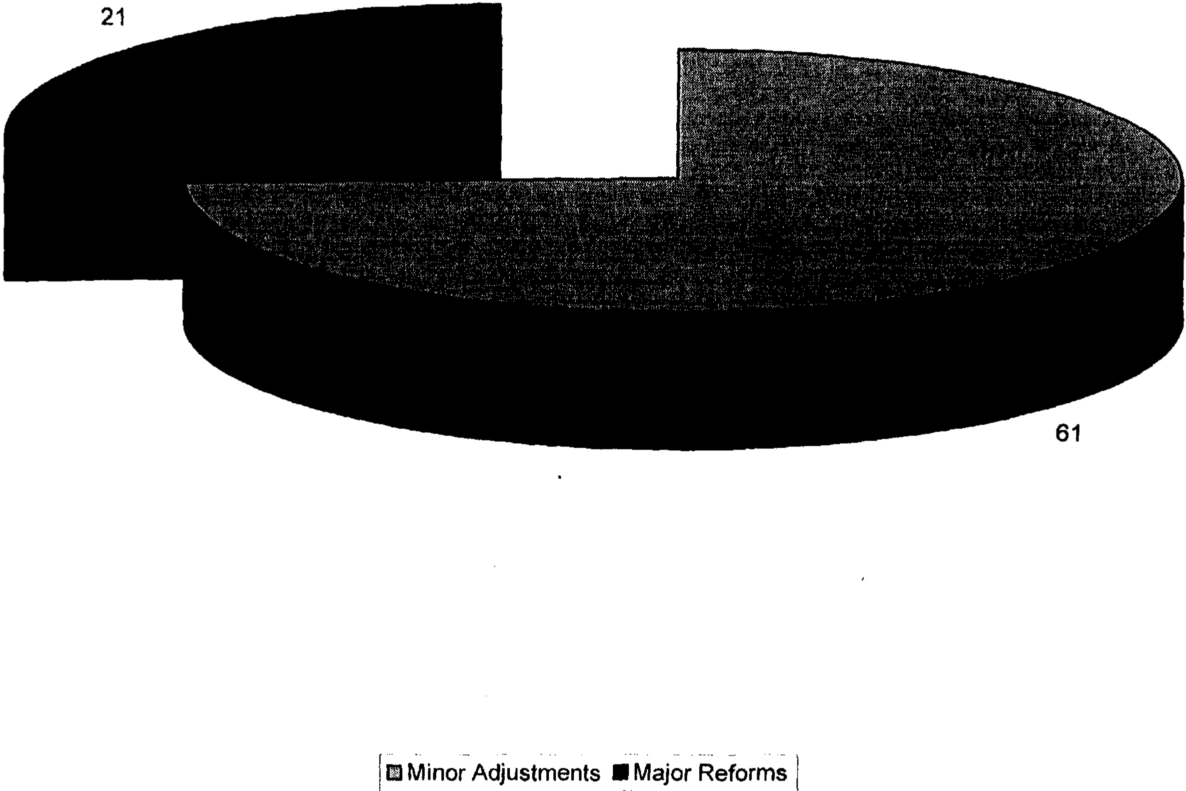


Figure 5: Different Types of Reforms

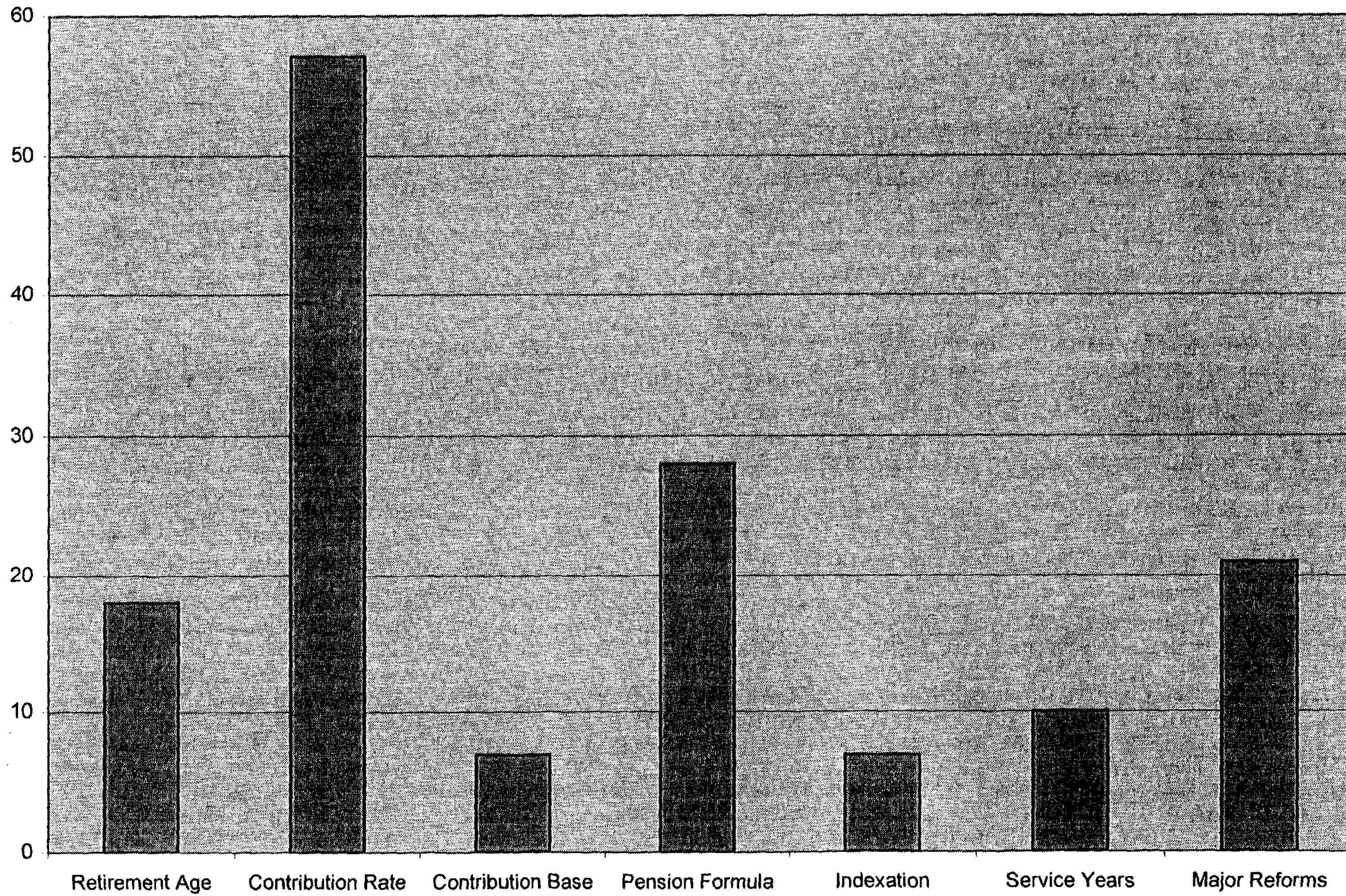
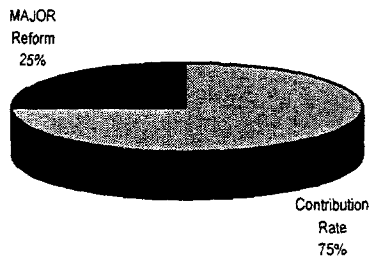
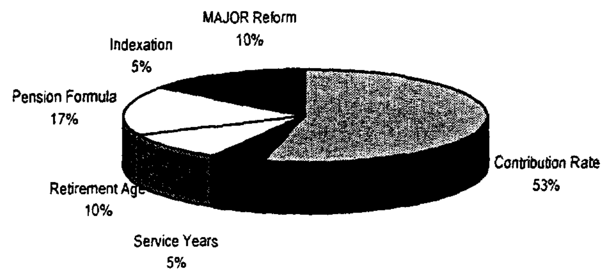
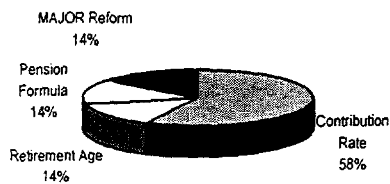
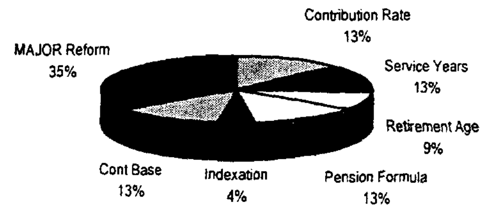


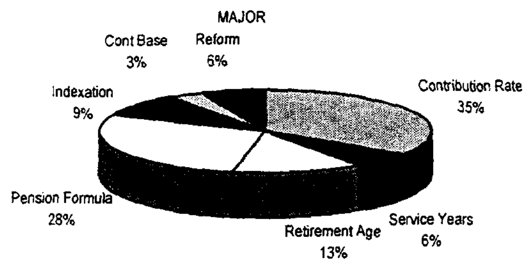
Figure 6: Regional Breakdown of Reforms











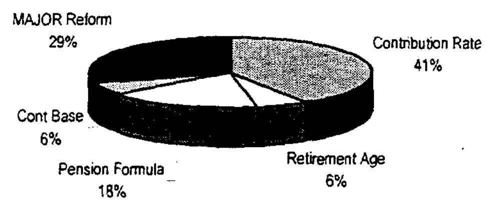


Figure 7: Changes in Retirement Age for Men

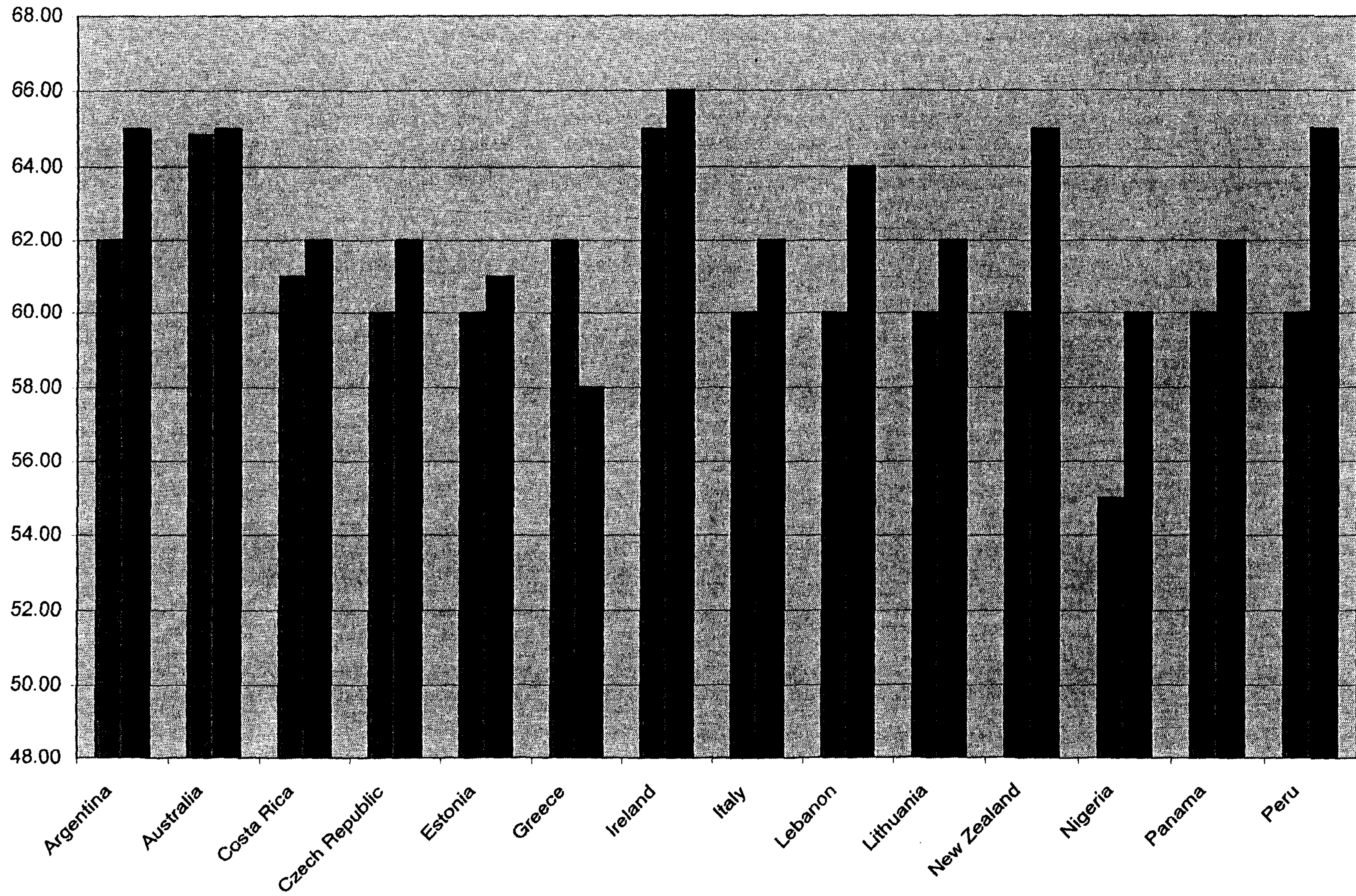


Figure 8: Changes in Retirement Ages for Women

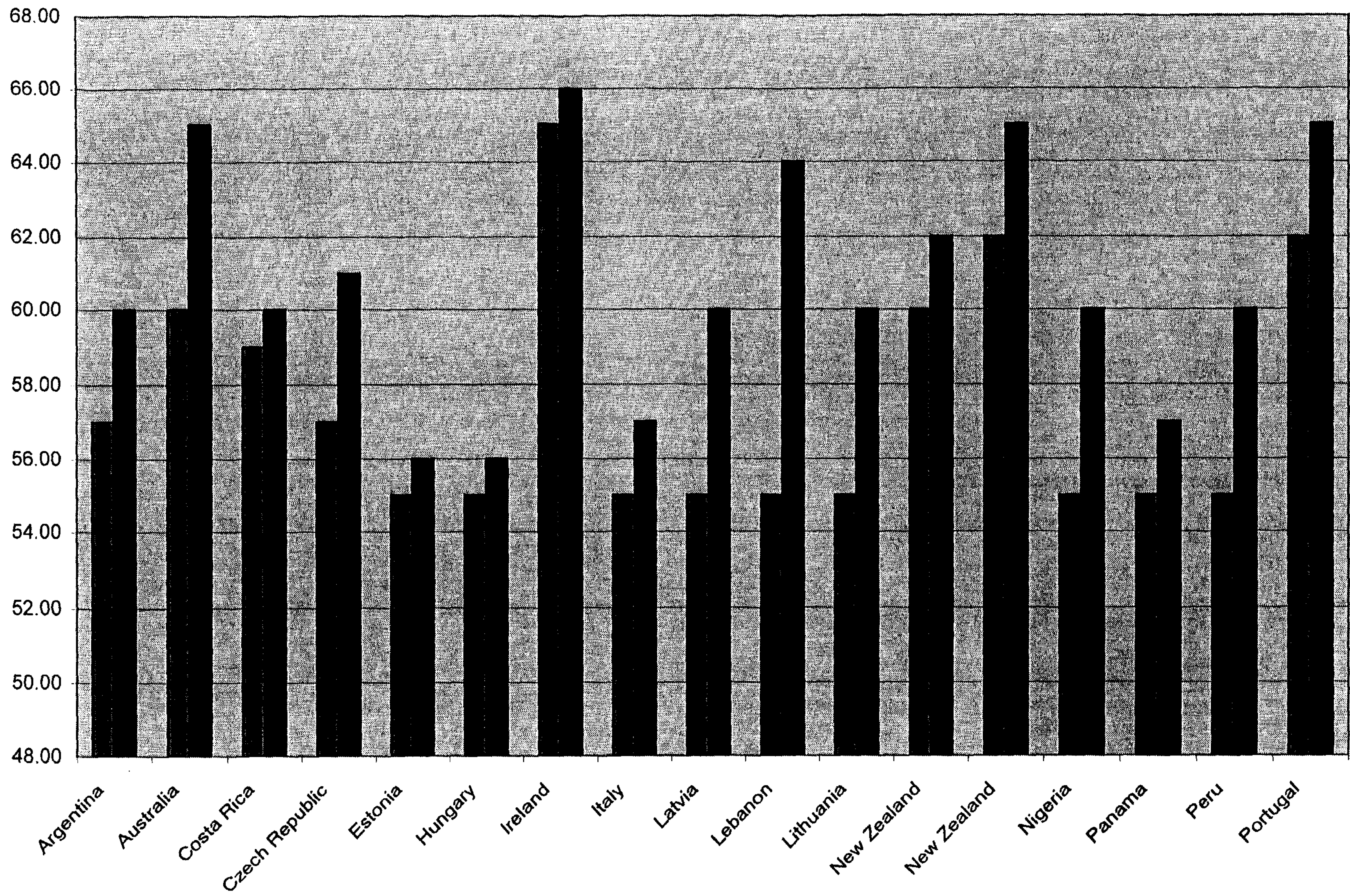


Figure 9: Minimum Required Service Years

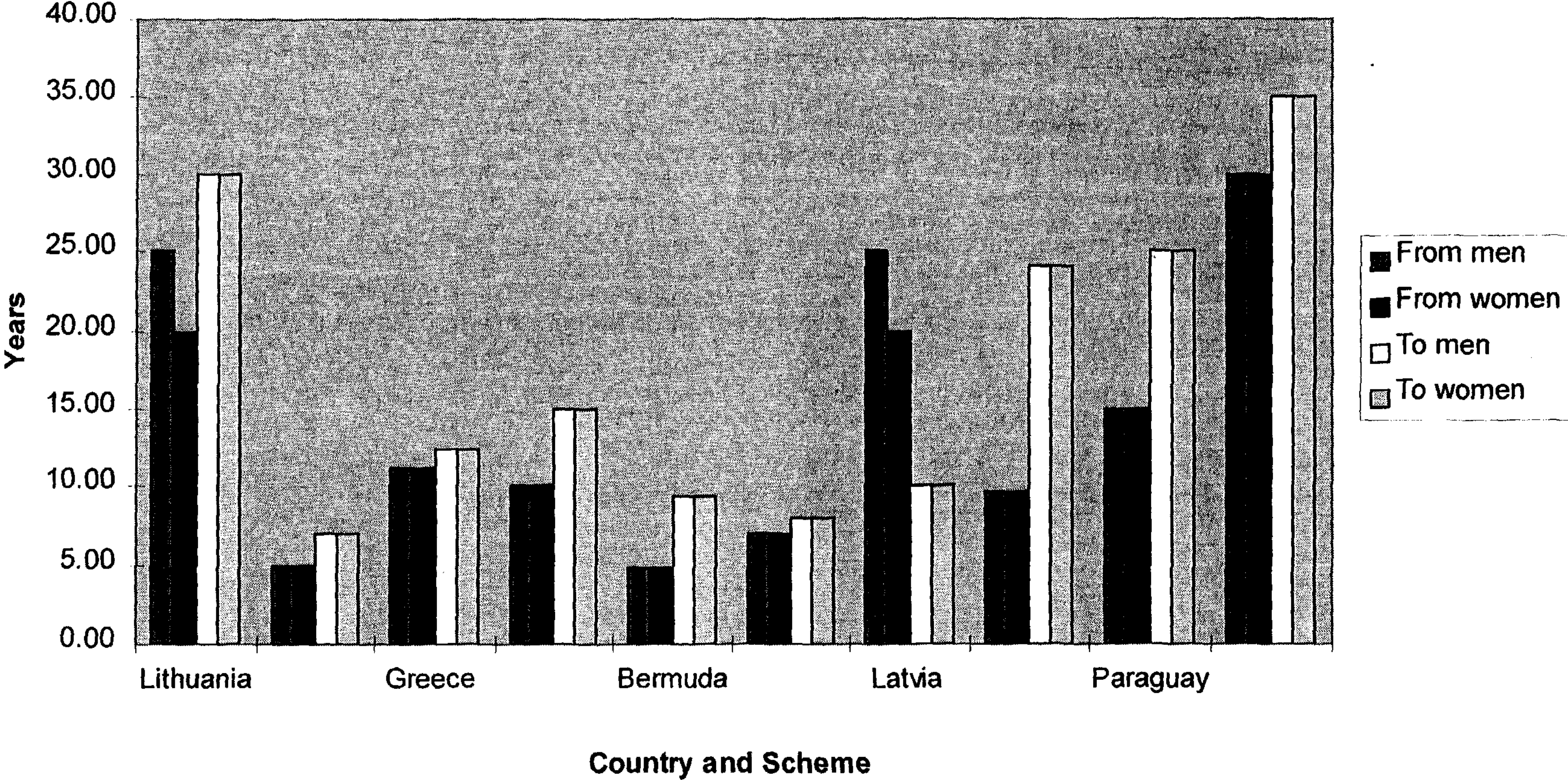


Figure 10: Changes in Contribution Rates for Employers

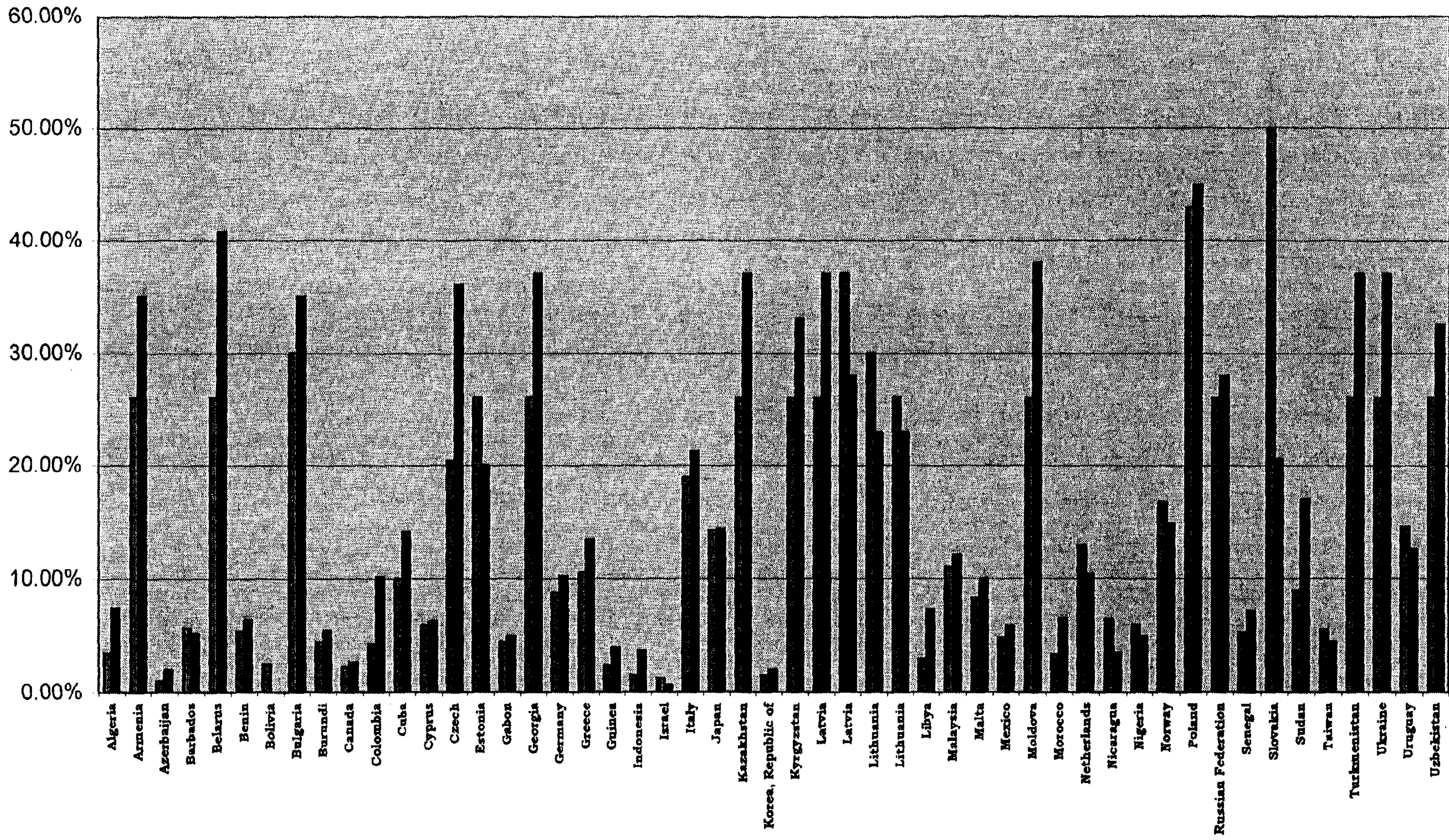


Figure 11: Changes in Contribution Rates for Employees

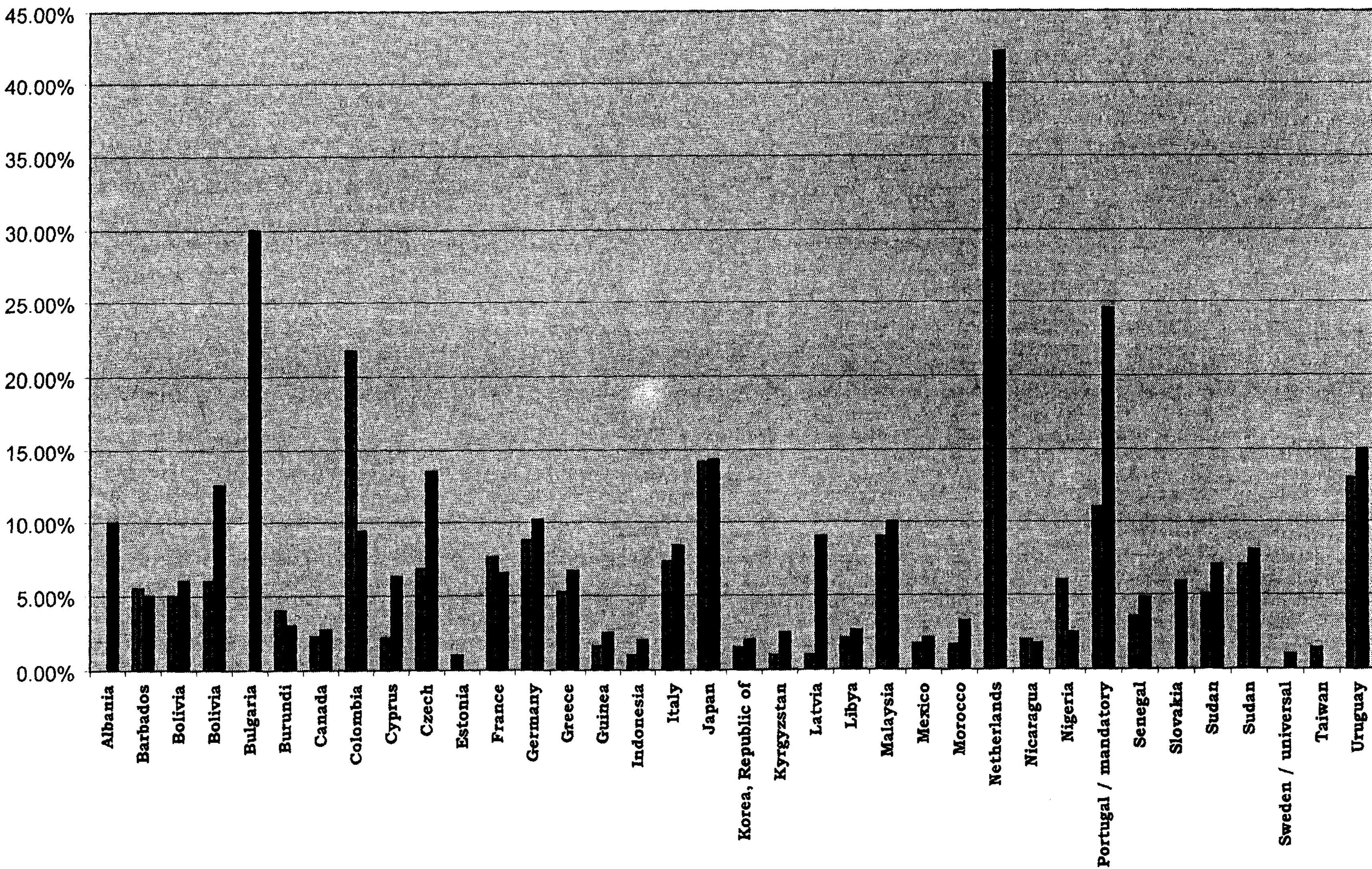


Figure 12: Rate of Return to Different Cohorts

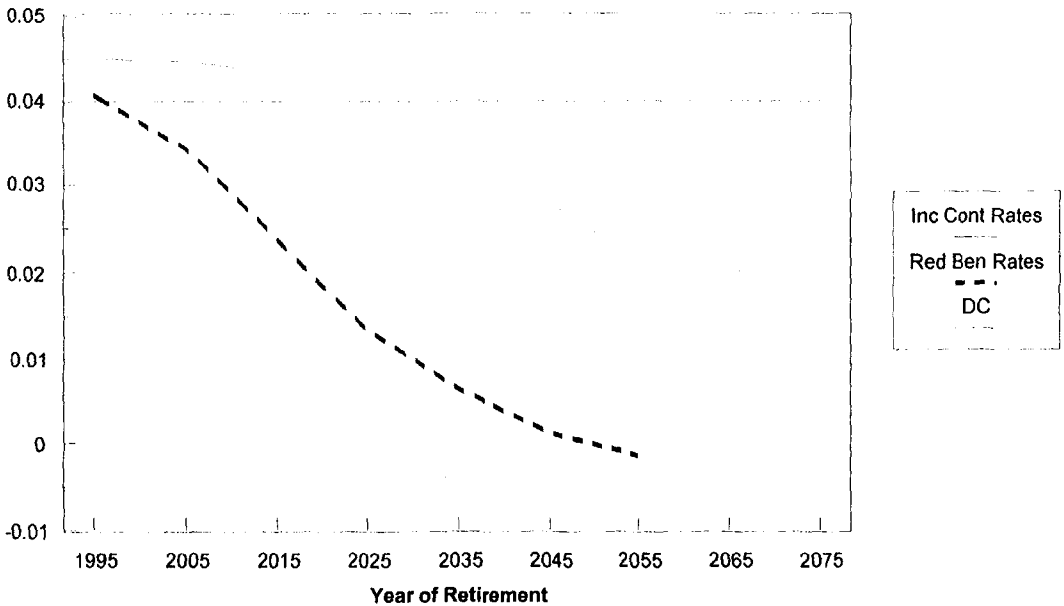
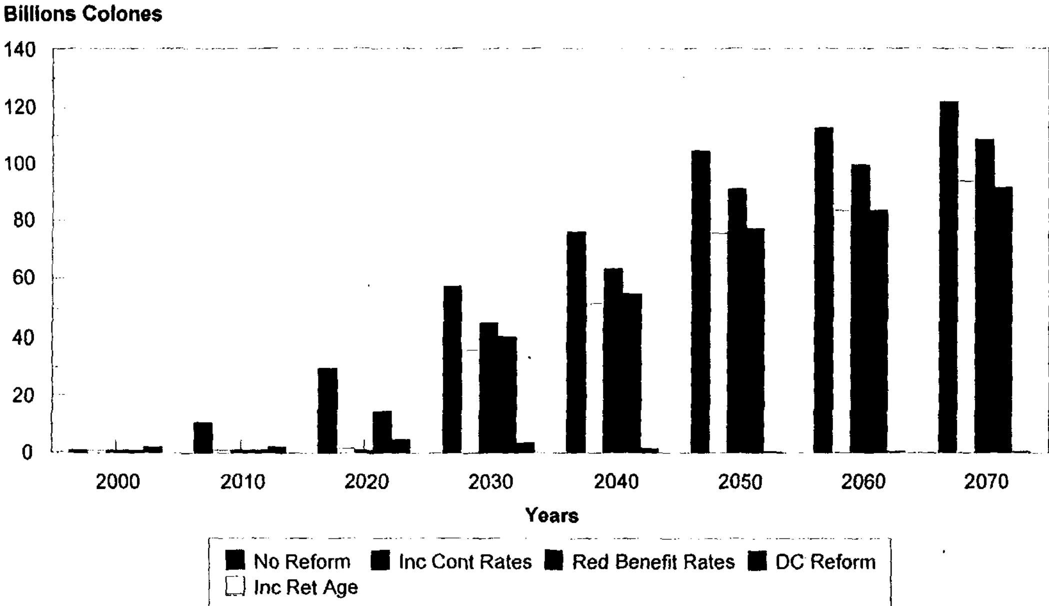


Figure 13: Cost to the Government Under Different Reform Options



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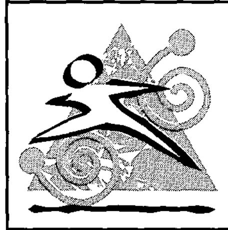

Summary Findings

Systems providing financial security for the old are under increasing strain throughout the world. Over the next 35 years, the proportion of the world's population that is over 60 will almost double, from 9 percent to 16 percent. Populations are aging rapidly due to rising life expectancies and declining fertility rates. This puts added strain on extended families and other traditional ways of supporting the old which are already weakening under the pressure of urbanization, industrialization, and increased mobility. At the same time, public systems of old age security are themselves in need of reform. Most existing systems are very costly even though they provide inadequate protection for the old. The purpose of this paper is to provide a brief summary and evaluation of recent pension refroms around the world.

HUMAN DEVELOPMENT NETWORK

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