



Social Protection Discussion Paper Series

Disability Pensions and Social Security Reform Analysis of the Latin American Experience

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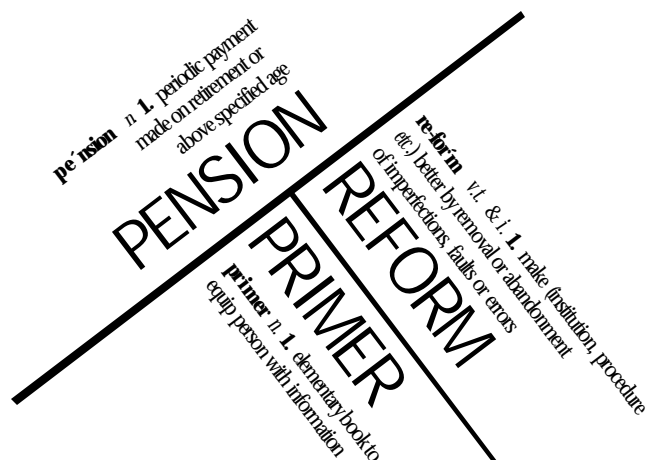
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Analysis of the Latin American experience

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Disability pensions and social security reform

Analysis of the Latin American experience¹

1. Introduction

This paper describes the disability pension arrangements prevailing in ten Latin American countries that reformed their pension systems. The analysis is limited to the topic of disability pensions, without attempting to evaluate other critical aspects such as the available infrastructure: handicapped access generally (ramps, blind cues), medical and nursing support, home care, and so on. The relative significance of disability pensions is highly dependant on these factors and, however, they are really limited in most countries of Latin America.

Disability pensions are often a source of inefficiency and inequity in social-security systems. Although coverage, qualification criteria and organization may be independent of the pension system adopted, any discussion of pension reform must include a clear picture of the organization and structure of disability pensions. Given the range of misleading information which can be supplied by the claimant, and the associated transactions costs in checking the information out, the topic of moral hazard may deter the development of disability insurance. Still in developed economies, while there is a deep market in life insurance, disability insurance is much thinner.

From a social and financial perspective, there is a big challenge to find ways to prevent abuse on one side and not be very restrictive on the other. The total number of social security beneficiaries can be divided into three main programs: old age, survivorship and disability. The participation of the latter varies from 8% in Chile (33 out of 441 thousand, AIOS, 2003) to 19% in Mexico (0.3 out of 1.7 million, IMSS, 2002).

The disability-pension system consists of eight main elements, which are discussed in turn. First, the definition of contingency covered varies between countries in four main ways:

- Total or partial disability, and the definition of these two categories
- Duration of disability (permanent or temporary)

¹ Chapters 1 to 3 of this paper are partially based on a previous work (Grushka and Demarco, 1999). The authors are grateful to Robert Palacios and to an anonymous reviewer for their helpful comments and to Yvonne Sin for her assistance developing the mathematical models.

- Cause of disability (e.g., inclusion or exclusion of job-related illnesses, working accidents, self-inflicted injuries, etc.)
- General or specific disability (i.e., inability to previous job or to any job)

All pension systems also establish eligibility requirements such as previous affiliation. In some countries, the pre-existence of illness at the time of affiliation may be a cause to exclude coverage, as in the case of private insurance.

Pension systems often insure family rather than individual incomes against various contingencies. Although these could be considered as part of survivors' benefits, it is essential to consider the extent of these 'derived' pensions, particularly when comparing levels of costs.

The benefit level is also important. Even in defined contribution or individual account schemes, disability pensions tend to be 'defined benefit', i.e. a proportion of earnings in a period prior to becoming disabled. The formula will therefore include a reference period and a reference income as well as a specified proportion of the income to be paid as a pension.

The period of coverage usually depends on the permanent or temporary nature of the disability. In the case of permanent disability, the period of coverage is usually the remaining life of the disabled worker and his or her immediate family group (including surviving spouse and children until they reach adulthood). However, an alternative system is to pay disability benefits only until normal retirement age, as in Bolivia.

The institution responsible for certifying disability is not simply an operational issue: some countries have seen improvements from reforming the disability-pension system alone, while others have not reaped the full benefit of introducing funded pensions, because the disability system has not been properly adapted to the new regime.

Contributions to finance the disability-pension system are usually only differentiated in funded systems when a separate insurance mechanism is introduced, whereas they are usually subsumed within general pension contributions in pay-as-you-go systems. This lack of transparency is an important cause of inefficiency in traditional, state-run disability systems. But funded systems alone are not a guarantee of transparency, for example, when disability is lumped together with survivors' benefits or when insurance companies and pension-fund managers are part of the same economic group (see below).

Mechanisms of financing disability benefits are naturally linked with the rest of the pension system. Involvement of insurance companies does not necessarily require private

administration of pension funds. Similarly, some individual account systems continue to finance disability benefits through public institutions.

This paper focuses on ten Latin American countries that have reformed their pension systems introducing individual funded pension accounts. Comparisons reveal that a wide variety of options for disability systems are possible. In the following sections general issues in the design of the disability-pension systems are identified.

2. The disability-pension system in Latin America

Latin-American countries reforming their social-security systems have adopted alternative models. The comparisons that follow are not exhaustive, but show the different approaches taken. Fundamental pension reform is neither a necessary nor a sufficient condition from reform of the disability system. However, setting aside the idea of the monopoly of the state in providing social insurance helps a great deal. It is easier reform the disability sub-system within the context of a systemic reform.

The Chilean reform of 1981 was an important basis for other Latin-American systems. Disability benefits are granted to members who suffer a permanent loss of working capacity (decree 3500, 1980). The permanence of the loss is established by objective demonstration of an underlying disease or condition (Aguirre et al., 1996).

A central part of the new pension systems is that different functions - such as collecting contributions, management, insurance, disability qualification and regulation - are the responsibility of different agencies or companies.

2.1 Contingency covered

The definition of the contingency comprises three basic parts: type, degree, and duration of incapacity. Each aspect will be considered separately below.

2.1.1 Type of disability

In Argentina the system covers people incapable of work, totally and for any reason, granting them a disability pension ('retiro por invalidez'). Disability is defined as incapacity to do any job, not a specific job. While the new system explicitly excludes 'earnings' incapacity, the previous pension law was ambiguous over incapacity to carry out a job compatible with

professional qualifications. During the 1980s and early 1990s, different verdicts of the social-security federal court and national supreme court said that claimants should be able to substitute any other activity compatible with their skills, age, position reached in the hierarchy in their usual job, and the conclusions of the medical diagnosis. Similarly, disability was not based on psychophysical incapacity alone, but also on socio-economic conditions affecting earnings capacity (Fernandez Madrid and Caubet, 1994). This approach was explicitly abandoned after the reform.

In Chile, disability refers to general, not specific, incapacity and its inability to perform day-to-day activities.

The Bolivian system defines disability as total and definitive incapacity to perform a 'reasonable paid job', caused by chronic illness, injury, loss of a limb or a function, excluding those arising from 'professional risks' (Law 1732, 1996). Professional risks - work accidents or job-related disease - are considered separately, when the affiliate becomes definitively unable to perform his or her usual job. Incapacity may be total or partial (greater than 10 per cent). The disability pension is set as a percentage of a reference salary, according to the percentage of incapacity, as long as this exceeds 25 per cent. For incapacity between 10 and 25 per cent, affiliates receive a one-off payment of 48 times the reference salary times the percentage of incapacity.

Disability in the Mexican system is defined as the inability to obtain a similar job paying at least 50 per cent of usual remuneration in the last year of work, according to the law of December 1995. Inability to work must be a result of a non-professional disease or accident. Benefits are denied if the insured intentionally caused the disability, if he/she is responsible for the crime that caused the disability, or if the disability arose before membership of the pension scheme.

In Peru, there is a right to benefits when disability did not result from professional accidents or diseases, intentional action, or alcohol or drug use (Decree 25897, 1992). Total disability is defined as physical or mental incapacity, presumed permanent, preventing work of more than two-thirds of normal productive capacity. Partial disability is defined as incapacity, presumed prolonged, impeding work of between half and two-thirds of normal capacity.

In Uruguay (law 16714, 1995), there are three kinds of benefits related to disability. First, total disability benefit covers absolute and permanent incapacity for any job, originating while working or in a compensated period of inactivity, by any cause. Two years of recognized pension membership must be proven, with a minimum of six months immediately before

incapacitation. There is no membership requirement when incapacity is caused by the job or occurred during work-time. The period is extended up to two more years when ten years of people who are absolutely and permanently incapacitated for any job, but do not meet the other requirements recognized membership are completed. Secondly, a non-contributory benefit is granted to. Thirdly, a temporary payment is made for partial incapacity when absolute and permanent incapacity for the usual job cannot be established for a maximum of three years.

2.1.2 Degree of disability

Of the ten countries analyzed (Table 1), only two - Chile and Peru - allow for partial disability pensions, but in both cases at least a 50 per cent decrease in capacity is required. In Mexico and Colombia, the same percentage defines total disability. Both Chile and Peru define the partial disability benefit as the total disability pension times the proportion of disability. In Argentina the system covers total incapacity, defined as a loss of 66 per cent or more of working ability (including intellectual and physical aspects). In Colombia, benefits are paid if 50 per cent or more of working capacity is lost due to any non-professional, unintentional cause (Law 100, 1993).

Table 1. Required degree of disability in Latin-American countries

| Country | Total | Partial |
|----------------|--------------|----------------|
| Argentina | 66% | |
| Bolivia | 60% | |
| Chile | 66% | 50% |
| Colombia | 50% | |
| Costa Rica | 66% | |
| Dominican Rep. | 66% | 50% |
| El Salvador | 66% | 50% |
| Mexico | 50% | |
| Peru | 66% | 50% |
| Uruguay | any job | usual |

There are two main arguments for partial disability pensions. First, they compensate the worker for the reduction in expected salary due to limitations imposed by partial disability. Secondly, these benefits could prevent discrimination against partially disabled workers, since

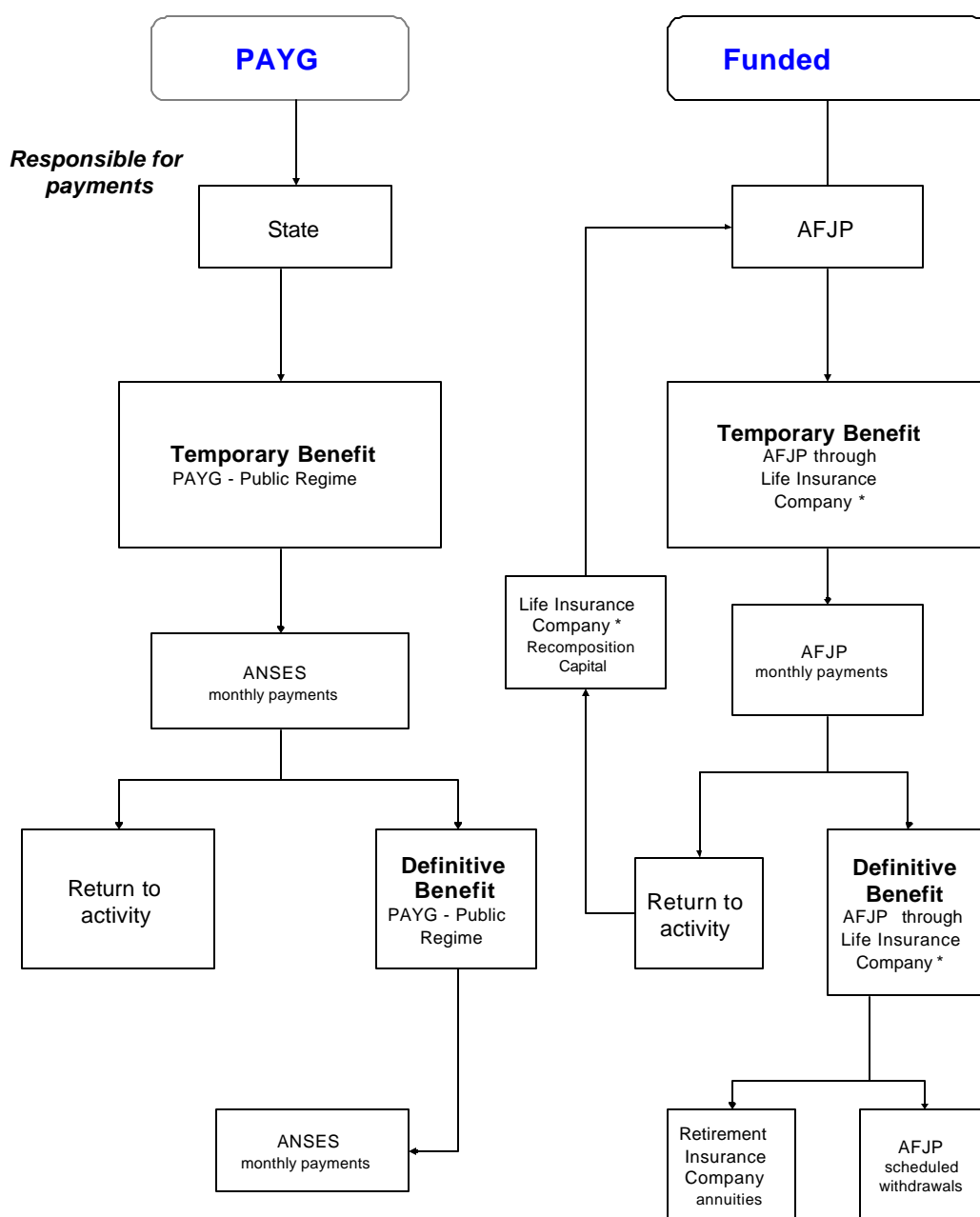
employers would only be responsible for marginal increases in the degree of disability and they might be able to offer lower salaries to partially disabled workers.

Apart from cost, the main argument against partial disability pensions is the need for simple rules. While total disability pensions clearly cover the inability to earn a reasonable income from work, it is difficult to establish a clear distinction between partial disability and reductions in working capacity for other reasons.

2.1.3 Provisional and. definitive benefits

The set of rules and procedures for obtaining disability benefits must be clearly established and the case of Argentina, as an example, is summarized in Figure 1. The benefit is initially considered provisional ('retiro transitorio') since it can be revoked by the medical commission, based on reports from professionals and institutions carrying out psycho-physical treatment and work rehabilitation. Three years after the provisional declaration, the medical commission summons the member, through their private-pension fund, to ratify his or her right to a permanent benefit ('retiro definitivo') or to revoke it. This period can be extended by two years if the medical commission considers rehabilitation might still be possible.

Figure 1. Disability benefits in Argentina



* During the transition period the Public Regime is also partially responsible.

Most countries pay a provisional benefit during before disability is considered permanent. Only Uruguay offers definitive benefits immediately. At the other extreme, benefits never become definitive in Bolivia and Colombia (Table 2).

The provisional period allows benefits to be withdrawn or revised when disability disappears. In Argentina, rehabilitation therapy is prescribed together when disability is first assessed and beneficiaries are expected to follow this therapy. This solution appears generates a whole range of practical problems: who finances rehabilitation? Who rehabilitates? Who certifies rehabilitation?

Table 2. Definitive declaration of disability in Latin-American countries

| Country | Definitive declaration of disability |
|----------------|----------------------------------------------|
| Argentina | 3 to 5 years after provisional |
| Bolivia | none; benefits can be reviewed up to age 65 |
| Chile | 3 years after provisional |
| Colombia | none; benefits can be reviewed every 3 years |
| Costa Rica | none; benefits can be reviewed at any time |
| Dominican Rep. | none; benefits are reviewed every 3 years |
| El Salvador | 3 years after provisional |
| Mexico | according to each case |
| Peru | after 3 annual declarations |
| Uruguay | immediate |

There are strong arguments for a provisional period, since social security aims to replace incomes only in cases of earnings incapacity. Nevertheless, revision a long time after becoming disabled is unreasonable, since the possibility of re-integration in the labor market diminishes with long periods of inactivity.

2.2 Eligibility requirements

Eligibility for disability requires that members neither have reached retirement age nor are receiving early-retirement benefits. All countries require regular contributions over a certain periods before becoming disabled (Table 3). Two criteria are possible. First, Argentina, Chile, Peru, and Colombia require contributions in the period immediately before becoming disabled. Secondly, Mexico simply requires that a certain number of contributions have ever been paid. Finally, Bolivia and Uruguay combine the two. The first of these has the advantage that workers must be regular contributors when they become disabled, which might deter evasion if members are conscious of not being covered in case of death or disability.

Table 3. Contribution requirements in Latin-American countries

| Country | Requirements |
|----------------|--------------------------------------------------------------------------------------------------------------------------------|
| Argentina | 30 months in the last 3 years, or reduced benefit with 18 months |
| Bolivia | 60 contributions, at least one in the last year and or 18 in the last 3 years |
| Chile | Employees: one contribution in the last year and 6 months in the previous year Self-employed: previous month |
| Colombia | 26 weeks in the year previous to last contribution |
| Costa Rica | 36 monthly contributions, the first one before age 55 |
| Dominican Rep. | |
| El Salvador | 36 monthly contributions, women aged below 55 and men below 60 |
| Mexico | 250 weeks |
| Peru | 3 consecutive in the last 4, 4 non-consecutive in the last 6 months, excluding illness pre-existent at the time of affiliation |
| Uruguay | 2 years, including 6 months immediately previous to disability |

Another important issue is whether the insurance system covers members as soon as they start work. This is the case in Argentina and it might be costly, but otherwise all workers would have a period when they start working when they are not covered in the case of death or disability. Pre-occupational medical examinations are necessary to prevent fraud if immediate coverage is granted.

The coverage of the self-employed is a particular problem. Evasion and irregularity of self-employed contributions are common. Manipulation of contributions to obtain benefits for an existing disability is possible and mechanisms to prevent this are required. Three solutions are possible. First, requiring a medical examination before affiliation. Secondly, requiring a declaration of health before membership is granted ('declaración jurada de salud'). Thirdly, excluding coverage immediately after affiliation ('período de carencia'). The last of these is common in private insurance contracts but seems inappropriate for a social-security system. The first was adopted in Argentina initially, but the disproportionate cost relative to the low level of contributions of this group made the mechanism unsustainable. Additional objections were raised at paying for a medical test when the affiliate might transfer to another pension fund before the initial fund recovered its costs. The second, adopted at present, also has problems: checking the veracity of the affiliate's declaration and using this declaration in case of future disability.

Regularity of contributions is also compatible with private insurance clauses, but it is interesting in the context of a social security system. A simple condition of coverage or

exclusion is needed (e.g., to have contributed ‘regularly’ during the past n months). But consideration of the contribution history would also be sensible, since members are supposed to contribute for 35 years or more. For example, is it fair that the system pays out to a 50-year-old who has only contributed ‘regularly’ during the past two or three years and exclude another 50-year-old who contributed for 20 years but became ‘irregular’ in the past two or three years? Argentina has introduced the concepts of ‘irregular with rights’ and ‘irregular without rights’ to treat these situations more equitably. The distinction allows for partial fulfillment of conditions required, giving rights to lesser levels of benefits.

Another theoretical possibility is to adjust the benefits to reflect the whole contribution history, with benefits reduced for periods without contributions. This system, however, requires very detailed contribution records.

2.3 Other family members covered

Disability systems cover not only disabled workers but also their immediate family group after death. All countries provide survivors benefits, but differ in the entitlement conditions attached. Widows and young children are included everywhere, with varying age limits (up to age 16, extended to age 25 for students in Mexico, 18 in Argentina and 21 in Uruguay). Parents are included only as alternative beneficiaries in Chile and Mexico, and in the case of being disabled in Uruguay.

Rules regarding cohabitant couples differ significantly. In Argentina, the definition of widow(er) includes legal spouses and also ‘cohabitants in apparent marriage’, although requiring legal proof. Until 1970, the ‘derived pensions’² of spouses ceased after a new marriage, but this condition was removed because religious institutions saw it as promoting cohabitation outside marriage. Uruguay includes the right for surviving divorcees to continue receiving alimony payments after the worker’s death.

2.4 Benefit levels and indexation

In all cases, disability pensions are a defined benefit, with the amounts expressed as a percentage (‘replacement rate’) of the average income perceived during a reference period before becoming disabled. Each country defines this percentage arbitrarily, replacement rates varying from 35 to 100% of salary (Table 4). Note, however, that in Mexico there is a

minimum disability pension equivalent to the minimum salary. Derived pensions are up to 30 per cent lower (in Argentina and Chile), depending on the number of surviving dependants.

In theory, one might refer to the last salary (as is the case in Bolivia), or to an average of salaries corresponding to the reference period (as in the rest of the cases considered). The former alternative provides direct substitution of present income, but this is an advantage only in case of continuous labor relationships with growing wage. In order to avoid the possible effects of labor instability, and also the possibility of fraud, the alternative of an average of past salaries appears more appropriate.

Another issue to consider is the length of the reference period. In the cases considered (with the exception of Bolivia), the length varies from three to ten years. A longer period minimizes the risk of instability or fraud, but makes replacement of present income more imperfect.

Table 4. Benefit levels in Latin American countries

| Country | Benefit in terms of average income | Reference period used to calculate average income |
|----------------|--------------------------------------------------------------------------------|------------------------------------------------------------|
| Argentina | Regular: 70%. Reduced: 50% | 5 years |
| Bolivia | 70% (plus a 10% to the individual account for the old age benefit) | last salary |
| Chile | Employees: total: 70%, partial: 50% Self-employed: total: 50%, partial: 35% | 10 years (adjusted for inflation) |
| Colombia | Related to disability proportion | |
| Costa Rica | 60% plus 0.0835% for each monthly contribution over 240 | 60 months (best 48 adjusted for inflation and wage growth) |
| Dominican Rep. | Total: 60% Partial: 30% | 3 years (adjusted for inflation) |
| El Salvador | | |
| Mexico | 35% (including family subsidies and welfare benefits) | 500 weeks |
| Peru | Total: 70% Partial: 50% | 3 years (adjusted for inflation) |
| Uruguay | Total: 65% Partial: 65% (maximum of 3 years) | 10 years |

The differences are even more notorious if the effective replacement rate is considered. In fact, the simple comparison of rates is irrelevant, considering the additional differences in the definitions of the reference income. Besides the different ways to adjust earnings, 50% of the last salary might be greater (or lesser) than 70% of the average salary corresponding to the

² Derived pensions are survivorship pensions generated by a previously retired or disabled pensioner.

last 3-5 years. Differences will also arise as a result of considering tax treatment and presenting net versus gross replacement rates.

Without having enough information to calculate the effective replacement rates, it seems interesting to analyze it before introducing new definitions about disability benefits. The exercise includes a discussion about the income intended to be substituted and the degree of effective substitution desired.

As mentioned before, expressing the reference income as an average of past salaries reduces the possibility of fraud, but individuals are interested in preserving their present level of income. Another system might also contemplate possible income increases or reductions, but these cases appear not only more expensive, but also complex and risky as well. The model adopted will depend on the (relative) weight of two opposite matters: a) individual 'ex-post' preferences regarding replacement rates, and b) the degree of risk involved in a 'last-salary substitution scheme'.

The index used to determine the reference income is of special interest. Argentina uses nominal values (since 1991) underestimating individual real average earnings. In the past, with high inflation levels and despite wage-adjustment rules, there were opportunities for manipulation of the formula (particularly when the government could not find a better way of financing the social-security deficit). Other Latin-American countries have had similar experiences.

After retirement, once the reference income is established, the lack of wage or price adjustments has a different effect. Even without indexation of periodic pension estimates, there is a natural adjustment mechanism through participation in nominal profits. When pensions are paid as scheduled withdrawals by the Pension Fund Managing Companies (PFMC) it is clear that, in the long run, the only mechanism to protect from inflation is a positive real rate of return on investment of pension funds. Otherwise, the use of price or salary indexes would accelerate depletion of the funds in the individual account.

This situation is more complex when retirement insurance companies pay the benefits, since annuities do not necessarily reflect the return on investment of the insurance company's mathematical reserves. However, with profits annuities are available in Argentina and Bolivia, while in Chile and Mexico annuities are indexed.

One last aspect to consider is that members of the funded system that become disabled without meeting requirements can withdraw what they have accumulated in their individual

accounts. This might be viewed as an advantage for the beneficiaries but it is an additional cost for the system as a whole.

2.5 Benefit period

Most disability systems are defined to generate pensions from the moment of disability declaration, and during the rest of the worker's life. This is the case in Argentina, as well as in Chile, Mexico and Peru.

An interesting alternative is provided by the Bolivian system, in which disability insurance covers the period between disability declaration and the age of retirement (as in Canada and United States). In this model, the insurance has to provide the necessary funds to generate a temporary annuity: disability benefits are paid until a new qualification suspends the disability determination or until the affiliate reaches age 65, and begins to perceive his/her retirement. This annuity has the role of substituting the worker's income and contributions, the latter being directed towards the individual account. At retirement age (say, 65 years old), the disability pension is not paid any longer, and the affiliate can purchase an annuity with the funds accumulated in the individual account, directly during the 'working period', and through the insurance during the 'disability period' of his/her active ages.

This alternative system is perhaps more coherent with the idea of 'individual capitalization', given that the defined benefit pension is limited to the period since becoming disable up to retirement age. Retirement pensions are, in all cases, the consequence of individual accumulation. The main problem to evaluate is the possible negative effect on public opinion of an eventual reduction in retirement income after a more or less sustained period of constant incomes provided by the social security system.

In Argentina and Chile, during the first three years of incapacity (which can be extended to five years), benefits are provisional. After a second examination at the end of this period, individuals are either declared rehabilitated or benefits become 'definitive' and they receive a lifetime pension, which can be inherited by the widow(er), and young children. In Mexico, in the absence of widow(er) and orphans, parents have the right to a reduced benefit.

2.6 Institutions responsible for certifying disability

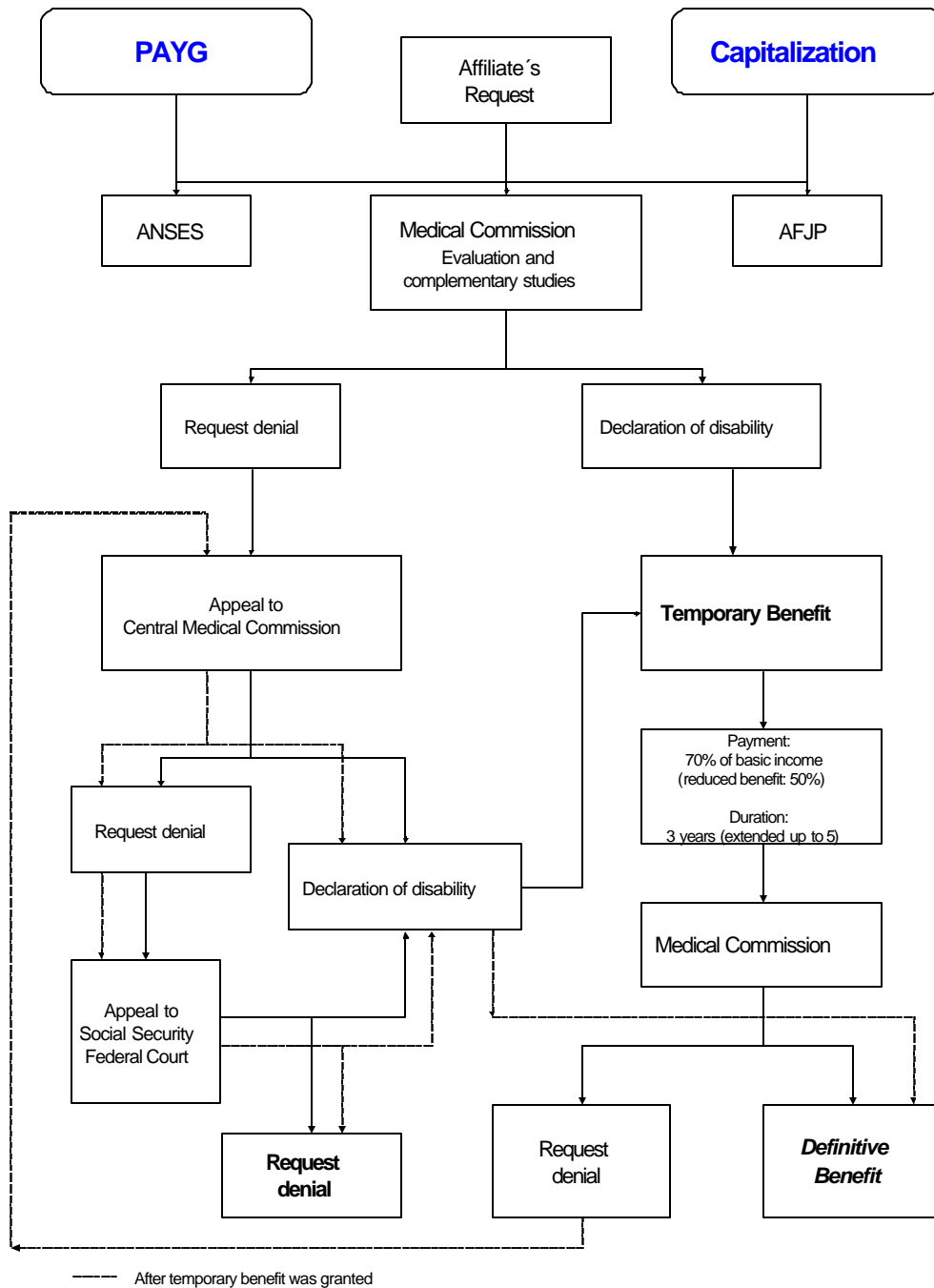
Different agencies are responsible for the evaluation and certification of disability, as summarized in Table 5.

Table 5. Responsible agencies in Latin American countries

| Country | Agency |
|----------------|-------------------------------------------------------------------------|
| Argentina | 3 instances: Medical Commission, Central MC, Social Sec. National Court |
| Bolivia | Medical Board financed by the insurance companies |
| Chile | 2 instances: Medical Commission, Central MC |
| Colombia | 2 instances: Regional Medical Boards, National Board |
| Costa Rica | Qualifying Commission (Caja Costaricense de Seguridad Social) |
| Dominican Rep. | 2 instances: Regional Medical Boards, National Board |
| El Salvador | |
| Mexico | Instituto Mexicano de Seguridad Social (IMSS) |
| Peru | 2 instances: AFP Committee, Supervision Committee |
| Uruguay | Banco de Previsión Social (Social Security Adm.) |

In Argentina, autonomous and independent medical commissions are responsible for disability qualification. Their activities are co-ordinated by the pension-fund supervision agency ('Superintendencia de Administradoras de Fondos de Jubilaciones y Pensiones', SAFJP). Each medical commission has five members and takes decisions by simple majority. The commissions analyze medical records and documentation from the petitioner and can ask for additional studies. Any party involved — affiliate, pension-fund management company, insurance company, the social-security administration ('Administración Nacional de la Seguridad Social' or ANSES) can appeal the medical commissions' decisions. Appeal go in the first instance to the central medical commission and then for judicial review to the social-security federal court. This system, summarized in Figure 2, is better ordered and more transparent than before the reform.

Figure 2. Procedures for claiming disability benefit



Three of the five members of each commission are appointed by the pension supervision agency and two by the labor-risks supervision agency ('Superintendencia de Riesgos del Trabajo', SRT), after public hearings and evaluation of qualifications. The medical commissions are administratively dependent on the supervision agency, and are solely responsible for disability qualification: they also evaluate cases under the pay-as-you-go regime

and industrial injuries. They are financed by the pension funds, labor-risks insurance companies ('Aseguradoras de Riesgos del Trabajo', ART), and the social-security administration, in proportion to the number of cases considered.

This is one of the central differences between the old and new regimes. Prior to the 1994 reform, disability and disability qualification were the responsibility of the same public agency that administered the whole social security system, as is the case in other Latin American countries.

Several institutions take part in the process of disability evaluation and qualification in Chile: a) the Supervision ('Superintendencia de AFP'), through the Unit of Medical Commissions; b) the PFMC, through their association ('Asociación de AFP A.G.');

 and c) the insurance companies, through their association ('Asociación de Aseguradoras de Chile A.G.').

- a) The Superintendencia de AFP (SAFP) oversees the global functioning of the system, establishes the administrative rules, controls their compliance, evaluates the system's functioning and analyzes improved alternatives, is responsible for the Medical Commissions' performance, resolves appeals, and heads the Technical Commission for the Improvement of Evaluating Rules.
- b) The PFMC take a group insurance to finance death and disability pensions and pay disability benefits determined by the Medical Commissions; the Asociación de AFP A.G. finances medical evaluations, manages the Medical Commissions, and takes part in the Technical Commission.
- c) The insurance companies offer the group insurance to finance death and disability pensions and offer individual insurance (annuities) to pensioners with a definitive benefit. The Asociación de Aseguradoras de Chile A.G. takes part in the evaluation process, through medical observers, and in the Technical Commission.

Since 1988, the Regional Medical Commissions, constituted by three medical doctors appointed by the SAFP, are in charge of verifying the compliance with legal and administrative requirements, and determining the loss of working capacity. In 1994 there were 18 Commissions with 55 administrative employees and 66 medical doctors distributed along the country. They had to consider eight thousand claims and the waiting period until resolution was 53 days. While the State is responsible for hiring, paying and supervising medical doctors, the private sector is in charge of providing and managing human and material resources for the Commissions' functioning.

The Central Medical Commission was created in 1983 as a superior instance for appeals, trying to unify criteria and jurisprudence. It has three medical doctors appointed by the SAFP, who considered 1,700 cases during 1994.

The Disability Qualification Boards of Colombia are autonomous institutions of private character. Members are designated by the Labor and Social Security Ministry, who supervises and controls their functioning. Qualifications are made primarily by regional medical committees and may be appealed to a National Committee ('Junta Nacional de Calificación de la Invalidez').

In Peru, disability qualification, causes, exclusions and documentation analysis, in the first instance, corresponds to the Medical Committee of the PFMC ('COMAFP'), an autonomous organization financed by the PFMC. Their resolutions can be appealed to the Supervision's Medical Committee ('COMEC').

On the other extreme, in Costa Rica, Mexico and Uruguay, disability is determined by the pre-existing Social Security public administration agencies: the 'Caja Costaricense de Seguridad Social', the Mexican Institute of Social Insurance (IMSS) and the 'Banco de Previsión Social', respectively.

The following indicators have been proposed to evaluate the quality of the process and define some standards (Aguirre et al., 1996): number and location of evaluating centers; number of medical consultations and complementary analyses for each evaluation; cost for claimant; ease to access to appeal instances; proportion of resolutions appealed; and rate of disagreements between Regional and Central Medical Commissions.

In Argentina, there are 33 commissions, five in Buenos Aires and the rest distributed across the country. By law, there must be at least one commission per province and one in the federal district (Buenos Aires). About 21% of the cases is appealed and 76% is confirmed (De Biase and Grushka, 2003).

Comparisons with other LA countries cannot be established without knowing precisely the alternative mechanisms adopted. However, this is an aspect in which the Argentine experience has proved to be very useful.

2.7 Technical guidelines for determining disability

In Chile, after eight years of experience, a unique scale (baremo) was developed in 1990. It consists of fifteen chapters that group the different organic systems, classifying

pathologic afflictions into classes according to the levels of functional hazard and assigning percentages of loss in the working capacity. Additionally, a set of complementary factors is established, taking into account age, years of schooling, and difficulties to perform affiliate's usual jobs.

The same mechanism was adopted in Argentina to guarantee objectivity in the determination of the degree of disability. The detailed instructions (baremo) set out the correlation between particular afflictions and the percentage disability or loss of working capacity. Afflictions should be verifiable and result from obvious anatomic injury, measurable functional disorder and/or assessable psychological problem. Prior to reform, there were no explicit criteria for percentages of incapacity.

The baremo allows the diverse medical commissions to evaluate, qualify and quantify the degree of disability for all workers according to common criteria. Its essential characteristics are:

- Uniformity across cases and regions
- Transparency: it was discussed with medical professionals, academics faculty and the final version published in the national official bulletin (as decree 1290/94)
- Universality: qualification is unrelated to occupation or industry of the beneficiary
- Each different affliction is applied to residually after taking into account other incapacity (for example, arterial hypertension with repercussions implies a loss of 30 per cent in working capacity and deafness a loss of 4 per cent, but the combination of both gives a total of 32.8 per cent i.e., $30\% + 4\% * (1-30\%)$).

The following criteria are recommended:

1. Establish clear written rules; it is highly desirable to have a manual or “baremo” to determine the degree of invalidation.
2. Adapt the rules to the health conditions and risks of the population covered. This means that in case of adopting technical rules from another country, some effort should be made to adapt them to the characteristics of the country or region.

Three aspects of the baremo system have been criticized. First, it is different for disability and for industrial injuries (at least in Argentina). Secondly, the baremo system is inflexible and, thirdly, it looks only at medical considerations.

The law establishes ‘incapacity’ as a medical concept: a loss of capacity resulting from physical and/or psychological disease. But disability depends also on factors such as age, education, and the nature of the worker’s usual job. These so-called ‘complementary’ factors can add up to 15 percentage points of disability for a 61-year-old illiterate with severe difficulties performing his or her usual job. It can be useful to involve other professionals, such as social workers, legal advisors and social psychologists at this point. Finally, there is also a ‘compensating’ factor to approximate incapacity from the baremo to the perception of the claimant’s deterioration according to medical criteria.

2.8 Cost of disability benefits

In Table 6 we show the financing mechanisms effective in the selected countries considered, discussed in depth below in Sections 2.9 and 3.2.

It is a very complex job to establish the total costs of a disability system given the different factors involved. One of the most important components is the insurance premium that includes not only disability risks but survivorship as well. These premiums tend to be included in the overall fee since PFMC are the insured subject but they are, in all cases, established as a percentage of salaries.

Cost of life and disability group insurance varies significantly across countries and also within countries through time. Premiums are 0.7% of salaries in Chile, 0.9% in Argentina, and 2.5% in Mexico (Grandolini, 1998). In Chile (as later happened in Argentina) premiums decreased from 2.1% in 1987 to 0.6 in 1994-97 (Martinez, 1996) and around 0.7 later on (AIOS, 2003).

Table 6. Financing disability pensions in Latin American countries

| Country | Source of financing | 2002 life and disability insurance cost (% of salaries) | Additional Public responsibility |
|----------------|-----------------------------------------------------------------|---------------------------------------------------------|----------------------------------|
| Argentina | Accumulated funds + complementary capital (insurance companies) | 0,7 | proportional recognition |
| Bolivia | Insurance companies (up to age 65) | 1,7 | |
| Chile | Accumulated funds + complementary capital (insurance companies) | 0,7 | recognition bonds |
| Colombia | Accumulated funds + complementary capital | | recognition bonds |
| Costa Rica | Public PAYG (CCSS) | | total |
| Dominican Rep. | Insurance companies | 1,0 | |
| El Salvador | | 1,4 | |
| Mexico | Accumulated funds + complementary capital (insured by IMSS) | 2,5 | none |
| Peru | Accumulated funds + additional contribution | 1,2 | recognition bonds |
| Uruguay | Accumulated funds + complementary capital (insurance companies) | 0,8 | |

However, these comparison have severe limitations: each system offer different benefits; there are indirect costs that should also be taken into account (such as running the Medical Commissions and/or the Public Regime). Besides, the participation of the Public Regime in Argentina and the recognition bonds in Chile, Colombia and Peru help to diminish the insured capital.

In most funded systems, each fund is responsible for paying benefits in the case of disability. Benefits are financed from the individual's accumulated fund and through group insurance with a life-insurance company. The insurance premiums are paid from the fees received by the fund with each contribution. PFMC pay the benefits with funds from the insurer while the disability is considered temporary. Once the disability is definitive, the insurance company must supply sufficient funds ('capital complementario') to the individual retirement account to purchase a defined-benefit pension.

Members can then have either buy an annuity ('renta vitalicia') by transferring their funds to a retirement-insurance company ('Compañía de Seguros de Retiro') or retain their funds in the individual account and make scheduled withdrawals ('retiro programado').

A special payment ('capital de recomposición') is made when the provisional disability benefit expires and the beneficiary is refused the definitive pension. This capital represents the contributions the member would have accumulated in their account during the period that they were receiving the provisional benefit. These funds are provided by the life insurance

companies, and/or the State during the transition, and are then added to the individual's account with the pension funds.

Argentina incorporated a different way of handling the transition as a substitute of kinds for the recognition-bonds route taken in Chile, Colombia, and Peru. During the transition to the funded system, the role of the public system depends on age (year of birth) and sex according to the following formulae

For men, public proportion = $(1963 - \text{year of Birth}) / 35$

For females, public proportion = $(1968 - \text{year of Birth}) / 35$

For men born in 1963 or after and women born in 1968 or after, the pension fund (through group insurance) is responsible for the total cost of the pension. The formula aims to reduce insurance costs by taking into account what affiliates might have saved if the funded regime had existed years before.

To illustrate the formulae, a 45-year-old single man, with 25 years of contributions, constant salary, net contributions of 7.5 per cent of pay, and constant annual returns of 5 per cent, might accumulate a fund equivalent to 48 times annual salary, or 36 per cent of the defined benefit. In 1994, with no accumulated fund, the public pension proportion for a single 45-year-old man who became disabled was 40 per cent, i.e. $(1963-1949)/35$.

In the PAYG public system, there is no insurance mechanism for financing disability pensions, and so their costs tend to be implicit.

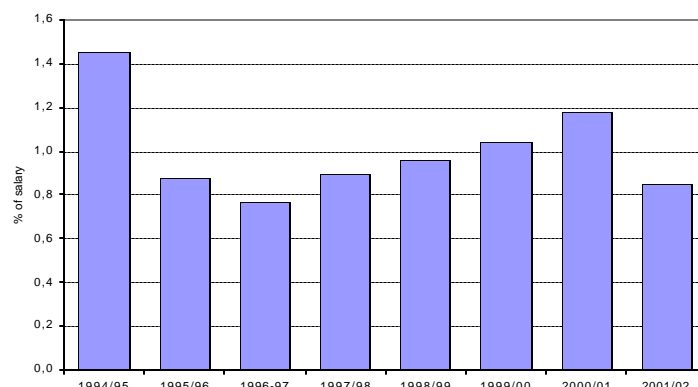
2.9 Determinants of Costs and Premia

Estimating the total cost of disability benefits is difficult. The explicit insurance cost covers not only disability but also death. Complementary funds paid by the state and the cost of the medical commissions should also be taken into account. In Argentina, during 1997, the medical commissions evaluated 25 thousand cases and total expenditure (including personnel) was \$10 million, averaging \$400 per resolution (SAFJP, 1998). In 2002, values reached 54 thousand cases (De Biase and Grushka, 2003), \$15 million and less than \$300, respectively³.

Since the 1994 reform, contributions for insurance and commissions averaged 3.5 per cent of salaries, representing 32 per cent of total contributions. These contributions include

administrative costs and the cost of the group insurance that covers disability benefit and survivors' pensions for active and disabled workers. Although initially forecast at 2.2 per cent of salaries, total insurance costs have averaged 0.9 per cent. Figure 3 shows a time series of this cost.

Figure 3. Cost of death and disability group insurance in the funded system, 1994-2002



Disability insurance costs are a result of the contracts between each pension fund and life insurance companies. Premiums paid by pension funds ranged from 0.9 to 2.3 per cent during the year 1994-95 and from 0.5 to 1.2 per cent in 2001-02. The pattern in Figure 3 can be explained not only by the technical factors affecting insurance costs, but also by the structure of the insurance market and specific regulation.

A number of factors affect insurance costs:

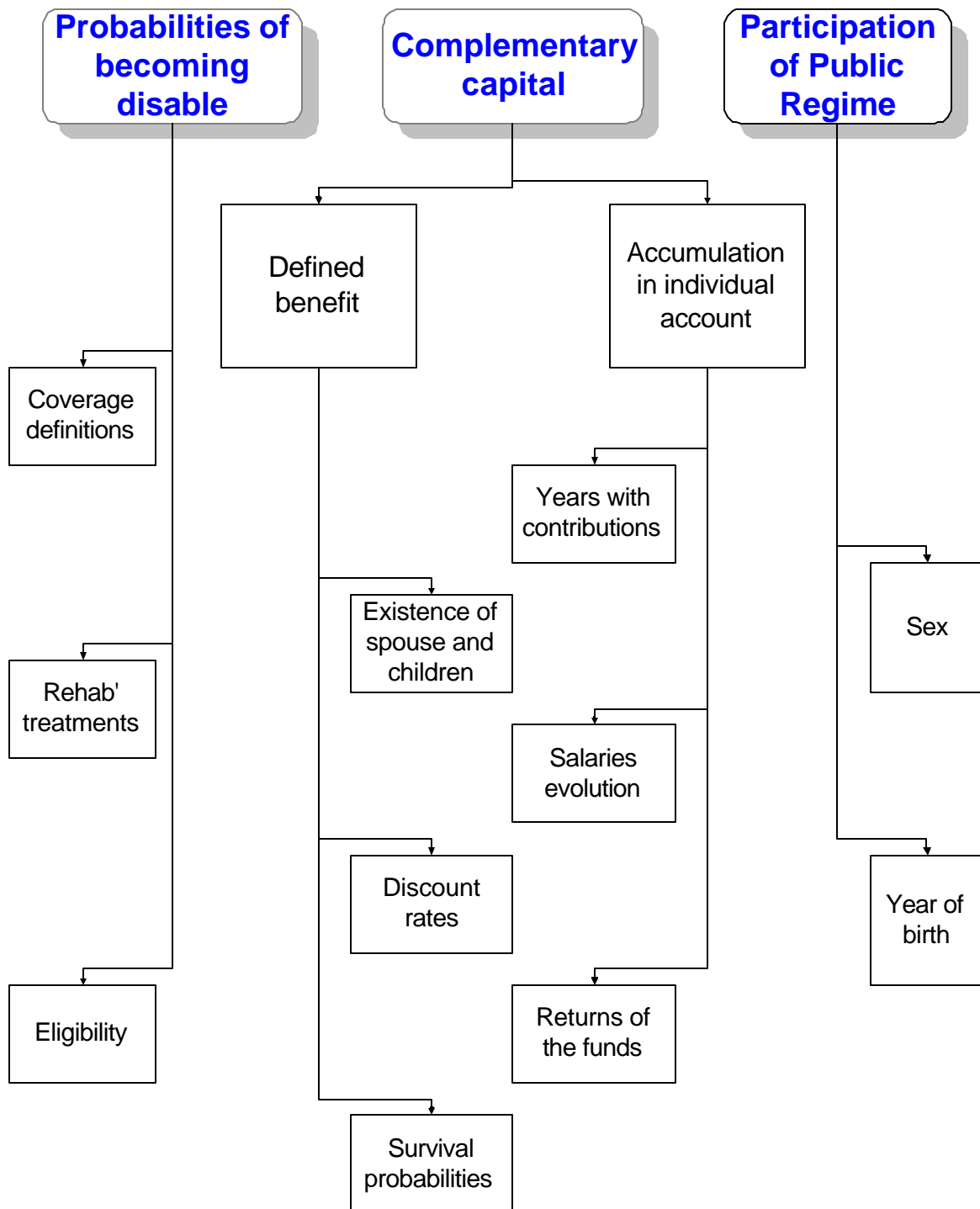
- The probability of becoming disabled
- The replacement rate for the defined benefit (a policy choice)
- Survival probabilities for disabled workers
- Marital status and age and number of children of the disabled
- Discount rates for likely future payments
- Previous work experience
- Development of earnings
- Investment returns for individual accounts
- The participation of the public regime (which, in turn, might depend on the age and sex structure of the covered population)

³ Under the old pension system the overall administrative cost was unknown. However, indirect calculations reveal that the implicit life and disability cost in 1993 was around 4.4 per cent of salaries (Demarco, 1994).

Figure 4 shows the relationship between these variables while Chapter 4 gives a detailed, formal explanation of the way in which they determine insurance costs.

These variables can explain the long-run insurance cost. However, during the first years of the new system, lack of experience meant that the relevant variables had to be estimated using incomplete information. Later, as the actual value of the variables became clearer, insurance costs fell rapidly.

Figure 4. Insurance costs



A second important determinant of the disability premium rate is the structure of the insurance market. Disability (and life) insurance in many countries has to be provided by specialized, single-product companies. The PFMC are responsible for integrating the complementary capital; it is strictly their liability that is insured, and not the members. The

consequence of market concentration in both insurance and pension industries is that the disability-insurance market may be open to collusion and manipulation.

The relationship between cost and price that characterizes perfect competition, or even monopoly, cannot be observed in Argentina. Regulations require competitive contracting but, in practice, these are avoided. By December 2002, 11 of the 12 pension funds belonged to the same economic group as their insurance company, including many cases where both firms carry the same name. Insurance cost is not determined by market forces, but by the overall benefit of the economic group. For example, surpluses can be transferred from one company to another to minimize tax bills, modify capital structure or alter the profits of any of the companies.

With a different approach, in the case of Bolivia, pension and insurance laws do not allow related companies to participate.

2.10 Rehabilitation

Another aspect that might reduce the burden of disability pensions is recovery, given the opportunity to return to work or the judgement to no longer meet the definition of disability. Rehabilitation programs would help significantly to increase recovery but, however, they have a minimum presence in Latin America. As an example, in Argentina during the last decade, less than 3% of temporary beneficiaries were denied the definitive benefit.

More developed economies (such as Australia, Germany, Israel, and United States) offer alternative models with the goal of directing rehabilitation towards the needs of the local labor market. Recovery rates in Canada and US average around 1%, although their decrease in recent years is mostly due to the fact that the decrease of the incidence rates is associated with more stringent eligibility requirements. As disabilities become more severe, the probability of recovery become lower (CPP, 2002; Donkar, 2003; Zayatz, 1999).

In Argentina, the pension-reform law established a fund to promote rehabilitation treatments for the disabled (article 49 law 24,241) that, however, was never implemented. The fund was supposed to be financed partly by the government, and partly with 30 per cent of the benefits of disability pensioners who do not follow the treatments prescribed by the medical commissions. Life-insurance companies, with the authorization of the medical commissions, can substitute or complement prescribed treatments with other(s) at their own expense.

Insurance companies have a strong incentive to pay for treatments since, when successful, they reduce pension costs⁴, but they have not yet done so.

An important guideline for further progress in this aspect is provided by the conclusions of the International Social Security Association study group on rehabilitation, after their meeting at Nusa Dua on November 1995 (ISSA, 1996):

- Rehabilitation should be an integrated process, since medical treatment alone is not enough. The lack of links between the different institutions involved may be detrimental
- 'Community-based' rehabilitation guarantees a more precise link between skills that are developed and those that the local economy demands
- Successful programs adapt rehabilitation to the specific capabilities and needs of the clients
- Individualized workplace training led to a new paradigm of 'protected employment', which was particularly successful with mental illnesses
- Disability should be seen as a social and not just a medical problem

The group also recommended further study of the viability of different measures of program efficiency, the use of cost-benefit analysis to set goals, and exploration of what contributes to the quality of successful programs.

3. A general approach to organization and financing issues

3.1 Alternative models of organization to qualify disability

The following general models of organization, depending on the authority defined to qualify disabilities can be identified:

- a) Independent Medical Commissions (as in Argentina, Chile and Colombia);
- b) Life insurance companies (as in Bolivia);
- c) Pension Funds Managing Companies (as in Peru);
- d) Pre-existing Social Security agency (as in Mexico and Uruguay);
- e) Pension Funds Supervision Agency (to some extent, in Argentina);
- f) Another public agency (no case reported).

⁴ However, insurance companies are only interested in cases where disability can be reduced below 66 per cent.

We will briefly discuss the advantages and disadvantages of each alternative model.

a) Specialized Medical Commissions

The principal advantage of this system is the independence from other interested parties of the system, and the consequent transparency. These characteristics are closely subject to the legal design to select the professionals and to coordinate or regulate their operation.

The latter consideration may have important consequences, and in some cases the legislation is not explicit as to the functional dependence of these Medical Commissions. In Argentina, a complementary regulation established the competence of the pension funds supervision agency ('SAFJP') to coordinate and control the Medical Commissions.

The choice of an adequate model of supervision of Medical Commissions is crucial as a guarantee of their independence and transparency.

b) Life insurance companies

For many countries going through pension system's reform, life insurance companies were the companies with the most relevant experience on disability qualification setting aside the public agencies.

On the other hand, their experience might prove to be biased and insufficient with respect to a mandatory social security system. In addition, insurance companies are interested parties, and the goal to lower costs might generate unfair request denials when disability benefits should be granted.

c) Pension Funds Managing Companies

These companies are the main counterpart the affiliates have in privatized social security systems. As the system matures, the quality of services to their affiliates is expected to play an important role in the competitive strategy. The counter-arguments are, again, their being involved as interested parties of the process, and their lack of experience and specialization in the field of disability qualification.

d) Pre-existing Social Security agency

Pre-existing SS agencies have the necessary experience, technology and trained human resources, but they are part of the “old” system, usually inefficient, lacking resources to adopt technological innovations and, in some cases, responsible for a substantial part of the system’s lack of transparency and corruption.

e) Pension Funds Supervision Agency

Pension funds supervision agencies were created in most countries that reformed their pension systems as specialized independent regulatory agencies. The Chilean and the Argentine cases provide a good experience of countries developing modern and efficient supervision schemes.

These independent experiences might be transferred to the supervision of disability pensions, and especially to the most specific task of disability qualification. This is the case in Argentina, where the SAFJP supervises the Medical Commissions, who are in charge of the disability qualification process.

One possible counter-argument to this alternative is that, given the high costs of establishing and closing down disability qualification agencies, there may be some duplications with a negative incidence on costs, at least during a transition period (i.e., some services of the new system will coexist with those corresponding to the old system). In addition, medical matters are not specific to conventional pension funds regulatory agencies, so their inclusion might increase the risk of over-scaling. In fact, concentration of diversity of functions in one single agency is a central aspect that most pension systems reforms intend to avoid.

f) Another public agency (such as the Ministry of Health, of Labor, or an agency depending from any of them).

Finally, an independent regulatory agency specialized in disability qualification matters can be created. Arguments for specialized pension funds supervision can also be applied to support this alternative (Demarco and Rofman, 1998). Considerations about functional decentralization can also support this model of organization. The disability qualification

regulatory agency could be assimilated to the same sphere as the pension funds regulation (i.e., Ministry of Labor or of Finance), or to a different one (e.g. Ministry of Health).

One possible limit to avoid an excess of decentralization is the coherence needed to guarantee the operation of the different aspects of the system as a part of the whole. The risk of producing an excessively autonomous agency (with its own goals and rules) might be high in the case of medical services, given the differentiated nature of its subject.

3.2 Alternative mechanisms to finance disability benefits

The discussion of the previous section shows that mechanisms adopted to finance disability pensions are not only important to guarantee a reasonable correspondence between costs and benefits, but also to detect, measure and correct the system's inefficiencies.

Mechanisms to finance disability benefits differ according to the following items: a) agent who provides the funds necessary to pay for the benefit; b) existence of an explicit insurance mechanism; c) procedures whereby affiliates compensate (i.e., pay) funds suppliers; d) distribution of costs between the system's affiliates.

3.2.1 Source of financing

The necessary funds to pay for benefits may be supplied by the State, by an insurance company or by a pension fund managing company (PFMC). The first case is normally associated with PAYG systems, but it is neither excluding nor exclusive. In fact, even in a PAYG system insurance companies might provide disability pensions.

Capitalization regimes could admit any of the other two alternatives. If the insurance company is the funds provider, the legal relation is between the beneficiary and the company. If the PFMC is responsible for providing the necessary funds, it may take risks on its own or subscribe an insurance policy. If the latter alternative is possible, an indirect relationship is established between the beneficiaries and the insurance company through the intervention of the PFMC, which is in fact the insured subject.

Finally, pension systems that contemplate some sort of 'recognition' for past contributions admit, during transition, a combination of the mechanisms described above. This was the case in Argentina, where the State provides the funds together with the PFMC, the latter being obliged to subscribe an insurance policy with a life insurance company (LIC). In

Chile, the State does not participate (although it provided 'recognition bonds'), except when the amount of the pension determined is below the minimum pension. In both cases, the individual capitalization component is similarly organized through a direct responsibility of PFMC and an indirect responsibility of LIC. Although the Argentine experience shows that strong economic interests tie LIC with PFMC (which, in most cases, are members of the same economic group), separation of accounting and patrimonies of both companies may prove to be convenient.

Mexico constitutes a very distinct case, since it does not admit the intervention of private institutions as insurers, even in the case of beneficiaries of the individual capitalization system and, thus, the public regime (IMSS) manages death and disability risks. However, the IMSS does not pay the new benefits directly but through buying annuities to retirement insurance companies (RIC). These annuities are estimated in all cases with a discount rate of 3.5% and the same life table (determined by the insurance supervision). RICs compete by offering additional benefits that are financed by returns in excess of the guaranteed rate and by the favorable differentials in life expectancy. This mechanism might produce some conflict of interests when there are alternatives to select cases or to postpone the moment of buying annuities, especially when the established discount and/or mortality rates are perceived as low (IMSS, 2003).

3.2.2 Insurance mechanisms

As mentioned above, although the development of individual capitalization has allowed for a more transparent cost of disability pensions through the measurement of death and disability premia, the PAYG regimes might also apply the insurance mechanisms. However, there is no case known in which a social security institution (or the affiliates) subscribe to a group life insurance policy. When social security agencies operate as self-insured companies, insurance costs are not usually explicit, despite being an important element to add transparency to the system's intermediation costs. In the case of Mexico, the cost is relatively high (2.5% of the salary), although it is explicit and financed by the employer (70%), the employee (25%) and the State (5%).

3.2.3 Price paid by affiliates

When the State is a direct supplier of the necessary funds to finance disability pensions, affiliates normally do not pay an explicit price, since the system's transaction costs are usually unknown. Affiliates (or tax contributors) certainly pay for the benefits, but the real amount and the distribution of charges between the different actors are not only unknown but also usually unpredictable. Once again, Mexico constitutes an exception where affiliates do know that they are paying directly 0.625% of their salaries.

In the case of individual capitalization regimes, insurance cost is often part of the overall intermediation fee. In the case of Argentina, Chile, Peru, and Uruguay, the PFMC must inform their affiliates the distribution of total fees between insurance and administration costs, but the level of fees constitute a single price.

Total charges can be added to the mandatory contribution rate (as in Chile and Peru), or they may be deducted from it (as in Argentina). While the former scheme helps affiliates to be aware about the level of fees paid, the latter is advisable to enable cross controls in multipillar systems, where part of the contribution is paid by the employer and/or it has to be divided between PFMC and the State.

3.2.4 Distribution of costs between affiliates

As mentioned above, the absence of insurance mechanisms complicates the identification of real costs and, consequently, of their distribution between individuals. Insurance mechanisms permit such identification, but now the question is 'who pays for insurance?'

Individual account schemes with insurance for disability still involve a risk-pooling element. Disability and survivors insurance is done through group insurance purchases in most Latin American countries with private pensions.

Apart from re-enforcing the idea of social protection, group insurance facilitates individual affiliations, is easier to control, and prevents PFMC (and/or insurance companies) from discriminating between potential affiliates.

4. Some statistics

Given the different ways to manage the pension system and the different definitions adopted, it is very difficult to compile comparable statistics. However, Table 7 does provide, at least, an overview of the significance of disability in the reformed pension systems.

Table 7. Disability rates and prevalence in Latin American countries

| Country | New registered disability benefits | | | Disability rate (per thousand contributors) | Stock of disability pensions | Percentage of total benefits | Prevalence per thousand members |
|----------------|------------------------------------|--------|-------|---------------------------------------------|------------------------------|------------------------------|---------------------------------|
| | 2000 | 2001 | 2002 | Avg. 2000-02 | | December 2002 | |
| Argentina | 4.414 | 3.540 | 2.938 | 1,1 | 15.616 | 13,8 | 1,7 |
| Bolivia | 54 | 248 | 45 | 0,3 | 738 | 29,9 | 1,0 |
| Chile | n/a | 2.892 | 3.339 | 0,9 | 32.124 | 7,5 | 4,8 |
| Colombia | | | | | | | |
| Costa Rica | | | | | | | |
| Dominican Rep. | | | | | | | |
| El Salvador | 174 | 214 | 155 | 0,4 | 571 | 6,7 | 0,6 |
| Mexico | 10.550 | 11.985 | n/a | 1,1 | 49.656 | 45,6 | 1,7 |
| Peru | 723 | 956 | 1.018 | 0,8 | 1.838 | 5,6 | 0,6 |
| Uruguay | 46 | 92 | 208 | 0,3 | 592 | 15,1 | 1,0 |
| Total | 15.961 | 19.927 | 7.703 | 0,9 | 101.135 | 14,5 | 2,0 |

Source: Own elaboration based on AIOS (2003).

In the seven countries with available data, the number of disability pensions is higher than 100 thousand, representing near 15% of the total beneficiaries and 2% of the total membership. With less than 20 thousand new cases a year, disability rates average less than 1 per thousand contributors. There are important variations among countries, but in many cases depending more on the specific regulations of the overall pension system than on disability itself.

Program substitution is an aspect worth mentioning, since raising the retirement age (as it was established in many reforms) should increase disability claims. Unfortunately, time series of reasonable quality are not available to prove it; however, the fact that disability rates for the age group 60-64 are almost twice as large that for ages 55-59 in Argentina (Altieri, 2002) and in Chile (Angulo, Andrade and Arteaga; 1999) constitutes a good hint.

5. Components of insurance costs

Insurance costs can be decomposed into three components: one is the risk of becoming disabled, a second is the complementary capital (C_t), and the third is related to the participation of the Public Regime, either directly or through recognition bonds.

$$\boxed{IC_t = i_t * C_t * (1 - PPR_t)} \quad (1)$$

After the transition period this equation can be simplified, leaving aside the last term, into:

$$\boxed{IC_t = i_t * C_t} \quad (2)$$

One of the difficulties to further develop equation (2) is the fact that it depends not only on the period considered, but also on individual ages (x), so that

$$\boxed{IC_{x;t} = i_{x;t} * C_{x;t}} \quad (3)$$

Estimates of individual risks ($i_{x;t}$) cannot be properly assessed for each country, given the manifest differences of the reformed systems and the lack of data (especially previous to the reforms). Nevertheless, as an example, age-specific rates can be assumed, using the 'Pension disability table 1985', a table elaborated by the American 'Society of Actuaries' and the analysis of the Chilean experience. As new data become available in each country, it will be possible to estimate the real risks, taking into account definitions of coverage, requirements, and rehabilitation treatments.

The complementary capital is the difference between the amount needed to pay for a defined benefit and the amount accumulated in the individual account.

$$\boxed{C_{x;t} = DB_x - IA_{x;t}} \quad (4)$$

The defined benefit is an annuity with monthly payments equivalent to a given percentage⁵ of the average earnings base that applies. It also depends on the projected life expectancy (which varies according to sex and age) and the rate of discount. Survival probabilities for disabled workers are often unavailable and the life table approved by the

⁵ For example, 70% in Argentina, reduced to 50% for those affiliates who contribute irregularly.

Chilean ‘Superintendencia de AFP’ (‘MI85’) is used here. Future likely payments are discounted at an annual rate of 4%⁶.

In case of death of the beneficiary of a disability pension, spouse and children often have the right to a pension equivalent to some fraction of the defined benefit (70% in Argentina and Chile). Life expectancy for survivors are estimated with the 1971 Group Annuity Mortality Table (‘GAM-71’) which is used in Argentina and payments are also discounted at 4% annual rate. This additional benefit represents, on average, about 30% of the individual benefit. Thus, for a married person, the total defined benefit here is:

$$DB_x = 0.7 * \left(\sum_{t=0}^{\infty} {}_t p_x^i * v^t + 0.7 * \sum_{t=0}^{\infty} {}_t q_x^i * {}_t p_y * v^t \right) \quad (5)$$

Where:

${}_t p_x^i$ = probability of surviving from age x to age x+t according to the MI85 Life Table

v = rate of discount = $1/1.04 = 0.96154$

${}_t q_x^i = 1 - {}_t p_x^i$ = probability of dying between ages x to age x+t (MI85 Life Table)

${}_t p_y$ = spouse’s probability of surviving from age y to age y+t (GAM-71 Life Table)

The accumulation in individual accounts depends on the previous working life (years contributed), salary (or assessable income) by age (W), contribution rate (c), management fees (f), and returns of the funds (r).

$$IA_x = \sum_{t=18}^x W_t * (c_t - f_t) * \prod_{j=t}^x (1 + r_j) \quad (6)$$

From the development of equations (3) through (6), it is possible to conclude that the theoretical insurance cost for a given age depends on several variables: probabilities of becoming disabled; survival probabilities of disabled workers; existence of spouse and children and their age; discount rates for likely future payments; working and earnings history; investment returns of the accumulated funds. The overall insurance cost depends on the age structure of the insured population, since it is a weighted average of the age-specific costs.

⁶ The 4 % assumption is based on the annual rate fixed by regulation in Argentina, although there are different rates in other countries (Palacios and Rofman, 2001).

Transition arrangements as well as administrative expenses and profits of private providers are not considered here.

5.1. A basic scenario

To analyze the different components of the insurance cost by age, an hypothetical basic case is developed, choosing the following set of circumstances: a male, married to a woman 3 years younger, beginning to work at age 20, perceiving a constant salary. The contribution rate (net of fees) is 10%, a contribution density of 70% (on average, 30% of every year is spent out of the labor force or, at least, without paying contributions), and annual investment returns of 4%.

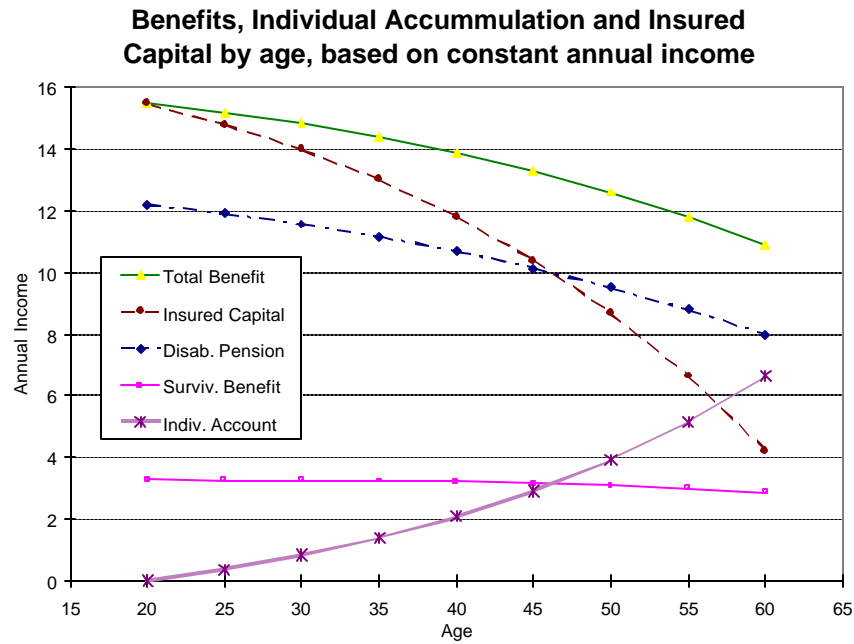
As shown in Table 8 and in Figure 5, the present value of future payments decrease slowly, on average at an annual rate of 1.0% in the case of disability benefits, 0.3% the survivorship pensions, and 0.9% the total defined benefit. On the other hand, the accumulation in the individual account increases exponentially, so that the insured capital (the 'complementary' capital) decreases significantly with age, about 3% a year.

Table 8. Insurance cost of disability and its components

| Age | Disab. Pension (a) | Surviv. Benefit (b) | Total Benefit (c)=(a)+(b) | Indiv. Account (d) | Insured Capital (e)=(c)-(d) | Prob. disable (f) | Insurance Cost (g)=(e)*(f) | Pop. structure (h) |
|-------|--------------------------|---------------------------|---------------------------------|--------------------------|-----------------------------------|-------------------------|----------------------------------|--------------------------|
| 20 | 12.19 | 3.29 | 15.48 | 0.00 | 15.48 | 0.02% | 0.24% | 15.5% |
| 25 | 11.91 | 3.27 | 15.19 | 0.38 | 14.81 | 0.03% | 0.51% | 13.6% |
| 30 | 11.58 | 3.26 | 14.83 | 0.84 | 13.99 | 0.06% | 0.77% | 12.8% |
| 35 | 11.17 | 3.24 | 14.41 | 1.40 | 13.01 | 0.09% | 1.21% | 12.4% |
| 40 | 10.70 | 3.21 | 13.91 | 2.08 | 11.82 | 0.17% | 2.03% | 11.8% |
| 45 | 10.14 | 3.17 | 13.31 | 2.92 | 10.40 | 0.30% | 3.11% | 10.5% |
| 50 | 9.51 | 3.10 | 12.61 | 3.93 | 8.69 | 0.53% | 4.62% | 8.9% |
| 55 | 8.79 | 3.01 | 11.80 | 5.16 | 6.65 | 1.03% | 6.84% | 7.7% |
| 60 | 8.00 | 2.87 | 10.87 | 6.65 | 4.22 | 1.58% | 6.68% | 6.9% |
| Total | 10.77 | 3.19 | 13.96 | 2.09 | 11.86 | 0.31% | 2.32% | 100.0% |

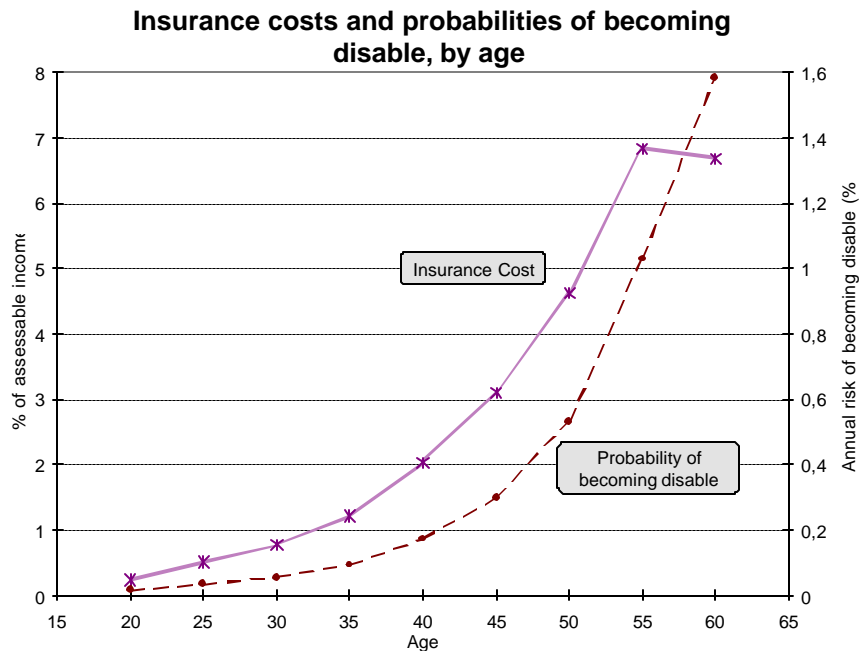
Notes: Absolute measurements are in annual salaries.
Totals are population weighted averages.

Figure 5



The probabilities of becoming disabled increase about 12% a year (see Figure 6). Finally, the age-specific insurance cost can be obtained by multiplying these probabilities times the insured capital. Costs by age increase about 9% per year, although they are flat after age 55, due to the larger impact of the reduced insured capital, compared to that of the increased risks.

Figure 6



On average (weighted by the age structure of the male population of Argentina in 1995), disability pensions imply 11 annual salaries, pensions for the surviving widow represent 3 annual salaries, producing a defined benefit equivalent to 14 annual salaries. The accumulation in the individual account, under the assumptions described above, amount to about 2 annual salaries, thus generating an insured capital of about 12 annual salaries. The annual risk of becoming disable is about 0.3% and the estimated average insurance cost is 2.3% of salary.

Note that these estimates do not intend to reflect the 'real' costs. This is a simplified model (the participation of the public regime is not considered), the interaction of the intervening variables may produce very different results from those shown here, and data and assumptions involved might also be biased. However, through this exercise it is possible to get a better understanding of the relevant components of insurance costs and a reasonable measurement of their relative impacts.

5.2. A sensitivity analysis

Although there is certain interrelationship between all the variables included in the basic scenario, in this section, alternative cases will be considered modifying, one at a time, the following assumptions and evaluating their impact on long-term costs (see Table 9):

- 1) Reducing the replacement rate from 70% to 50% (a change of -29%) implies a cost reduction of 49%⁷.
- 2) Reducing the pension for the surviving widow from 70% to 50% (implying a change in benefit levels from 49% to 35% of reference salary) implies a cost reduction of 17%.
- 3) Reducing the replacement rate and the survivorship pension from 70% to 50% implies a cost reduction of 56%.
- 4) Eliminating the pension for the surviving widow (or assuming the case of a single man) implies a cost reduction of 35%.
- 5) Reducing real investment returns (from 4%) to a level of just 2% per year implies an increment in costs of 21%.
- 6) Increasing real investment returns to a level of 6% per year implies a cost reduction of 34%.

- 7) Increasing net contribution rates from 10% to 12.5% (25%) implies a cost reduction of 16%.
- 8) Decreasing net contribution rates to 7.5% implies a cost increment of 16%.
- 9) Not computing net contribution rates towards the insurance implies a cost increment of 64%.
- 10) Reducing the density of contributions from 70% to 60% of the active life (-14%) implies an increase in costs of 9%.
- 11) Increasing the density of contribution to 80% implies a cost reduction of 9%.

Table 9. Insurance costs under alternative scenarios

In terms of assessable income

| Alternative | Replacement Rate | Survivorship Pension | Investment Returns | Contribution Rate | Contribution Density | Insurance Cost (%) | Differ. with basic case |
|-------------|------------------|----------------------|--------------------|-------------------|----------------------|--------------------|-------------------------|
| Basic | 70% | 70% (49%) | 4% | 10.0% | 70% | 2.32 | |
| 1 | 50% | | | | | 1.19 | -49% |
| 2 | | 50% (35%) | | | | 1.92 | -17% |
| 3 | 50% | 50% (25%) | | | | 1.02 | -56% |
| 4 | | 0% | | | | 1.51 | -35% |
| 5 | | | 2% | | | 2.80 | 21% |
| 6 | | | 6% | | | 1.53 | -34% |
| 7 | | | | 12.5% | | 1.95 | -16% |
| 8 | | | | 7.5% | | 2.69 | 16% |
| 9 | | | | 0% | | 3.81 | 64% |
| 10 | | | | | 60% | 2.53 | 9% |
| 11 | | | | | 80% | 2.11 | -9% |

Note: For a detailed explanation of assumptions see text.

Summarizing, costs determination is a very complex matter. However, it is important for policy determination to get an idea of the impact of each one of the intervening variables. The basic case developed in the previous section, and the sensitive analysis shown above depend on the set of assumptions adopted, but the relative contribution of the components of insurance costs can be considered reliable within a reasonable range.

⁷ Note that this is the reduced benefit level for affiliates with irregular contributions in Argentina.

6. Summary and conclusions

Pension system reforms implied important changes in the disability sub-system, which in many cases had been a major source of instability. Some changes consisted of more strict conditions of eligibility, thus affecting the system's coverage, but the main reforms referred to financing mechanisms, clearer rules and technical procedures, and self-control mechanisms.

Reform in disability sub-systems is a major issue in the agenda of pension reformers. Expected goals include changes in costs, equity and transparency. In fact, looking at the Argentine experience, the reform reduced the frequency of claims given the stricter requisites, and this implied less corruption and lower costs, although, at the same time, population coverage have been reduced. The effect on equity is particularly associated with the adoption of a unique scale to evaluate the loss of working capacity, the presence of a medical board that has to agree on their assessment, and the existence of different levels of appeal to reconsider decisions. Finally, the procedures established to assess the loss of working capacity, and the clear regulations added transparency to the system.

Introduction of pension systems including individual capitalization is neither a necessary nor a sufficient condition to reform the disability sub-system, since some aspects of its organization are not directly affected by the logic of individual capitalization. On one hand, some countries reforming their pension systems have assigned little or no importance to reform in disability qualification institutions, mechanisms and procedures. On the other hand, some PAYG systems have made significant efforts to improve disability qualification mechanisms (for instance, Argentina before 1994).

The diversity of criteria and mechanisms is clear when comparing the Latin American countries that reformed their pension systems. With the exception of some special aspects (such as the financial ones), there seems to be no general ideal model associated with individual capitalization or PAYG systems.

Thus, an important degree of flexibility is possible when defining the structure of the disability sub-system, on the basis of analyzing the advantages and disadvantages of specific aspects that come to define the desired model for each country.

Apart from the financial aspects, clear definitions should be adopted in reference to the population covered and eligibility requirements, the type and degree of disabilities, the institutions responsible for certifying disability, technical criteria and procedures to qualify, the benefit levels generated, the period of payment, and the mechanisms of control.

The cost of disability insurance is highly affected by a complex set of variables, which are not independently determined. Comparisons and forecasts should be provided only after a detailed analysis of the levels, trends and interactions. In this aspect there is a big challenge for Latin American countries to improve data quality and availability. A very important and pending task is to develop estimates of disability incidence rates and mortality among disabled workers. Further research should benefit from integrating newly available data.

Another challenge comes from a social and financial perspective and the need to find ways to prevent abuse while not being very restrictive. In other words, costs should not be reduced only at the expense of coverage or levels of benefits. Recent reforms in more developed countries have had a broader approach replacing some compensation policies through integration policies and thus have different challenges ahead. Their recommendations include more general disability programs with mutual obligations and work/benefit packages; greater involvement of employers in the process; the promotion of early intervention and flexible cash benefits (OECD, 2003). The experience in more developed countries should be seriously taken into account, although recognizing their past and present different circumstances.

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