GREYING OF INDIAN RAILWAYS

Asian Institute of Transport Development

CONTENTS

FOREWORD

The world over, organisations are coping with the financial pressures arising from the need to provide for an increasing number of their retired employees. The Indian Railways is no exception. Currently, it has over a million pensioners whose retirement entitlements have to be met. However, for a variety of reasons, the railways have been remiss in evolving a viable pensionary system in the long-term perspective. As a result, their pension liabilities have mounted to alarming proportions and an enormous implicit debt has accumulated over the years. Unless remedial measures are taken immediately, this debt could cripple the railway finances over time.

This study by S. N. Mathur, who is a Senior Fellow of the Institute, focuses on the several problems flowing from the 'greying' of the Indian Railways. It shows in detail how the burden of railway pensions has been inexorably increasing and warns that it will soon reach unsupportable levels. It argues, the time has come for the railways to contain the rising pressures of the implicit debt by opting for a partially or fully funded pension scheme in place of the existing system. It points out that such a system can succeed only if the railways are given full financial autonomy in respect of their pension funds.

K.L. Thapar
Director

EXECUTIVE SUMMARY

1. The Indian railways employ nearly 1.6 million workers who account for a very large share of the working expenses, which include pensions to former employees. The number of pensioners in 1981 was only 2.71 lakhs; in 1998, it touched the million mark.

2. One consequence of this is that the dependency ratio, i.e. the number of retired employees as a percentage of those still employed, has risen from 17.24 per cent in 1981 to 63.1 per cent in 1998. A second consequence has been that the share of pensions in the working expenses of the railways has risen from 4.65 per cent in 1981 to nearly 13.30 per cent in 1998.

3. In order to meet pension obligations, a pension fund was established by the railways in 1964. However, adequate contributions based on actuarial assessments were never provided. This has led, over the years, to an increasing implicit debt. Thus, the term 'pension fund' is a misnomer as the nature of the fund differs from the conventional implications of the term. The balances lying in the fund do not represent the potential cumulative pensionary liability.

4. Presently, the railways set apart from their operating surplus a certain amount, based on an estimate of the pensions likely to be paid during the year. This amount gets credited to the consolidated fund of India in a pension fund and withdrawals are directly charged on the basis of the settlement needs.

5. But this system has not worked well either from the viewpoint of the railways or from that of the employees. The former do not have the necessary operational flexibility in managing the fund. The latter do not have the comfort of a fund which provides fully for their future benefits. As it is, the railways' finances are under strain.

6. This state of affairs needs to be changed urgently by setting up an independent pension fund for the railways. In other words, it has become absolutely essential to operate a pension fund which is independent of the government.

7. Such independence will allow the annual contribution made by the railways to earn interest at the prevailing market rates rather than the current government-administered artificially low rates. Under the existing arrangement, the balances lying in the railways pension fund receive a credit of only seven per cent from the central government. This has also prevented the corpus from growing at a sustainable rate.

8. The railways should, therefore, demand a complete segregation of their pension fund accumulations from the consolidated fund of India. They should also be free to invest these funds in approved securities (although, if deemed necessary, the guidelines for making these investments may be drawn up in consultation with the finance ministry).

9. Currently, the railways follow the 'defined benefits' pension system under which the employees who have completed the prescribed minimum length of service are entitled to a fixed percentage of their last emoluments as pension. The amounts required to meet the pensionary liabilities each year are contributed by the railways through appropriations from their general

revenues. This is intrinsically the pay-as-you-go (PAYG) plan, which is now widely regarded to be an expensive and sub-optimal option.

10. This method should be replaced by a system where the railways can either opt for full funding of pensions for the new entrants (maintaining PAYG system for the current employees) or for partial funding for all employees. In the case of the former, it could be made a condition of service that they shall have to contribute a fixed percentage of their salaries to the designated pension fund so that the railways can cope more easily with the financial strains inevitably associated with transition to a funded system.

11. Depending on the extent of funding required, an actuarial exercise needs to be carried out for determining the annual contributions. As a result of inadequate provisions made in the past, contributions to pension fund will initially have to be much higher.

12. If partial funding is introduced, the PAYG liabilities will show a gradual reduction based on various parameters such as rates of increase in wages and interest, growth in numbers of working employees, life expectancy and dependency/passivity ratios and salary structures. The railways will have to prepare simulation models for working out yearwise amounts to be contributed to the pension fund and the corresponding decrease in PAYG payments.

13. It is also vitally important for the railways to reflect the accrued pensionary liabilities of previous years in their accounting statements. This will enable the implicit debt accumulated by them to be formally recognised. Thus, a truer picture of their finances will be presented to the government and the public.

14. In order to manage the pension fund, an experienced and competent asset management company can be engaged. The railways may consider the LIC in this regard. Companies managing similar funds abroad could also be considered provided their rates are competitive.

15. Fund managers should generate and guarantee a rate of return on investments which could ensure payment to pensioners without raising the level of appropriation from the railways' revenues. The administrative cost of the fund should be carefully calculated and the size of such expenditure clearly understood since this will be a permanent addition to the railways' working expenses.

1

THE PROBLEM

Indian Railways are the largest single undertaking in the country employing nearly 1.6 million workers. This large workforce, also accounts for a very large share – 56 per cent – of the working expenses by way of salary, wages, allowances and other benefits to employees. Their impact on the railways' finances is thus considerable.

Pensions also fall under the same category of expenses, but deserve special attention due to the inevitable rise in the amounts which need to be set apart for this purpose. For instance, in 1997-98 the contribution to the pension fund (as an appropriation from railway revenues) was Rs 3456 crores and formed 13.30 per cent of the railways' working expenses. In 1980-81, the corresponding figure was 4.65 per cent only. This is a cause for serious concern, but the railways have so far not taken any measures to address this problem. The adverse impact of increasing pensionary liabilities on the financial performance is now palpable. It is, therefore, imperative that the railways formulate an appropriate strategy to meet this challenge.

It is not as if the railways are or were unaware of the problem. After all, the railway pension fund was established in 1964. As a commercial undertaking, the railways were required to contribute to this fund whatever amounts the actuarial estimates suggested so that the balance in the fund reflected not only the amount paid in a particular year, but also the potential cumulative liability for the pension benefits earned for each year of service. Since the railways failed to do so and dressed up their balance sheets, the birds are now coming home to roost.

This study intends to focus attention on the implicit debt which has been accumulating over the years on account of insufficient contributions made to the fund by the railways, who also did not care to operate the fund in the manner it was originally contemplated. They can no longer afford to remain indifferent to the massive liabilities which would surface in their prospective budgets on this account. The study also suggests reforms in the pension scheme currently being operated by the railways, with a view to improving its financial position in the coming years.

A fresh actuarial evaluation would have helped the railways to have a better perception of the rate of future growth in the number of pensioners and the amount of pension payable in the coming years. It was hoped that the Life Insurance Corporation (LIC) would assist in carrying out this exercise. Unfortunately this has not been possible so far. In that sense, till such time this aspect can be covered, this study may be treated as the first part of a larger report. The actuarial calculations, the estimated rates of future contributions and how these will affect the railways' finances will be brought out in detail in the second part of the study.

2

THE BACKGROUND

The pension scheme was introduced in the Indian railways with effect from 16 November 1957. All staff members appointed after that date were compulsorily covered by the pension rules. Those who had joined earlier were covered by the state railway provident fund (SRPF) scheme which was similar in scope and content to the contributory provident fund scheme applicable to other civilian employees of the central government. Following the extension of the pension scheme (applicable to the central government employees) to the railways, only those employees who did not opt to switch over to the pension scheme continued to be covered by the SRPF scheme.

Subsequently, as a result of the recommendations of the Fourth Central Pay Commission, all those covered by the SRPF scheme and still in service as on January 1, 1986 were deemed to have switched over to the pension scheme on that date unless they had specifically exercised their option to continue in the SRPF scheme. The present position is that practically all railway employees are governed by the railway pension scheme.

For the purposes of accounting the pensions were charged to revenues of the year in which they were actually paid. This procedure was similar to the one followed in the case of non-pensionable railway employees. In their case also the government's contribution to the provident fund was charged to the accounts in the year in which it fell due. This procedure worked well in the initial years; the number of pensioners was not large and the monetary outgo was equally small. With increasing number of staff opting for pension, not only the outgo was likely to increase

manifold in the years to come but it was also expected that there would be significant variations in it from year to year.

To this, the railways found a solution in setting up a pension fund with effect from April 1, 1964 to which contributions were to be made from the railway revenues every year. It was further decided that pension payments actually made each year from 1964-65 onwards would be charged to the pension fund. The provision for credit to the pension fund and for withdrawals therefrom was proposed to be covered by two new Demands for Grants to be sanctioned by the Parliament in the same way as contributions to and withdrawals from the railways' Depreciation Fund were covered.

The Railway Board correctly felt that such a measure was essential for a commercial undertaking like the railways as the cost of staff each year should reflect not only the amount paid but also the potential cumulative liability for the pensionary benefits earned against each year of service. It was considered desirable that the burden of this expenditure should be evened out from year to year. In a note sent to the Department of Economic Affairs in January 1964, the then Financial Commissioner for the railways made the following observations:

"The railways are expected to operate as a commercial undertaking. The railways have a very large number of employees. The cost of their pension..... is high; it is also a high proportion of the working expenses paid by the railways. It is further not unlikely that the railways, after increasing their employee strength..... may then begin to contract as the British and other railways in the West have already begun to do. It will be quite unreasonable to expect the smaller labour force of those days, to earn sufficient revenue not only to meet their own cost but the cost of lakhs of employees who had retired earlier but for whom no adequate provision had been made for the payment of pensions, as they fall due. The correct course is, therefore, to build up a pension fund at least from now,

as we have built up a Depreciation Fund so as not to have a false picture of our surplus position and of our future liabilities."

In reply, the Economic Secretary, ministry of finance said: "We agree that in view of the steadily rising pension bill which the railways will have to meet, it would be appropriate for a commercial department like the railways to devise a procedure whereby its working expenses bear the pensionary liability more or less on an accrual basis rather than on the basis of the actual payments as and when made. We are, therefore, in agreement with your proposal to set up with effect from the next financial year a pension fund from out of the railway surpluses; the transfers to the fund as well as the withdrawals therefrom being covered by a vote of Parliament".

At the request of the railways, the Controller of Insurance had assessed that in order to meet the cost of pensions including family pensions as they fell due in respect of a stationary population of 10 lakh employees (estimated to opt for the pension scheme) an amount of about Rs 30 crores would have to be credited to the pension fund every year. However, in actual practice, the annual appropriations to the fund were far less, ranging from Rs. 12-16 crores during the period 1964-65 to 1974-75.

A revised actuarial exercise was carried out in December 1974. It revealed a short-fall of Rs. 252 crores in the pension fund as at end March 1970. The amount in balance was Rs. 80.02 crores as against Rs. 332.34 crores required to meet the potential cumulative liability. No action was, however, taken to make good the shortfall. This was the first blow to a well-conceived pension fund.

The fresh actuarial exercise had also suggested enhanced appropriations to the pension fund from 1 April 1975 onwards. Once again, the actual contributions to the fund were far less for the next few years till 1978-79. Thereafter, the contributions were stepped up but, as it turned out, the actual outgo was more than the contributions assessed by the actuary as well as the contributions made by the railways.

In 1981, an in-house assessment showed that the pension fund was short by Rs. 203 crores. Despite this, no action was taken to build the fund to the desired level. Thus, the accrued pensionary liabilities kept on mounting, and the *raison d'être* of the fund was totally lost.

With the passage of time, the system of carrying out periodical actuarial exercises was also given a go by. The initial actuarial calculations were based on certain assumptions regarding mortality ill-health retirement, etc. The closeness of these assumptions to actual experience had to be watched and necessary adjustments made from time to time so that the fund always remained self-sufficient. But this was not done.

3

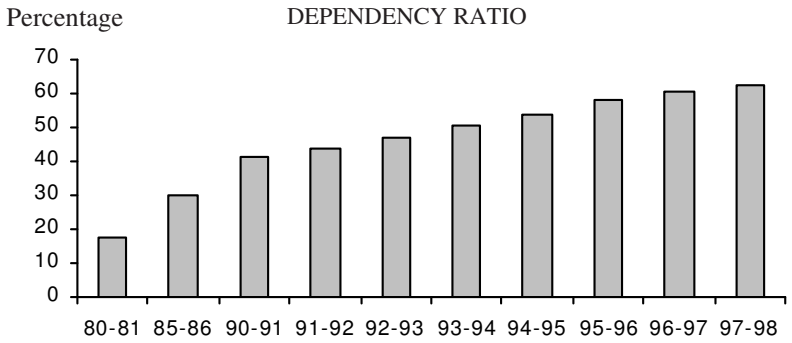
THE BURDEN

The Indian Railways have witnessed a fourfold increase in the number of pensioners during the last two decades. From a low of 2.71 lakhs in 1981, this figure touched a million mark in 1997-98. The graph below depicts the steady rise over the years.

This phenomenal increase in the number of pensioners could be explained by two significant developments. One relates to the increase in the life expectancy in the country which presently is 78 years for a retired government servant. The other, which is of the railways own making, was the large induction of staff in the fifties; around five lakh additional employees were recruited. Its impact was felt decades later in the nineties when these hands started completing their service tenures.

In consonance with the increase in the number of pensioners, the dependency ratio has also registered a sharp increase; a high of 63 in 1997-98 as against a mere 17 in 1980-81. *Pari-passu,* the burden on the serving employees to support their erstwhile colleagues is growing manifold. In the years to come, this ratio will

further increase, since the railways will have to shed a lot of flab. It is quite possible that at some stage in the future the number of pensioners almost matches that of the serving employees, which means one pensioner for every serving employee.



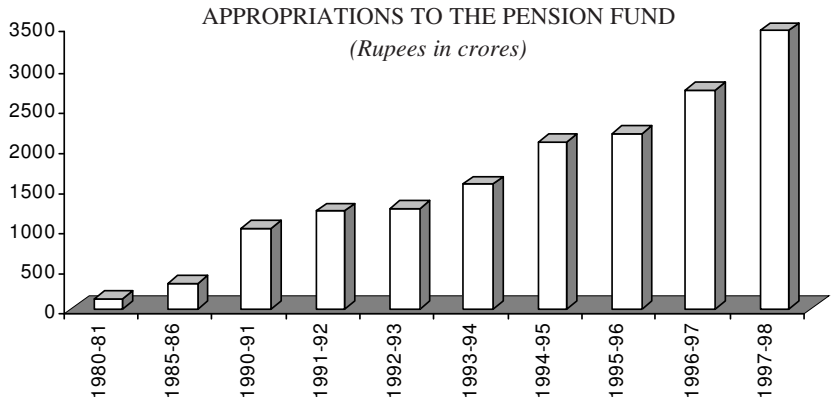
Note : Dependency ratio = $\frac{\text{No. of pensioners}}{\text{No. of employees}} \times 100$

Coupled with the increase in the number of pensioners, the pensionary liabilities have also been influenced by the implementation of the recommendations of successive Pay Commissions, a package which has invariably included increase in the emoluments of railway employees, betterment of their promotional avenues and liberalisation of their pensionary benefits. Such a welfare approach cannot be ruled out in the future as well.

The recent announcement by the central government to raise the age of retirement to 60 years would no doubt help in arresting the outgo on pensionary benefits at least in the short run. In the long run, however, the impact may be neutralised by further increase in life expectancy – a distinct possibility in the coming decades. In line with the developments elsewhere in the world, India would also be experiencing substantial greying of its population.

The amounts appropriated from the pension fund for the period 1980-81 to 1997-98 are indicated in the table below. In

1980-81, the withdrawals were Rs. 106 crores. Within a span of 18 years, this amount increased more than 300 fold to Rs. 3,456 crores (1997-98). This accounts for about 13.30 per cent of the working expenses as against 4.65 per cent in 1980-81.



The burden of pensionary liability on the railways has to be appreciated in the context of :

- An environment of downsizing in the government and falling budgetary support.
- A climate of growing competition and the railways' falling market share.
- Rampant political profligacy.

As is well known, the share of budgetary support from the government in the total plan outlay for the railways has been declining – from 75 per cent during the fifth plan to 23 per cent in the eighth plan. The ninth plan projects an even lower level of 20 per cent. The fact that government support is declining at a time when Indian railways needs it the most, is making things all the more difficult.

A look at the ninth plan resource gap and funding structure shows that the system is already struggling to make ends meet.

Internal resource generation is purported to account for Rs. 19,500 crore (30 per cent); budgetary support from the government is supposed to cover Rs. 13,000 crore (20 per cent); and borrowings are to make available Rs. 16,250 crore (25 per cent). This leaves a resource gap of Rs. 16,250 crore (25 per cent).

In the years to come, Indian railways will have to depend largely on internal resource generation to meet its requirements. This can only be achieved by increasing its market share, cutting costs and getting prices right. Slow growth and increased competition from other modes of transport has led to a progressive erosion of Indian railways' market share, its natural advantages notwithstanding. While its share in freight traffic was down from 89 per cent in 1950-51 to about 35 per cent in 1997-98, the share in passenger traffic in this period fell sharply from 68 per cent to 20 per cent. This represents a loss of more than half in freight and almost two-thirds in the passenger segment.

The future does not look rosy either, with increasing competition from road transport (larger trucks on bigger roads eating into share of freight), pipelines (Indian railways losing out on petroleum products), new import possibilities for coal (which is Indian railways' single largest transported commodity), siting of power plants at ports and pit-heads, and development of inland waterways. Indian railways' business now hinges largely on movement of bulk commodities, which too stands threatened.

Indian railways goes about its borrowing functions through IRFC, its resource mobilising arm. IRFC borrows directly from the market through taxable bonds, non-taxable bonds and external commercial borrowings (ECBs), and then invests in rolling stock, which is subsequently leased to the railways in return for a lease rental. Funds invested in rolling stock have a short gestation period and start generating revenue immediately. This is important as IRFC needs money quickly to service its loans, as most of the borrowings are short-term (5-7 years).

Borrowing through IRFC has its limitations. Firstly, the cost of borrowing has been going up as the share of taxable bonds to the total value of bonds issued has increased. This is partly because of the government's policy to restrict the use of tax-free bonds by the public sector units and partly on account of the declining rates of income tax which has made tax-free bonds less attractive to the investor. The higher average rate of borrowing has resulted in an increase in the lease charges which railways have to pay to IRFC. Secondly, there is an inherent danger of the railways falling into a debt trap in case the total lease charges exceed a certain level making it difficult for the railways to meet the lease and dividend payment obligations.

The above analysis shows that if the railways had built the pension fund, as contemplated, its internal resource generation would have been of much higher level. This fact is clearly borne out by the higher plan outlay of the railways for the current financial year which, as pointed out by the Railway Minister in his budget speech, has been "made possible through an increase in the resource component to Rs. 4400 crores mainly because of pensionary and other benefits as a result of government's recent decision to raise the age of retirement from 58 to 60 years".

4

THE NEED

Currently, the railways are following the 'defined benefits' pension system under which the employees who have completed the prescribed minimum length of service are entitled to a defined percentage of their last emoluments as pension. The amounts required to meet the pensionary liabilities each year are being contributed by the railways through appropriations from the general revenues. This is intrinsically a pay-as-you-go (PAYG) plan, although a separate pension fund was established in 1964. Since the balances lying in this fund do not represent the potential cumulative pensionary liability in respect of pensionable employees on a particular date, the term 'pension fund' is a misnomer as the nature of the fund differs from the accepted connotation of the term.

Normally, under a purely contributory PAYG plan, the benefits accruing to the current retirees determine the contribution (paid either by the workers or from general revenues). Then C = BD, where C is the rate of contribution, B the benefit rate and D the dependency ratio (beneficiaries/workers covered under the scheme).

For example, if there is one retiree for every five working employees and if beneficiaries have been promised an average pension equal to 50 per cent of the average wage, a contribution rate of 10% of wages will cover system costs. If the dependency ratio rises to one retiree for every two workers, either the contribution rate must be enhanced to 25 per cent or the benefit rate be reduced to 20 per cent of the average wage. Since it will be difficult to effect any reduction in the benefit rate, it is obvious that the contribution rate will have to rise.

On the Indian railways where the dependency ratio is now one retiree for less than two workers, the contribution rate was 30 per cent in 1997-98, as against less than 9 per cent 1980-81. Any further increase in the dependency ratio or in the quantum of retirement benefits would push up the pension contribution further. In this context, the following observations of the Fifth Pay Commission (Para 132.8, Vol. III) are worth noting:

"Increased system dependency rates, i.e. the ratio of number of pensioners to the number of workers, have put pressure on the viability of PAYG schemes. As such, rapid increase in this rate has caused pressure on public pension systems, resulting in a situation where most of the countries of Eastern Europe and South America have made their pension plans more sustainable by converting part of the pension obligation into a funded contributory scheme ... Large funds have accumulated under occupational pension plans amounting to 133 per cent of GDP in Switzerland, 117 per cent in the Netherlands, 105 per cent in UK and 72 per cent in USA. In Chile, which represents an example of successful pension reform, the funded pension schemes are government-mandated but are privately managed by specialised fund management companies. The funds have accumulated resources which are equal to 30 per cent of GDP and achieved a real rate of return of 13 per cent per annum".

Simulation exercises carried out by the consultants engaged for the Fifth Pay Commission indicate that the estimated expenditure on pension for the civilian employees will go up from Rs 4,650 crores in 1997 to Rs 27,180 crores in 2015 and Rs 1,14,500 crores in 2030.

The consultants' report further suggests that if government contributes an amount equivalent to 17.73 per cent of the wages of the new entrants, it can provide 50 per cent of the final wages as pension after retirement without incurring any PAYG liability. However, the government may not find it easy to implement this

plan since the pension expenditure under PAYG for the existing pensioners and current employees would remain unchanged; hence there will be a progressive and steep increase in the total expenditure on pension account for the next 40 years.

If, in addition to the above, the government also contributes an equivalent of 18 per cent of the salary of current employees to the fund, it will cause a progressive reduction in the annual PAYG liability (ranging from 40% to 7.5% depending upon the remaining years of service) for such employees, with the result that the net additional expenditure by the government will not be as high as in the former case and the break-even point will also be reached earlier, say, after about 27 years.

The report provides yet another set of calculations which shows that if the government contributes 5.85 per cent of the employees' wages into a pension fund it can reduce its PAYG liability for every year of contribution so that, at the end of 33 years, the 50 per cent PAYG pension would be reduced to a 33.5 per cent PAYG pension and a 16.5 per cent funded pension. After about 27 years, the annual expenditure on pensions would be lower than the expenditure incurred if the entire pension was paid on a PAYG basis. The projected year-wise figures of expenditure for all government departments as a whole (excluding defence services) as given in the report are only broadly indicative of the magnitude of funding required for defined benefits plans.

The railways will, of course, have to work out separate projections of expenditure based on the forecasts of increase in the number of its own pensioners, the dependency ratios, the average amount of pension payable to its employees in different pay categories, the total amount of wages payable every year, etc. The size of railways' contribution to the fund required to achieve the objectives of each of the above-stated three plans can then be arrived at.

Other alternative schemes can also be thought of and simulation exercises carried out of at least equal value in real terms to the current basic pension. However, since enormous funds will be required for replacing the PAYG system overnight, partial funding, with the railways contributing a percentage of the employees' salary into a designated and independently operated fund, can alone provide the answer to the railways' mounting expenditure on pension payments.

So far, the railway pension fund has not been given the attention it deserves, either by the railways or the finance ministry which administers the fund. An ideal pension fund operates exactly like a provident fund with investments made in designated securities. In the case of provident funds, 60 per cent can be invested in government securities and special deposit schemes and the remaining 40 per cent in public sector bonds. There has, in fact, been a distinct change in the pattern of investment of such funds during the period from 1993-94 to 1996-97, as may be seen from table below:

(in percentage)

Investments in	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**
Central Government Securities	Nil	25	25	25	25
State Government Securities and other Negotiable Instruments guaranteed by Central or State Government	15	15	15	15	15
Special Deposit Schemes	70	55	30	20	20*
Bonds of PSUs and PSFIs, Certificates of Deposit of Banks	15	30	30	40	40

* 10 per cent investment in private sector bonds has been permitted.

The railway pension fund has no such provision for investment and the amount is held as a cash balance. The only interest accrual is on the balances maintained in the fund which

are negligible, though even on this amount the interest rates paid are significantly lower than those payable on treasury bills. For instance, if the entire balance of Rs 713 crores during 1995-96 had been invested in 364-day treasury bills at a price of Rs 88.40, it would have given a return of 13.2 per cent and the interest on that balance would have been Rs 94.15 crores. However, the actual interest earned was Rs 51 crores, which is only about 6.5 per cent.

Since as much as 40 per cent of provident fund investments are now permitted in PSU bonds, railways ought to follow the western models of setting up a pension fund, albeit for part funding of pension payments, and invest in public sector bonds which would give a much higher rate of return than what is currently credited on the cash balances available in the fund (as part of the Consolidated Fund of India) by the government.

This mechanism would be particularly helpful in a situation where funds from the government's budgetary resources have been drastically reduced, internal generation of resources can be limited and, extra-budgetary resources, such as borrowings through IRFC, are expensive. For instance, the taxable bonds issued by IRFC have in the past carried interest in the range of 15 to 16 per cent (only now the rate has been reduced on account of a regime of low interest rates introduced by the RBI) which obviously pushed up the amount of lease rentals payable by the Indian railways. If the pension fund had been properly operated there would have been ready buyers of IRFC bonds at costs which would have satisfied the requirements both of the pension fund as well as of IRFC/railways.

The advantages of setting up an independent pension fund are, therefore, manifold:

- A gradual reduction in the pension payouts from general revenues and, hence, release of more funds for plan activities;

- future increase in pension payments – both under PAYG and funded segments of the scheme – can be absorbed to a great extent by generation of additional income from the investments made by the fund; and

- IRFC bonds can find a ready market in the railways own fund thus benefiting both the fund and the IRFC besides minimising the risks of investment.

5

THE METHOD

Pension funds in countries with immature financial systems often accumulate reserves which almost always are required to be invested in government securities or the securities of state enterprises. The ultimate use of these funds is often not known since data are unavailable and money is fungible in the government budget. Very often, the governments are tempted to spend these reserves on consumption rather than investment, with the result that funds are not available when needed. It is, therefore, essential that pension reserves are kept separate from the rest of the budget and are managed by an autonomous body.

Regulation of the funding of benefits is a key aspect of the regulatory framework for defined benefits pension funds. Calculation of funding requires a number of actuarial assumptions, in particular, the assumed return on assets, projected future wage growth (for final salary schemes) and future inflation (if there is indexing of pensions).

Minimum funding limits provide security of benefits against default risk by the organisation setting up the pension fund. In the US, the Employees Retirement Income Security Act of 1974 introduced the Pension Benefits Guarantee Corporation to guarantee (upto a certain limit) benefits of funds in default. This increased the burden on the companies running a pension scheme, and, as a consequence, the growth in pension funds slowed. The number of new defined benefits plans dropped while some firms switched over to defined contribution plans.

More recent changes in US regulations have clarified funding rules. Pension fund liabilities have been defined as the present value

of pension benefit owed to employees under the benefit formula, discounted at a nominal rate of interest. Implicitly, these are the obligations of the fund if it is wound up immediately. Indexation upto retirement, as is normal in a final salary scheme, gives the projected benefit obligation which is not guaranteed except in the UK. However, taking account of future obligations instead of focussing purely on current liabilities could permit smoother levels of contributions as the fund matures.

In the UK, recent regulatory changes have limited overfunding to 5 per cent of the projected obligations, enforced a degree of indexation (upto 5 per cent) of pensions upto retirement for early leavers and outlawed compulsory membership. A decline of the company pension fund sector is predicted but, to date, there is little evidence of this happening.

The interest rate assumed to be earned on assets is a key aspect of funding arithmetic. If it is overestimated, funding may be inadequate; if underestimated, there may be overfunding. Some of the countries, like Japan, fix the contributions assuming a certain nominal rate of return on fund assets, others, like the Netherlands, UK and Canada, allow for an assumption of wage growth.

Requirements of full funding do not completely solve the default problem. Full funding requires a complex calculation that involves actuarial assumptions. The future rate of return on assets determines the growth. Inflation and year of retirement determine future obligations. None of the variables is known with certainty. The values that employers and their actuaries use in these calculations strongly influence the contribution rate deemed necessary for an actuarially sound fund. Also, for funding requirements to be meaningful, governments should specify their key actuarial assumptions, such as expected rate of return and wage growth.

How should the investment portfolio be regulated to prevent excessively risky investments? If investments fail, pensions could

be in trouble, and if there are government guarantees, the burden would ultimately fall on the government treasury. On the other hand, overly strict regulations defeat the capital market advantages of pension funds. In the US, the rule requires sensible portfolio diversification but places no limit on portfolio allocations other than a 10 per cent limit on investments in securities of the sponsoring employer. The case of the UK, where pension funds have taken advantage of the regulatory freedom to place a large share of their portfolio in equity investments, is similar. In developing countries, the restrictions on equity investments are generally much more strict.

To ensure competent and responsible administration of pension funds and protect their solvency, minimum capital margin needs to be prescribed. Shortage of local expertise can be overcome by temporarily utilising the services of foreign fund managers by working out a suitable arrangement within the framework of governmental regulations. Asset Management Companies (AMCs) who have so far been managing the mutual fund industry have not been able to generate much confidence among the investors. The selection of AMCs will, therefore, pose a major problem, but it can be overcome by permitting foreign fund-managing agencies of proven track record to start joint ventures with Indian companies already in this business locally. Developing countries reluctant to embark on joint ventures may have a hard time assembling the expertise needed to run the pension funds efficiently, especially in the early years.

In Chile, the pension fund is an independent entity, segregated both legally and financially from the fund management companies. The assets of the pension fund belong exclusively to individual members and are neither attachable nor affected by any financial losses suffered by the asset management companies. Besides, these companies are required to maintain investment reserves equal to 1 per cent of the total assets of the pension fund they manage. The reserves have to be invested in the same assets as the pension fund

under the asset management company's management to ensure that they apply the same incentives in investing the resources of the pension fund as are applied to their own resources. There are no floors requiring purchase of government bonds or other "socially useful" investments.

Currently, the upper limits are 50 per cent on government bonds, 30 per cent on corporate equities, 10 per cent on foreign securities and specified limits on bank deposits, mortgage loans and other assets. There is also a provision for a "profitability reserve" wherein the excess over a prescribed percentage of investment return is to be placed. Similarly, when the real investment return for the pension fund is below a prescribed figure, the AMC has to make up the difference by transferring funds from the profitability reserve. However, the twelve months' average used in calculating returns unduly emphasises short-term performance which is not desirable for long-term contracts. An alternative approach would apply narrower limits on performance over 3 to 5 year periods.

Financial regulation aims to protect the participants from fraudulent or imprudent functioning of the managers of financial institutions. One way to provide such protection is through regular disclosure of information. AFPs in Chile are required to provide statements to contributors three times a year disclosing the monthly contributions made by the employees, the accumulated balance and rate of return on individual accounts.

To protect against inflation, pension funds managers could invest a portion of their portfolios in assets that provide an effective hedge against inflation. More than 95 per cent of the investments of AMCs in Chile are in equity, real assets, or indexed bonds. Hedging against inflation is, however, more difficult in countries with less developed financial markets, poorly indexed financial instruments and an inflation rate which is high and volatile.

Another problem concerns the workers' exposure to the risk of a sharp decline in the market at the time of retirement. This risk

could be reduced by requiring workers to purchase small annuity contracts periodically once they reach a predetermined age, say, 50 years. The timing problem could be mitigated more effectively by developing variable annuities whose value would rise and fall with the market rather than being fixed on the retirement date.

Recent developments in the UK have focussed attention on the functioning of the pension fund managers. The UK's big four firms of fund managers have been able to increase their market share significantly since 1990, largely by winning balanced fund mandates which give one fund manager discretion to invest in a wide range of assets classes. This has led to increased concentration in the hands of a few in an industry where the biggest has been considered to be the best and safest bet.

Events of the past few months, however, suggest a fundamental change in the attitude towards the fund managers. The most recent example is that of Unilever who have dismissed MAM, the UK's largest fund manager, from a £1bn portfolio because of poor performance. Two other major companies – PDFM and Gartmore – which have suffered the worst performance problem, were hit by their decision to hold a large proportion of assets in cash. As asset allocation is a key component of balanced management, this failure on the part of these companies has called the system into question.

This rethinking has also been caused – more fundamentally so – by the Pension Act introduced by the British government about a year ago, which has made pension funds reassess the way their assets are managed. The minimum funding requirement – a central feature of the Act – insists that funds exactly match their assets with their liabilities, that is, the money needed to pay future pensioners. As the liabilities are based on the movement of key indices, the change has served to increase the attraction of index funds for trustees. The investment experts have, therefore, suggested that for best results, there should be a mix of index tracking, balanced

management and specialist managers for managing different types of assets.

Although occupational pension schemes (which may cover workers in civil service, public utilities, large corporations, etc.) were initially unregulated, substantial regulations have been devised in every country where such schemes are introduced. A basic reason for regulating complex pension schemes is that the workers may not fully understand the schemes or may not realise that the pension promises are underfunded and, therefore, not trustworthy.

Also, if the government guarantees payments to the retirees out of these funds, the managers of pension plans could be tempted to make excessively risky investments for the reason that in case the investments fail, the burden will eventually be passed on to the government. Regulation thus prevents the organisations controlling the pension funds from taking advantage of such guarantees (or other concessions) by pursuing inefficient or inequitable ways. A basic problem, however, remains in that the developing economies may lack the institutional capacity to regulate effectively.

From the start, the developing economies need to frame regulations requiring a sound long-term financial basis. Funding requirements may reduce the temptation for the employers to make irresponsible promises and increase the trustworthiness of the promises that are made.

A promising model for enforcing regulations is in place in the Netherlands. A single statutory authority, the Insurance Supervision Board, oversees occupational pension plans. Pension funds have to provide the Board with detailed information on benefit payments and investments. The Board ensures that pension fund commitments are adequately covered by assets and plan rules and conditions are satisfactory.

This model of monitoring, i.e., one supervisory body, specific rules on funding, standardised actuarial assumptions, portability provisions and periodic on-site inspections, have considerable merit for developing economies where regulations, disclosure requirements and enforcement mechanism relating to pension funds are at an early stage. Indonesia recently enacted a new pension legislation covering regulatory and disclosure issues that could serve as a model for developing countries. Significant among the major provisions of this legislation, which could be relevant for the Indian railways, are:

- An occupational pension programme must be operated as a legal entity separate from the employer's business, with the pension fund's assets held by an approved custodian.
- Pension programmes must be fully funded.
- Permissible investments should be specified, with strict diversification standards. Transactions between the pension fund and the employer should be restricted.
- There should be regular reporting to the participants (it could also be an elected body of workers/employers) and independently audited financial statements and actuarial opinions should be submitted to the Ministry of Finance.
- Both the contributions and the pension fund investment income should be tax-free, while pensions are taxed as normal income.

The portfolio distribution of pension fund and the corresponding return on the assets held would determine the viability of the fund. The findings given in one of the research papers written for the World Bank (E.P. Davis, 1993) indicate that for domestic assets the highest returns (and the highest risks) are normally offered by equities, followed by property. Both are

generally in excess not only of inflation but also – crucially for final salary plans – of the growth rate of average earnings.

International diversification in equities also offers sizeable real returns, at generally lower risk than domestic shares, despite exchange rate hazards. While international investment may involve the dangers of institutionalised capital flight, loss of control by monetary authorities and depriving local markets of the increased availability of long-term funds, it has the singular advantage of contributing to the credibility of domestic stabilisation policies and opening up the domestic economy to enable it to become a part of the global economy. Liberalisation of capital outflows may also encourage inflows by convincing foreign investors that they will be able to get out of the market quickly in case the need arises.

Bonds constitute over two-thirds of pension fund assets in Sweden and Denmark, largely due to portfolio regulations : 60 per cent of Danish assets have to be invested in domestic debt instruments, while the majority of Swedish assets are to be in listed bonds and debentures. In the United States, bonds form around 40 per cent of pension funds' portfolios. In contrast, in the UK, the bonds' share has fallen sharply: from 50 per cent of gross assets in 1966 to 14 per cent in 1990. But this is largely due to the fact that, after abolition of exchange controls, UK funds sold bonds to buy foreign assets.

Loans constitute a large proportion of the Dutch and German pension funds' assets. Loans by German funds are largely given to banks and companies whereas Dutch funds lend predominantly to the public sector. Swedish and Swiss funds, which used to rely heavily on loans, now do so only to a limited extent. Generally speaking, loans face greater liquidity risk than bonds, while having the advantage of being tailored to the requirements (longer maturities, etc.) of the borrower and the investor.

6

The Costs

The efficacy of a pension scheme depends partly on its administrative costs. But a proper comparison of the administrative costs of different pension schemes is difficult because of the enormous differences in country conditions, the kind and quality of service provided, and cost accounting techniques. Nevertheless, there is enough evidence to show that the country's per capita income and number of workers covered by the pension plans are two major determinants of administrative costs.

It is often not possible to measure administrative costs. Public pension plans, in particular, systematically understate their costs. For example, in the US, the cost of investigating recalcitrant employees does not appear in the books of the Social Security Administration, although they add to the expenses incurred by the Internal Revenue Service. There are also bureaucratic costs of delayed payments and inconvenience costs to pensioners which remain unreported.

A pension scheme operating in a poor country faces different types of resource constraints than a scheme operating in a rich country. On the one hand, administrative costs may be higher in a rich country because of higher wages. On the other, weak communications infrastructure and banking system may raise the cost of account and disbursement of pensions in a poor country. Besides, scarcity of computers and of skilled personnel needed to use them could also raise the cost of record-keeping.

Certain features of the pension system, such as the scope and quality of the services provided, the amounts and kinds of

investments made and indexation of annuities (which are more expensive to administer) also influence the costs. In publicly managed plans with substantial reserves, the surpluses are usually required to be invested in government bonds or bonds of the state enterprises. In this case, investment expenses are negligible and investment returns are low. In contrast, where investments are allowed in a broad range of private as well as public securities, the pension schemes incur higher expenses but also allocate capital to more productive uses and, as a result, earn a higher rate of return allowing a lower contribution rate to finance a given pension scheme. There is thus a clear trade-off involved, about which a judgement has to be made.

There are also multiple external and internal influences on costs which need to be considered while determining whether a pension system is administratively efficient. In practice, such influences get ignored and simplified cost ratios that are often misleading are used as indicators of administrative efficiency.

Two ratios that are usually presented are administrative expenses as a percentage of total contributions taken or of total benefits paid out. In general, these ratios are high in immature systems with young populations. For instance, Indonesia and Kenya spend 30 per cent and 72 per cent of contributions, respectively, as administrative costs. In contrast, Japan and the US spend 1 per cent or less of benefits and contributions as operating expenses. These ratios, however, do not tell us anything about the internal efficiency of the pension schemes.

Another ratio is the administrative cost per member of the pension plan. Although this ratio avoids the bias against young countries with immature systems, it is also not an adequate measure of administrative efficiency, because it does not account for the quality of service provided, the price of labour and capital, and economies of scale. Moreover, such a ratio is useful for comparison purposes only when the countries/pension systems compared are

of almost an equal size and with, more or less, similar per capita incomes.

No objective norms for deciding on the optimum level of administrative costs can, therefore, be laid down. The right way, perhaps, is to compare statistical data from other countries with almost similar characteristics and then institute practices for lowering these costs below those which may be expected as a result of such comparisons. Also, as capital markets become globalised, large pension and insurance companies will increasingly operate as pension fund managers across national borders (provided they are permitted to do so by the respective governments), and can ensure high quality of service, strong investment performance and lower administrative costs.

The level of management fees charged by the fund managers depends on the competitive structure of the market. In the competitive UK market, a fund may pay about 0.2 per cent, whereas in the US fees tend to be higher at about 0.4 per cent. In countries such as Switzerland and Germany, with relatively uncompetitive fund management sectors, the rates are much higher – 1 per cent or more. In Japan, till recently, only trust banks and life insurers could manage funds with trust banks charging upto 1.8 per cent and life insurers charging 2 to 5 per cent of the inflow.

But more important than administrative costs is the efficacy of asset management. Countries with uncompetitive fund management may find that there are no incentives for obtaining a high return on investments. In India also, competition among the really capable fund managers may be very much limited and if railways do wish to operate through an independent asset management company, they will have to draw up an agreement which imposes penalties on the company for poor management and rewards it for earning higher than targeted returns.

7

RECOMMENDATIONS

1. In order that the net revenues of the Indian railways do not get depleted on account of the increasing burden of pension payments year after year, it is essential to operate an independent pension fund in which the annual contribution made by the railways can be put and allowed to earn interest at prevailing market rates. This will enable the corpus of the fund to grow at a faster rate. It is not possible to do so under the existing arrangement where the balances lying in the railways pension fund receive a credit of about seven per cent only from the central government.

2. The railways should seek approval from the Government of India for a complete segregation of their pension fund accumulations from the consolidated fund of India. Railways should also be free to invest these funds in approved securities though the guidelines for making these investments may be drawn up in consultation with the Ministry of Finance.

3. The railways can opt either for full funding for the new entrants (maintaining PAYG system for the current employees) or for partial funding for all employees. In the case of the former, it could be made a condition of service that they shall have to contribute a fixed percentage of their salaries to the designated pension fund so that the railways can cope more easily with the financial strains inevitably associated with transition to a funded system. However, if a disparity in the pension schemes of the railways and other central government departments cannot be introduced, the railways may opt for the second alternative. Depending on

the extent of funding required, an actuarial exercise will need to be carried out to determine what the annual contributions to the pension fund should be.

4. As a result of inadequate provisions made in the past, contributions to pension fund will initially have to be much higher. However, if partial funding is introduced, the PAYG liabilities will show a gradual reduction. Based on various parameters, such as rates of increase in wages and interest, growth in numbers of working employees, life expectancy and dependency/passivity ratios, and, finally, the salary structures, railways will have to prepare simulation models for working out year-wise amounts to be contributed to the pension fund and the corresponding decrease in PAYG payments. It can then be estimated how long it is going to be before the reduction in PAYG payments overtakes the increase in contributions to the fund. After this break-even point is reached, higher savings can be expected with each succeeding year. The objective of setting up the pension fund would then have been realised.

5. The railways must reflect the accrued pensionary liabilities of the previous years in their accounting statements so that the implicit debt accumulated by them gets formally recognised and a truer picture of their finances is presented to the government and the public.

6. It is necessary that the pension fund is managed by an experienced and competent Asset Management Company. Railways may hold discussions with the LIC to find out whether they can manage the fund and what their terms and conditions for undertaking this work will be. Companies managing similar funds abroad may also be considered provided their rates are competitive.

7. Fund managers should generate and guarantee a rate of return on investments which could ensure payment to pensioners without raising the level of appropriation from the railways' revenues.

8. Administrative cost of the fund should be carefully calculated and the magnitude of such expenditure clearly understood, since this will be a permanent addition to the railways' working expenses.

9. Part of the accumulated balances in the fund could be utilised for investment in IRFC bonds. A provision to this effect could be made in the agreement to be entered into by the railways with the fund management company. Such an arrangement will ideally meet the interests of both the parties but will require fine-tuning of the rate of interest on the bonds so that while the pension fund gets adequate returns, the viability of IRFC's leasing arrangements with the railways remains unaffected.

I

TYPES OF PENSION SYSTEMS

Basically, pension systems can be categorised as (i) defined contribution (DC) schemes, and (ii) defined benefits (DB) schemes.

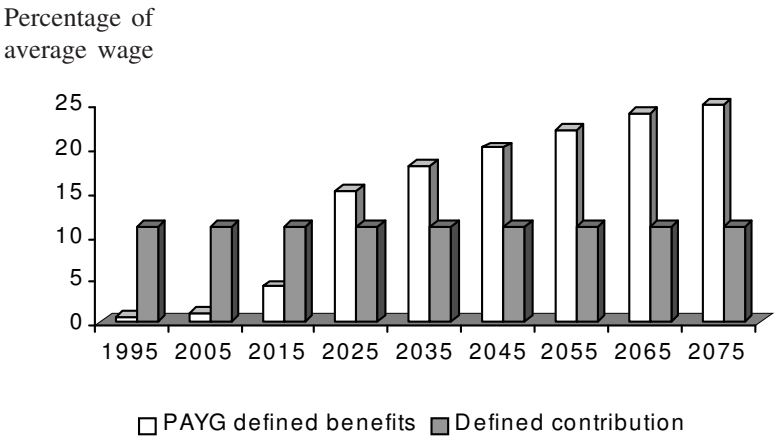
All schemes which can be classified as DC schemes allow individuals and employees to know how much has been or has to be contributed but the benefits from these schemes are uncertain as they depend on the market outcome or the yield on the total contribution. DC systems are, by definition, fully funded: the current workers contribute to a fund which is invested and its yield is utilised to pay old age pension to those very workers. Payments under the DC system are generally not a liability on the public funds.

On the other hand, under the DB system, while the benefits are specified in advance, the cost of providing the benefits is uncertain. Such a system is generally run either on a pay-as-you-go (PAYG) basis or on a partially funded basis. The PAYG system takes contributions from the current workers (or on their behalf from the employers, out of general revenues) and uses them to pay the current pensioners. The amount of the pension is known, since it would be similar to the pension today, but the quantum of yearly future contributions is not known with certainty as the same would depend on the forecasts of workforce growth.

Under the DB system, in an ageing population, the contribution rates will go up if the benefits are held constant for the current retirees. This will happen as more and more retirees join the pensioners and pensions are adjusted for average industrial wage

index. As an example, we can take the demographic profile of China and the simulations* of the increasing costs of a PAYG system which seeks to provide pension at the rate of 40% of the average wage in the economy. The simulations assume that the system begins in 1995 with a minimum 10-year contribution period required to receive a pension. Workers are assumed to enter the labour force at the age of 20 and retire at 60. In the initial years, few beneficiaries qualify for a pension, so the required contribution rate is less than 1%. But the required contribution rate rises as the system matures and the population ages. By 2025, the contribution rate rises to 15 per cent and by 2075 to 25 per cent. While China's population is ageing relatively more rapidly, nearly all countries of the world are undergoing a similar process and can expect similar cost increases.

The chart below shows the above simulation results for a PAYG defined benefits system as against the defined contribution system which, by contrast, has constant costs (contribution rates).



* Anita M. Schwarz in "Pension Schemes : Trade-off between Redistribution and Saving

Defined benefits plans have the advantage that they protect the workers from investment risk and, if benefits are indexed, from inflation risk. However, defined benefits based on the final salary

lead to unequal treatment for those who get substantial increase in their salaries during their last active years against those who do not. For example, in the case of an employee who gets an increase in salary to the extent of 10% in the last year of service as against an average wage growth of 3% upto that period, the rate of contribution in the last year would be much higher than in the previous years. In a defined contribution system, such additional contributions would have to be made explicit and, as such, would be more transparent. But under the defined benefit schemes, the effects of salary hikes and promotions near the end of a person's career are obscured by the average rates of contribution made on behalf of all employees. It is argued by some that the popularity of the defined benefits pension schemes (based on final wages) is significantly due to the favourable treatment of senior managers who get accelerated promotions and substantial increases in salary late in their careers.

If the DB system is of a partially funded type, the initial contributions are high in order to create a reserve fund, which, through its yield, keeps under control the pressure on contribution rates to increase. Theoretically, full funding of defined benefits is also possible and many countries do have fully funded occupational pension plans which are also defined benefits plans, but there are no fully funded public plans with defined benefits.

II

Rate of Contribution to Pension Fund

Pension plan calculations can be complicated by a plethora of necessary actuarial assumptions. However, these assumptions obscure a fundamentally simpler equation that underlines the working of pension plans. The basic pension structure of the Indian Railways being that of defined benefits, we shall discuss in the following paragraphs the arithmetic of pension plan concerning defined benefits system only.

Where the real rate of interest (r) and the growth rate of real wages (g) are equal to zero, the pension rate in a defined benefits plan is equal to

$$p = n \times q$$

where p = gross pension rate, i.e. ratio of pension to the gross real wage

n = length of the working life

and q = the rate of accrual of pension benefit as a per cent of salary per year of service.

The contribution rate (k) is then constant and given by

$$k = q \times m$$

where m = the length of life in retirement

The objective function of the pension plan under these conditions is given by $k x w x n = p x w x n$

where w = gross real wage

Thus, if q = 1%, n = 40 and m = 20, a contribution rate of 20% would be needed to pay a pension rate of 40%.

If g = 0, but 'r' is positive, and pensions are indexed to prices, the contribution rate will vary from year to year, since contributions will be accumulating interest until the time of retirement. The contribution rate for the first year will be

$$k_1 = \frac{q \times A}{(1+r)^{(n-1)}}$$

For the second year, the contribution rate will be given by

$$k_2 = \frac{q \times A}{(1+r)^{(n-2)}}$$

and so on until the last contribution rate will be given by $k_n = q \times A$

where, A is the value at the time of retirement of a stream of payments for 'm' years at a real rate of interest of 'r' per cent.

If both 'r' and 'g' are positive, the calculation of annual contribution rates becomes more complex and depends on whether accumulated and projected benefits are taken into account. Accumulated benefits cover benefits already earned on the strength of the past service, while projected benefits cover benefits to be earned on the basis of future service. Estimating accumulated benefits requires assumptions with regard to the planned retirement age and the expected retirement life of beneficiaries, the growth (i.e. price or wage indexation) of pensions, and the discount rate. For projected benefits, further assumptions about future wage growth are also required.

On the basis of projected benefits, the series of contribution rates with pensions indexed to prices will be :

$$k_1 = \frac{(1+g)^{(n-1)}}{(1+r)^{(n-1)}} \times q \times A$$

$$k_2 = \frac{(1+g)^{(n-2)}}{(1+r)^{(n-2)}} \times q \times A$$

$$\text{and } k_n = q \times A$$

If reserves are set aside for accumulated benefits only, the fund will need to cover the value of the accrued benefits at the time of retirement, without any allowance for projected benefits to be accrued. Also, it should be understood that using projected benefits for determining annual contribution rates smooths out the impact of future wage growth, but may require high initial contribution rates if wage growth exceeds the rate of interest. On the other hand, using accumulated benefits as the basis for determining annual contribution rates may involve major changes in contribution rates from one year to the next as a result of wage growth and longer period of service. Contribution rates may need to be raised steeply late in the working life of the employees.

III

Pension Plans

Funded or Pay-As-You-Go

Old age security plans can be fully or partially funded, or financed on a pay-as-you-go (PAYG) basis. Under PAYG system, the plan's current revenues (financed either through a payroll tax or from general revenues) cover its current obligations, and there is no stock of savings to pay future pensions. A low ratio of retirees to workers (the system's dependency ratio) and a high rate of productivity and real wages permit high benefits or low contributions.

In a fully funded scheme, a stock of capital accumulates to pay future obligations so that aggregate contributions plus investment returns are sufficient at any time to cover the present value of the entire stream of future obligations.

When the system's dependency rate is very low due to the reason that there are few eligible beneficiaries, PAYG will always appear cheaper than a fully funded plan. But as the system matures, and more retirees are eligible for benefits, this temporary advantage disappears. PAYG will, however, continue to have a cost advantage in the long run if the earnings growth rate plus the labour force growth rate exceeds the interest rate. In this case, PAYG could result in getting back a higher present value of pensions than was paid in as contributions. But if the rate of earnings growth plus labour force growth falls below the rate of interest, the long run cost advantage and the high rate of return go to fully funded programmes. Today, for instance, just as plans of the Organisation for Economic Cooperation and Development (OECD) are beginning to mature, the conditions conducive to a successful PAYG scheme are fast

disappearing. Population growth is coming to a halt. Mortality rates among the old are decreasing raising their share in the population while wage growth is declaining.

Because of its emphasis on current cash payouts, PAYG finance hides the true long-run cost of pension promises. The present value of the future stream of expected benefits is known as the "implicit public pension debt". In many countries it is 2 to 3 times the value of the conventional explicit debt. An implicit debt is a hidden liability of which many policy-makers are unaware. Such liabilities have grown rapidly with the proliferation of publicly managed, defined benefits pension plans throughout the twentieth century. Unfortunately, they never get assessed and publicly reported by the authorities in most countries.

Although interest in the implicit pension debt is growing as countries are re-evaluating their pension schemes, estimates of its magnitude are included in only a few recent studies that have focussed principally on several member countries of OECD. The available estimates show that unfunded pension liabilities are large even in young, poor countries with limited pension coverage and they can reach alarming proportions in the developing countries exposed to demographic pressures.

In their Report, "The Implicit Pension Debt : Concepts and Measurement" (World Bank, 1996), the authors, Cheikh Kane and Robert Palacios have stated that the concept of external debt overhang (ratio of the discounted present volume of all future debt-service payments to annual export of goods and services) can also be applied to pensions. The pension debt overhang would be captured by the ratio of discounted future pension liabilities to the covered wage bill. "Calculated on a present value basis with an 8 per cent discount, an external debt-service ratio of 200 per cent indicates a severe external debt problem". In the case of 11 countries, selected by the authors, it was found that the pension debt overhang (based on a discount rate of 8 per cent) ranged from 220

per cent (Ukraine) to 713 per cent (Uruguay) during the early 1990s. In their own words, "These figures show in stark terms that pension liabilities deserve far more attention than they have received so far. Indeed, a case can be made for making the calculation of a country's implicit pension debt a requirement for any long-term assessment of its fiscal policy".

It is necessary that timely and comparable estimates of the implicit pension debt are produced, as these can provide important inputs for the public debate on pension reform and can be used by policy-makers to compare the results of different reform proposals. Calculating the value of implicit pension debt is also a useful step when the authorities are considering the implications of ending a PAYG scheme. When PAYG schemes become unsustainable, either on their own or when the implicit pension debt is considered along with other public debt, governments must seriously consider reducing the former. This can be achieved either by raising the retirement age or reducing the replacement rate of pension, or both.

The implicit pension debt is a fiscal burden in low and middle income countries since it measures intergenerational transfer of massive proportions. It is essential to move away from pension schemes that entail heavy burdens which get heavier with the ageing of population. This can be achieved by moving towards funded and, if possible, defined contribution schemes.

In the early years of PAYG pension plan, costs may look very low because the required contribution rates are very low, but the implicit pension debt continues to build up surreptitiously and has to be paid off through higher taxes, as the system matures and population ages. In contrast, under fully funded schemes, contribution rates are higher from the start, accumulating assets sufficient to pay the pension debt. As a result, the Government is not hit by exploding liabilities later on. Full funding has the added advantage that its accumulated savings are committed for the long term and may flow through financial institutions. They are largely

invested in financial assets, and can, therefore, be an instrument of capital market development. Under these conditions, a pension system with a large funded component may be part of a country's strategy for increasing capital accumulation and growth.

One of the most persuasive arguments in favour of funding from the standpoint of the employer is that it will reduce the out-of-pocket cost of the pension scheme. An employer would have to pay much more on a current disbursement (or Pay-as-you-go) basis if he were to provide for payment of pension to an employee whose life expectancy after retirement is 15 years than what he will be required to pay if the benefits were to be accumulated through a series of equal annual instalments for a period of say 35 years discounted for a specified rate of interest. (For the sake of realism, the interest rate used for discounting should not be higher than the rate of return which the funding agency can reasonably expect to earn in the long run on the assets backing up the reserve liability). The difference in the outlay under the two methods of financing is, of course, wholly attributable to the interest factor. However, while investment earnings on the funds set aside for the payment of benefits reduce the employer's outlay for pensions, they should be viewed as part of the true cost of the pension plan. They represent money which presumably would have been earned if the funds transferred to the pension plan had been invested elsewhere. In fact, one of the arguments in favour of non-funding is that such funds will earn more in the employer's business than in the hands of a separate funding agency.

There are various degrees to which a pension plan may be funded, ranging from no funding, as in the case of a PAYG system, to the accumulation of a fund so large that the investment earnings alone take care of the benefit payments.

The lowest order of funding would be represented by an arrangement under which the benefits payable to retired employees would be funded in full, while no funding is undertaken with respect

to the benefits credited to active employees. This type of funding could be accomplished through the purchase of an immediate annuity in the appropriate amount for each employee as he reaches retirement or by transferring to a trustee a principal sum actuarially estimated to be sufficient to provide the benefits to which the employee is entitled. The principal sums required for such funding would have to be provided from the operating income of the employer since he would not be making any advance provision for the accumulation of such sums. The annual sums needed for such funding would tend to increase each year until a stable employee population is reached, after which it will level off.

Another type of funding arrangement which would serve as a satisfactory measure of security for active employees, at the same time providing complete security to the retired employees, is one under which the total prospective benefits of each participant would be funded at a uniform rate from the participant's attained age upon entry into the pension scheme till his date of retirement. For the plan as a whole, contributions would be relatively high in the early years (say, 25 to 30 years) on account of the necessity of amortizing the initial accrued liability, declining gradually until the last employee with the prior service retires. Thereafter, the contribution would level out at the rate necessary to fund the benefits currently being credited.

A third type of funding pattern is the one where the benefits for all prior years of credited service would be funded in full at the inception of the pension scheme and thereafter the benefits for each year of service would be funded in the year in which they are credited. A condition of full funding would then prevail which, in fact, is the objective towards which many employers are striving. However, the initial accrued liability is ordinarily too large to be liquidated in one stroke.

The last method of funding contemplates funding in full the entire benefit envisioned for an employee at retirement on the very date he qualifies for membership of the pension scheme. The initial

contribution under this system would, therefore, fund the prospective benefits of all employees who qualify for membership of the fund at that point. Thereafter, contributions would have to be made only on behalf of those employees who enter the scheme during the contribution period.

If the economy is dynamically efficient, the interest rate should at least be as high as the rate of growth of GDP or total earnings (which include growth in wages per worker and growth in the labour force). Full funding in this case would at least be as cost-effective as PAYG scheme. The expectation, arising out of the real world data, is that the rate of return in the case of long-term capital, especially equity capital, has been considerably higher than the rate of wage growth over the last three decades. The fact that capital has become far more mobile than labour further boosts the expected returns to capital. Full funding permits international diversification of investments which allows pensioners in slow-growth countries to benefit from the higher yields in high-growth countries.

The required contribution rate under pay-as-you-go financing depends entirely on the old-age dependency ratio. The higher the dependency ratio, the greater the number of retirees relative to workers and the higher the contribution rate required to support them. Under full funding, the required contribution rate depends on two other factors : the passivity ratio and the difference between the real interest rate and the growth rate of real wages. A lower passivity ratio means that workers spend a smaller proportion of their adult lives in retirement, which reduces the required contribution rate. The contribution rate also drops if the interest rate exceeds the rate of wage growth. But if wages grow faster than interest rates, the required contribution rate rises. Some of the significant conclusions that follow are given below:

- When the dependency ratio equals the passivity ratio and the interest rate equals the rate of wage growth, pay-

as-you-go and fully-funded schemes require the same contribution rate.

- When the dependency ratio is lower than the passivity ratio, pay-as-you-go plans require a lower contribution rate than fully funded plans (and vice-versa), if interest and wage growth rates are equal.
- When the interest rate exceeds the rate of wage growth, fully funded plans have a cost advantage over pay-as-you-go plans, which do not benefit from the high interest rate. The opposite is true when the rate of wage growth exceeds the interest rate.

Any cost advantage that PAYG plans might have had in the past was the result of demographic factors that no longer hold good in many countries. In the future, if interest rates and earnings growth maintain their relative positions, especially if pension funds are able to benefit from equity investments, capital mobility and international diversification, a fully funded system will require lower contribution rates than a PAYG system to achieve similar pension benefits.

Partly funded public plans may have more positive effects on long-term saving and capital accumulation than pure PAYG plans. But these effects depend crucially on how the funds are managed and how they affect government spending. If they serve only as a means to increase current government spending and deficits, national savings do not rise. If they are allocated exclusively to public investments, some of the potential capital market development is lost. And if these investments have low productivity, some of the growth enhancing effects are lost.

In a mandatory saving scheme, the benefits that accrue to the workers ultimately depend on their contributions, investment earnings and expected longevity. The required contribution rate rises the higher the target wage replacement rate, the longer the

retirement period relative to the working period, and the smaller the rate of return relative to the growth rate of real earnings. The required contribution rate may also be higher in pension plans that make poor investments, incur high administrative costs, index pensions to prices or permit accumulated balances to be used for such other purposes as housing, education or health care. Difference in the basic parameters of the plan may explain why the contribution rate is only 13 per cent of wages in Chile and 35 per cent in Singapore. During the 1980s, in Singapore, about two-thirds of the pension fund was used for the purchase of houses. In Chile, about one-quarter of total contributions is used for term, life and disability insurance and fund expenses, while all the rest is used for retirement savings. Both countries are likely to achieve the same replacement rate – about 40 per cent of final gross earnings.

Unlike the PAYG system where contributions (from workers and/or employers) are paid direct to pensioners, the pension funds accumulate the workers' (or on their behalf the employers') contributions to pay their own pensions. Also, unlike banks, pension funds benefit from regular inflow of funds on a contractual basis and from long-term liabilities (i.e. no premature withdrawal of funds), which, together, imply little liquidity risk. The main risks are rather those of inaccurate estimates of mortality and lower than expected return on assets. Defined benefits pension fund schemes may also suffer from the impact on liabilities of unexpected changes in salaries and legal provisions. In addition, pension funds are generally contractual activities, meaning that lumpsum withdrawals are precluded even during the period when claims are payable after retirement. Members of pension funds are willing to accept low liquidity, given the potential for higher returns.

It has been suggested that pension funds should be seen as a form of employee retirement insurance, but defined benefits schemes are more favoured because they provide superior insurance component compared to defined contribution. However, a common feature of funded pension plans, whether they are based on defined

benefits or defined contributions, is the accumulation of a capital fund over the working lives of members to provide a desired pension to the beneficiaries after retirement.

In UK, USA, Canada, the Netherlands and Switzerland, pension funds account for a sizable part of the personal sector saving and wealth. Japan too has sizable total pension fund assets but these form a small percentage of saving or GNP. Other continental European countries, such as Germany and France, have relatively smaller quantities of such fund assets. However, the proportion of personal sector financial wealth accounted for by pension fund assets and the ratio to GDP has increased in almost all the nine countries which were selected for a World Bank study. This is shown in Table 1.

Table 1

Pension Fund Assets (as a percentage of GDP)

Country	**1970**	**1975**	**1980**	**1985**	**1990**
UK	17	15	23	47	55
US	17	20	24	29	35
Germany	2	2	2	3	3
Japan	0	1	2	4	5
Canada	13	13	17	23	28
Netherlands	29	36	46	68	77
Sweden	22	29	30	29	28
Switzerland	38	41	51	59	69
Denmark	5	5	7	12	15

Source : The World Bank Policy Research Working Paper 1229, December, 1993.

Savings-based life insurance policies, and pension funds managed by life insurers are alternative ways to build up pension funds for financing retirement. The combined size of life insurance and pension sectors has also grown but more slowly than the

pension funds, in these industrial countries. Table 2 illustrates this point. The principal change is in Japan, where the size of the life insurance sector is almost eight times that of pension funds (run by trust banks).

Table 2

Life insurance and pension fund assets (as a percentage of GDP)

Country	1970	1975	1980	1985	1990
UK	43	37	46	83	97
US	37	37	42	49	59
Germany	10	11	14	19	22
Japan	8	10	13	20	41
Canada	31	28	31	39	46
Netherlands	45	51	63	86	107
Sweden	42	48	51	55	63
Switzerland	51	55	70	82	n/a
Denmark	14	14	19	31	n/a

Source : The World Bank Policy Research Working Paper 1229, December, 1993.

In most of the countries, the primary role of pension funds is a supplementary one; there are no cases where they provide the only form of old age support. Such a mixture appears to be sensible, given the conflicting arguments for funding as opposed to PAYG system.

IV

Evolution of Pension Schemes Worldwide

In 1889, Bismark created the first national contributory old age insurance scheme, giving workers a stake in the Central Government. In 1891, Denmark put in place a means tested programme (non-contributory schemes), subsequently adopted in Australia, France, Iceland, Ireland, New Zealand and the UK. By the start of World War II, national contributory schemes, partially funded and partially PAYG, had been initiated in a large number of European countries.

In 1942, the Beveridge Report in England called for a new and large public sector role in old age security. Beveridge saw publicly financed pensions as a way for the emerging social welfare state to guarantee a minimum income to all older citizens. The result was the creation of new social insurance schemes in Switzerland, the Netherlands, Sweden, Norway and Canada and the dramatic expansion of such schemes in the rest of Europe, Japan and the USA large earnings-related tier was added to the existing means- tested tier in most of the public pension systems.

Enthusiasm for public pension schemes soon spread to developing countries. Often these countries were at lower levels of per capita income with lower ability to raise resources through taxation. The benefits offered by developing countries were often higher than those that had been offered by industrial countries when they started their old age pension schemes. Many of these systems – more particularly, in Latin America and East European economies – proved to be unsustainable because of the drain on government resources. In many countries, these systems had to be dismantled

and the benefits restructured and scaled down. For instance, countries such as Argentina, Brazil, Chile and Uruguay had contributory schemes that were initially supposed to be funded. When low investment returns and rising benefits hit the funded schemes, these countries switched over to PAYG financing, allowing them to pay more generous pensions to greater number of old people. After World War II, a few former British colonies – India, Singapore and parts of Africa – opted for Provident Fund Schemes. But most developing countries introduced PAYG pension plans.

Developing countries also promised higher replacement rates than those promised by the industrial countries when they had started. As a result, many developing countries today spend more on pension than industrial countries did at a similar stage of development.

Pension Schemes in Selected Countries

Let us now have a look at the pension systems existing in some of the developed countries as also in some of the Latin American countries (from among the developing nations) who have tried to introduce reforms in their earlier systems which they discovered were not so well structured.

USA

The coverage of the pension system in USA is about 40%. There are approximately 2400 public pension schemes covering 10 m full-time employees and about 3 m beneficiaries. Most of them are DB plans, though in some cases these are also backed up by making payments to a trust fund. Most primary private-funded coverage is again in DB schemes, although a large number of workers also have supplementary DC plans.

For private pension plans there is the Pension Benefit Guarantee Corporation (PBGC), which is a government-run

insurance scheme. The liabilities of this Corporation, i.e. pensions to members of the company whose pension plans it has taken over, are sensitive to changes in long-term interest rates. The best way to insure them is, therefore, to invest in bond portfolio with the same duration as the pension commitments. But rather than invest solely in bonds, the PBGC is investing a big chunk of its funds in equities. Last year, it raised the proportion of equities in its portfolio from 17% to 30%. The total underfunding of America's private pension plans stood at $ 71 billion at the end of 1993. PBGC believes that higher expected returns offered by equity investments will help it close the gap sooner. But tax payees may not want the Corporation to resolve the problem by gambling with their money.

Between 1975 and 1985, the percentage of workforce subscribing to DB schemes came down (from 39% to 30%) whereas that of DC plans registered an increase (from 14% to 33% of the workforce) with participation rising from 11.2 million to 33.2 million workers. Causes of this shift are not clear, but lower regulatory and administrative costs and actuarial funding standards required of DB plans may have perhaps contributed to this change.

Social security in the US is supportive of private schemes. There is also a degree of pre-funding for social security; funds are accumulated in a trust fund and invested in government bonds.

UK

Seventy per cent of the workers in UK have a funded pension; of these 50% are in company schemes. DB plans, often with provisions for a degree of indexation, cover all public sector and a majority of private sector beneficiaries. The government, concerned over the future state pension obligations, is offering incentives to individuals without a company scheme to go in for a personal defined contribution pension instead of an earnings-related state pension. It is also reducing the maximum benefits from the latter scheme.

Recently, the British Government have proposed that the current basic state pension should be replaced with a compulsory, privately provided pension. To be known as the 'basic pension plus', such a pension will have to be taken by the new entrants to labour force from an approved private fund manager or insurance firm. To enable them to pay for this new pension, the government would give back to the new workers around £9 a week of their national insurance contributions. The government actuary calculates that, when invested over a working lifetime, this amount should generate enough returns to pay a pension of at least equal value in real terms to the current basic state pension. In the unlikely event that it does not generate large enough returns, the government would make good the shortfall from public funds. The state earnings-related pension fund would, however, be gradually wound up. While there will be an increase in the pension bill in the short term, since the existing pension obligations will continue to be met at the same time as the new funded schemes are built up, the government expects that, in the long run, the public spending would reduce by around £40 billion a year in real terms. They also foresee funded pensions as an instrument for boosting the rate of growth of GDP by increasing the amount of saving consequently increasing the amount of investment in the economy.

Canada

Pension schemes in Canada are largely DB private 'trusted' schemes. They cover 40% of the labour force and co-exist with a flat-rate non-contributing state pension scheme (OAS) and a contributory earnings-related public pension system (CPP/OPP). The last is partly funded.

Sweden

The main funded pension scheme in Sweden is a compulsory publicly directed National Supplementary Pension Scheme (ATP Scheme), covering 90% of the workforce, which complements a

basic, flat-rate, social security scheme. The aim is to accumulate sizeable funds to provide future benefits, thus offering an occupational pension that is indexed and is equal to about 60% of the best years of earnings. The fund is administered, independent of the government, in a series of sub-funds which invest monies from different sectors of the economy in a variety of both public and private financial assets.

Japan

Japanese workers pay just under 17% of their salaries into the state pension fund. On the government's own reckoning, they ought to contribute 25% in order to fully fund their state pensions. The eight percentage point difference amounts to an annual 10 trillion yen shortfall for the system. Pension assets are 22 trillion yen and to earn 10 trillion yen, the annual investment return ought to be 5.5%. However, the average return over the past five years has been a niggardly 4.7%.

At present, four-fifths of the state pension system's cash is held by the finance ministry, which lends it out at modest rates of interest to farmers, home buyers and others who are selected for political reasons rather than financial considerations.

Until now, the welfare ministry has been allowed to hire only Japanese insurance companies and trust banks to manage pension money. New rules will allow the ministry to give some assets to specialist fund managers.

Japan's pension problems arise out of the country's financial system. Japan's firms have not made it a priority to earn a large return on equity. Equity investors, such as the pension funds, have, therefore, suffered.

As in the US, some assets, amounting to 50% of the GDP at present, are accumulated by the state in advance of meeting benefits

commitments. Such social security benefits commitments are likely to constrain the growth of pension funds. However, social security in Japan is not payable until 60, while retirement is often at 55. As such, a private pension can bridge this gap.

China

The Chinese Government has designed a nationwide savings programme to fund future pensions instead of relying on current contributions to cover payouts, as is happening now. All cities are establishing private accounts for each worker, as well as having pooled funds to guarantee minimum payments to retirees. Workers and their companies contribute to both. When workers retire, they will receive their personal account savings plus money from the pool. In reality, much of the money in the new system is being used to pay current retirees, so not enough is building up in the individual accounts. Some of the provinces began an experimental funded system in 1994 under which enterprises were supposed to send 19% of their annual payroll into the funds and the workers had to contribute 3% of their annual salaries. But this system has not worked, since the enterprises are not able to contribute their required share.

One partial solution is to ensure that the funds grow at a healthy rate. In China, however, investment in stock or bond markets involves a serious risk as the bourses are regulated poorly. Moreover, China is virtually without qualified fund managers. To prevent fund misuse, the government has directed that the fund managers, as they are, can invest only in bank savings or government bonds. But these do not yield returns sufficient to cover future burdens. If China's pension funds could be invested profitably they could become a powerful engine of growth. The World Bank estimates that by 2030 China's accumulated surplus could reach $1.6 billion (1994 prices). However, foreign companies will not be allowed to manage these funds.

Chile

Until 1981, PAYG pension system was obtaining in Chile. The benefits were linked only to wages and not to contributions. Hence there was a strong incentive to reduce the contribution. With inflation, the benefits declined as there was no indexing of the base. After 1981, the contributions were more defined (13.5% of wages) and, as a result, the system was fully funded. These contributions have accumulated in accounts which are being managed by private portfolio managers (AFPs). Government guarantees ensure that the difference between the minimum amount and the annuity available to an affected participant is financed from the general revenues. The government also guarantees a certain minimum rate of return to the assets of the AFPs.

The purpose of Chile's reforms was to replace a near-bankrupt public pension system with the one based on individual retirement accounts. Workers were asked to put at least 10% of their salaries into privately managed (but heavily regulated) pension funds.

The reform had two significant indirect and positive effects on the savings. The first was through fiscal policy. Chile financed most of the transition costs involved in building up a new retirement system by cutting expenditure elsewhere. This raised the savings rate directly because the public sector's surplus or deficit is a major part of national savings. Secondly, the private pension gave a boost to financial and labour markets. More liquid capital markets certainly helped boost Chile's growth by increasing efficiency in the utilisation of savings.

The increase in government savings underlines much of Chile's economic growth. This aspect is important for countries seeking to replicate Chile's success. Switching over to private pension funds alone will not boost savings rapidly: it requires sound fiscal policy.

Colombia

Colombia, like Chile, has also taken up reforms of its pension system. Implicit PAYG debt has been made explicit. Payments of pensions to current pensioners will now be made out of the newly established national and regional pension funds. This will imply explicit transfers from the central and regional governments as long as the last current pensioner survives, for at least three decades from now on. The second and larger part of the implicit PAYG debt comprises past pension rights accrued to current (1994) workers. Pension recognition bonds will be issued to those currently active workers who choose to shift affiliation from any pre-1994 pension institution to AFPs (privately-run, pension-fund management firms) or the ISS (state-managed, partially funded PAYG scheme). These are debt instruments that make the explicit DB pension rights accrue to workers in their old pension funds (proportional to the number of years of past application) and that mature on the date of retirement.

At the time of retirement, AFP contributors withdraw their capitalised pension savings to buy a pension annuity from insurance companies. Hence, while active life pension plans with AFPs are based on DCs, retirement-life pension benefits are actuarially fair DB plans. The co-existence of the two different pension systems potentially enriches the set of consumer's choice allowing contributors to decide between DC and DB systems.

Colombia's reforms combine two different changes : (a) a reduction in net benefits paid to future pensioners by the existing PAYG system; and (b) a gradual substitution of the existing PAYG scheme by a dual PAYG-fully funded system. The former improves the financial position of the public pension institutions by reducing the implicit PAYG debt of the government incurred vis-a-vis future pensioners. The latter makes explicit the currently implicit PAYG debt as current PAYG pensioners are paid off, and past PAYG pension liabilities accured to workers are paid to those shifting to a fully funded scheme.

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