CONSULTING ASSISTANCE ON ECONOMIC REFORM II

DISCUSSION PAPERS

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Pension System Issues and Their Relation to Economic Growth

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PENSION SYSTEM ISSUES AND THEIR RELATION TO ECONOMIC GROWTH

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Foreword

The present paper is the outcome of a study funded by the U.S. Agency for International Development (USAID) through its project Consulting Assistance for Economic Reform (CAER), directed by the Harvard Institute for International Development (HIID). The scope of the study was outlined and prepared by Orest Koropecky of USAID. It is designed to provide guidance to USAID staff whom client governments approach for advice and technical assistance in establishing or reforming public pension systems. The particular thrust of the guidance is supposed to help answer the question: what reform options will contribute most to accelerating and sustaining economic growth?

Three researchers, Clive Gray of HIID and David Weig and Charles Becker of IMCC, a consulting firm specializing in analysis of financial issues in developing and transition economies (DTEs), participated in the study. Gray coordinated the effort and drafted the present report except for section VI, concerning the link between pension reform and financial market development, which was prepared by Weig. Becker prepared a background paper, cited in section II, sounding cautions about use of conventional actuarial forecasting models to project pension parameters.

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Glossary of Abbreviations

AFPs	- pension fund administrators (Chile)
CAER	- Consulting Assistance for Economic Reform
CEE	- Central and Eastern Europe
DB	- defined benefit
DC	- defined contribution
DTE	- developing and transition economies
DWL	- dead-weight loss
FF	- fully funded
FMD	- financial market development
FSU	- former Soviet Union
GDP	- gross domestic product
HIID	- Harvard Institute for International Development
IMCC	- International Management and Communications Corporation
ISSD	- implicit social security debt
NDC	- notional defined contribution
OECD	- Organization for Economic Cooperation and Development
PAYGO	- Pay as You Go
PC/GDP	- private consumption ratio
SRA	- standard retirement age
SS	- social security
SSR	- saving substitution ratio
SSTF	- Social Security Trust Fund
USAID	- United States Agency for International Development

PENSION SYSTEM ISSUES AND THEIR RELATION TO ECONOMIC GROWTH

Executive Summary

The paper highlights those aspects of the world-wide debate on social insurance reform that concern the impact of alternative reform options on economic growth in developing and transition economies (DTEs). It adopts the classification of social insurance schemes in three "pillars", popularized by the World Bank through the 1994 volume, *Averting the Old Age Crisis.* Under Pillar #1, known as pay-as-you-go (PAYGO) or defined benefit, pensions are paid out of levies on current payrolls. A variant of this pillar, seeking to strengthen the link between contributions and benefits, features notional defined contributions (NDCs), crediting payroll levies and notional interest on them to unfunded accounts on the basis of which pensions are subsequently calculated.

Pillar #2, termed defined contribution and/or fully funded (DC/FF), features mandatory saving, such that a worker's benefits are paid out of investments accumulated over time with his/her payroll levies. As a rule, although the payroll contributions are mandated by the state, the resulting investments are privately managed. Pillar #2 can either supplement or (as in Chile) largely substitute for Pillar #1. Under Pillar #3, also fully funded, payroll levies, additional to those under the other pillars, are not state-mandated. The investments are privately managed, subject to prudential regulation.

The collapse of communism brought PAYGO systems in former centrally planned economies under severe fiscal stress. Declining formal-sector employment led to reduced collection of payroll levies, while inflating pension rolls. Benefits shrank to near-social assistance levels, and in some countries were subject to arrears. Efforts to correct these distortions, including but not confined to increased payroll taxes and diversion of budget resources from public goods in short supply, generated inflationary pressure and otherwise posed a threat to renewed economic growth. Demographic trends, notably low fertility and ageing of populations, threatened even greater stress in future. Reforms in system terms and conditions, beginning with an increase in standard retirement ages, were seen as essential, but in many cases inadequate, and interest turned to structural reform involving introduction of fully funded pillars, mandatory and/or market-determined.

The distortionary impact of payroll levies on labor market incentives, and the resulting deadweight economic loss, are analyzed. Drawing on recent theoretical work by Sachs and others, it is argued that pension reforms most favorable to growth are those forging a link between social insurance contributions and benefits, thereby decreasing the perception of payroll contributions as a tax.

The notional defined contribution (NDC) approach pioneered by Sweden and recently adopted in Poland, Latvia and elsewhere is cited as a means of forging this link within the first pillar by creating individual accounts, with a guaranteed real return equivalent to growth of the contributing workforce plus productivity increase. Countries believing they can shoulder the burden of the much-discussed DC/FF transition (simultaneously funding existing PAYGO pension liabilities and building up Pillar #2 assets) rely on the PAYGO pillar to provide basic income support and introduce the second pillar as a means of creating a still stronger benefit-contribution link, while promoting saving, capital formation and financial market development.

International evidence on Pillar #2's growth impact is reviewed. Chile, the only country with a long

enough track record of substituting DC/FF for PAYGO to generate reasonable time series, is often cited as demonstrating the positive impact of such a reform. Yet analysis by the World Bank's chief pension specialist raises uncertainties regarding this impact. IMF writers highlight the role of Pillar #1 in ensuring basic income support for retirement, and Pillar #3 in facilitating voluntary saving for supplemental income, and question the wisdom of mandating a second pillar to share either of those roles.

The current Asian financial crisis highlights the volatility of emerging stock markets and points to political risks, with potentially serious consequences for growth, from mandating pension contributions to funds subject to sharp losses of value. Many DTEs, especially those with nascent social insurance systems and financial markets, are probably best advised to delay introducing a mandatory DC/FF pillar. Meanwhile they should observe the outcome of this measure in other countries, create a regulatory apparatus for Pillar #3, and recast any existing PAYGO arrangements as an NDC scheme, keeping payroll levies modest. Leaving the income redistributive function to be covered out of general revenue rather than payroll levies enhances the contribution-benefit link.

For countries further along the spectrum of financial development, a serious alternative is to engage reputable international portfolio managers to invest pension assets in global index funds. At the moment, DTE authorities reject or severely limit this option on the ground that it amounts to exporting capital badly needed for domestic investment. However, domestic pension funds can overwhelm a nascent capital market and actually generate poor investment performance.

On balance, the standard fiduciary principle that investment policies should be determined exclusively by beneficiaries' interests, coupled with modern portfolio theory and practice in the structuring of optimal portfolios, calls for diversifying pension fund assets across many developed and emerging capital markets. Moreover, investment needs to reflect general risk tolerances, with less volatile portfolio characteristics as workers near retirement age.

Drawing implications for USAID assistance to client countries, the paper stresses the importance of allowing every country to determine for itself how to resolve the countless trade-offs in pension policy. It cautions against USAID becoming associated with advocacy of arrangements that further down the road could cause a pension fund severe losses through embezzlement or excessive risk.

Subject to this caveat, the paper commends to USAID a number of policy initiatives that should improve the efficiency and fairness of any pension system:

- *Notional defined contributions* can partially offset the disincentive effect of pension contributions on work effort and participation in the formal sector.
- Partial funding of a PAYGO system provides flexibility to enhance work incentives by increasing benefits, while laying a basis for financing the transition to a second pillar.
- The fully-funded third pillar, a response to market forces, complements arrangements under the first and/or second pillar. It will sooner or later become important in every country, and USAID assistance is appropriate to help build regulatory infrastructure.
- Given current demographic trends, "standard" retirement ages below 65 years are incompatible with system solvency. Incentives for early retirement should therefore be eliminated and replaced with incentives to work longer, even beyond age 65.
- To protect workers' interests, mandatory second pillars managed by private agents should be regulated to ensure diversification of investments, limits on administration costs, and portfolio allocation

that emphasizes capital preservation for persons approaching retirement.
- Where any portion of pension assets is funded, government should refrain from preferential access to the funds for public expenditure.

The paper ends by suggesting a number of focal points for USAID assistance. These include helping countries to install the information technology and management systems required to administer individual accounts efficiently, and establishing methodologies for projecting system finances under alternative scenarios, one such methodology being generational accounting.

I. INTRODUCTION

Policy makers charged with establishing or reforming a country's pension system, not least the U.S. Social Security System, will have in mind numerous competing social objectives, among which promotion of economic growth should be one, but by no means the only one. If economic growth were the sole objective, one would favor arrangements designed to (i) encourage people to work as long as they were physically or mentally capable of contributing value added, i.e., delay retirement as long as possible, and (ii) minimize the consumption of goods and services by retired and disabled persons, as well as, except for orphans comprising future workers, survivors. Such a policy would depress life expectancy severely, but that would be of little consequence to a dictator concerned only with maximizing his economy's growth rate.

Not even the communist regimes of Eastern Europe and the Soviet Union, notwithstanding their fixation on overtaking the capitalist West economically, combined with a lack of any democratic basis for a social contract, went that far. To be sure, even for the best-paid, senior-most workers (other than *nomenklatura*), communist pensions allowed little margin above subsistence.[1] On the other hand, seeking to demonstrate the social superiority of their system, the communists instituted standard retirement ages (SRAs) well below those of most western countries—the common pattern was 60-55 years for men and women, respectively, in the majority of job categories, with earlier SRAs for large segments of the labor force engaged in "hazardous" and selected occupations (e.g., ballerinas).

Relegating the communist record to history, the concept of social contract pertains to all societies—developing and transition economies (DTEs)—of concern in this paper. An integral part of the social contract is to fulfill commitments for income support and replacement, implicit if not explicit, made to workers during their careers. These commitments in turn have emerged from a social welfare function one of whose objectives is to ensure adequate income, either in relation to some minimum or as a proportion of earnings, to all older and disabled persons and survivors, including households whose breadwinners out of myopia have failed to make provision while working.

Obviously, augmenting the income of current retirees, disabled workers and survivors competes with the social objective of maximizing the welfare of the remaining members of society, present and future. Moreover, optimization of the overall social welfare function requires capital formation—i.e., sacrifice of current consumption—to support future growth. These goals introduce subsidiary, growth-oriented objectives in the design of a social insurance system, *viz.*:

- Limiting, preferably eliminating (except for purposes of income redistribution), the burden of pension payments on government budgets;
- Inducing workers to lengthen their careers, beyond traditional SRAs, so as to augment the labor force and dampen the rise of the dependency ratio in aging populations;
- Moderating the burden of pension contributions on payrolls so as to limit the disincentive on workers to work and employers to hire;
- Inducing workers to view their pension contributions as savings on which they will earn a reasonable return in retirement, rather than as a tax;
- Obtaining increased resources for investment by augmenting domestic saving through the pension system;
- Using the pension system to strengthen financial markets.

Not all these objectives can be maximized simultaneously. Moreover, the trade-offs among them are complex, heavily conditioned by a country's socio-cultural environment, and their estimation is subject to a wide margin of uncertainty. We do not believe in a single model suitable for all DTEs in their present stage of development, and will recommend in Section VIII that USAID's technical assistance in the field of pension reform should put the emphasis on (i) helping counterparts access and understand the principal alternatives/models under discussion, and (ii) striving to confer responsibility for eventual choices onto DTE authorities and stakeholders.

That said, it should be noted that proponents of some of the models under discussion, for OECD countries as well as DTEs, depict them as furthering all the above-cited objectives to a greater or lesser extent in comparison with the present state of affairs. This is particularly true of proponents of the reform option that makes a mandatory, fully-funded scheme the core of state-sponsored social insurance. This paper will review arguments in support of that position, as well as arguments in support of alternative models whose proponents describe them as better adapted to the socio-cultural environment of many DTEs.

Pension system options: the three pillars

Our discussion departs from the three-pillar approach to social insurance popularized by the World Bank in its 1994 volume, *Averting the Old Age Crisis*. To summarize the three pillars:

Pillar No. 1 is a public pension scheme that ensures a basic income to retirees, disabled workers and survivors. Its main model is the defined-benefit (DB), pay-as-you-go (PAYGO) system existing in most industrial and transition economies. The scheme may be characterized by a greater or lesser degree of pre-funding, i.e., accumulation of a pension trust fund equal to several years of benefit payments. A variant highlighted in this paper is the "notional defined contribution" (NDC) scheme, which establishes a link between contributions and subsequent benefit payments not present with DB schemes. In most countries the minimum pension is financed largely by payroll taxes or "contributions"; in some cases general government revenue is the chief source. It may be payable to every retiree meeting certain qualifications, or it may be means-tested. The schedule of benefits can be based on a variety of formulae, involving greater or lesser progressivity in relation to earnings on which taxes/contributions are based.

Pillar No. 2 is a mandatory defined contribution (DC), fully funded (FF) scheme where contributions paid by workers and employers (shares vary) are deposited with a publicly or privately run (if private, then publicly regulated) asset management fund. The proceeds are invested in a portfolio of securities designed to participate in the growth of the domestic and/or world economy, while safeguarding against imprudent speculation. Upon retirement, depending on the country in question, a participant may receive a lump-sum payment equivalent to the accumulated value of his/her account, make phased withdrawals, or draw an annuity based on the account value.

Pillar No. 3 encompasses supplemental, not publicly mandated arrangements involving workers who wish to supplement their retirement income, or whose employers voluntarily compensate their work force partly through deposits to a private pension plan. As with Pillar 2, retirement benefits may take the form of lump sum payments, phased withdrawals, or annuities. These arrangements are publicly regulated in order to protect participants.

The three pillars (for ease of exposition they will also be referred to here as first, second and third pillars) can and do exist in varying combinations. Since Pillar 3 reflects nothing more than the interplay of demand and supply in a segment of the financial market, it operates independently of the other pillars, every established market economy has one, and all aspiring market economies are in the process of establishing the necessary regulatory infrastructure. Pillars 1 and 2 can substitute for one another in mandatory social insurance, however they can also co-exist, with part of a worker's payroll taxes/ contributions going into a PAYGO fund and part being deposited in an investment fund. Some countries allow workers to choose whether they remain under PAYGO or shift to Pillar 2.

Governments that, following the Chilean model, are phasing out their PAYGO systems in favor of a second pillar, retain responsibility for social insurees who fall through the safety net by virtue of paying insufficient contributions to finance a pension above a specified minimum, or whose pension assets collapse for one or another reason. The typical safety valve in that event is a subsidy from general revenue. This can be viewed as retention of at least a residue of Pillar 1.

Apart from their third pillar, the large majority of OECD countries operate a PAYGO pillar, and a minority have introduced some version of Pillar 2.

The communist system offered only Pillar 1. In every transition economy the PAYGO arrangement has come under severe pressure through a combination of demographic trends (ageing of the labor force); early retirement and easy qualification for disabled status (as an alternative to unemployment); and decline of contributions (collapse of state enterprises and growth of the informal private sector). Nearly every transition economy is seeking to patch up its PAYGO pillar while introducing the regulatory infrastructure for a third pillar, and a few are designing some variant of Pillar 2. In a few cases, repair of Pillar 1 encompasses introduction of an NDC arrangement.

In the following section we analyze the implications, for growth of typical transition economies, of retaining their traditional PAYGO systems.

II. GROWTH IMPLICATIONS OF RETAINING THE PAYGO *STATUS QUO*

As the former communist countries began their shift to a market economy, their PAYGO pension systems encountered a crisis that threatened to undermine the effort to launch economic growth. The prospects for the systems' future evolution given their current structure posed an even greater threat to growth. The situation obliged every country to undertake or at least consider fundamental reform of its pension system.

Basic parameters of PAYGO systems

To show why this was so, it is helpful to isolate the basic parameters underlying a PAYGO system. Let:

P_t = total number of pensioners, comprising three categories:
- P_h = pensioners entitled to early retirement by virtue of working in ***h***azardous occupations
- P_e = pensioners accorded ***e***arly retirement thanks to distorted interpretation of disability or because of job redundancy

P_o = all ***o***ther pensioners
p = average pension
W = total number of active workers (both formal and informal sectors, where the informal sector is defined as comprising workers on whose remuneration no social insurance tax or contribution is paid)
c = proportion of W situated in the formal sector (also termed ***c***ompliance rate)
w = average wage, subject to social insurance tax, received by workers in the formal sector
T = total receipts of social insurance tax/contribution
t = tax rate (= T/cWw—i.e., ratio of (i) tax receipts to (ii) no. of tax-paying workers times their average wage subject to social insurance tax; (ii) is usually termed the "covered wage bill")
r = average income replacement rate = p/w
d = dependency ratio[2] = $P_t/W = (P_h + P_e + P_o)/W$

For the system to be in balance in any given year, T must equal the pension bill, $P_t p$. Failure to achieve balance compromises growth in one or more of three ways:

- by aggravating inflation, with well-known consequences for growth;[3]
- by requiring increased non-payroll taxes to provide general revenues in order to subsidize pensioners' consumption, with negative effects on producer incentives and saving; and/or
- by diverting existing general revenues from socially productive uses such as public health, education and infrastructure.

With T equal to the pension bill, we can write $T = tcWw = P_t wr$, $t = rP_t/cW$, and thus $t = rd/c$. In words, the payroll tax rate must equal the replacement rate times the dependency ratio divided by the compliance rate. The PAYGO crisis in transition economies consists essentially in inability to achieve system balance except at a value of t, the required tax or contribution rate, that is so high as to distort labor market transactions, notably by encouraging flight of workers and employers to the informal sector, stimulating inefficient substitution of capital for labor in the formal sector, and penalizing work.

An uneconomically high value of t corresponds in turn to unsustainable values of r, d and c. That is, r, the replacement rate, and d, the dependency ratio, are unsustainably high, while c, the compliance rate, is unsustainably low.

Transition economy pension systems—current parameters

The recent evolution of Ukraine's pension system provides an example of how these parameters interact:[4]

r : under the system in effect at independence, a full-career worker (40 years of service) was entitled to a pension replacing 70-75% of his reference earnings.

d : by the mid-1990s, d was equal to about 0.72.[5] This compares with an old age dependency ratio—combining the ratios of men over 60 to those aged 20-59, and women over 55 to those aged 20-55—of 0.49. The difference of 0.23 corresponds to pensioners below the ages of 60 (men) and 55 (women). In other words, 0.23/0.72 or roughly one third of pensioners were either on disability or early retirement. This reflected a practice, common in ex-communist

countries, of substituting early retirement or a liberal interpretation of disability for the lack of unemployment compensation in respect of workers made redundant by closure or downsizing of state enterprises.

c : estimated at 0.60, meaning that 40% of the labor force was estimated to be employed in the informal sector, not remitting payroll tax (more precisely, not having it remitted by an employer).

Combining these terms in the formula $t = rd/c$, we have a required payroll tax rate of $(0.7 \cdot 0.72)/0.6 =$ 84% (or 90% if $r = 75\%$).

A payroll tax rate of 84-90% is obviously not feasible. Hence the replacement rate has had to drop precipitously; in 1995 the ratio of average pension to average wage was 0.32. Substituting this value for *r*, we obtain $t = 0.384$ as the required payroll tax. A tax on this scale is being assessed in many ex-communist countries, and even so, governments are obliged to top it up out of general revenue (as of the mid-1990s, budget transfers made up 6% of pension fund revenues in Ukraine). The distortionary impact of such a tax on work effort is analyzed in section IV below.

Table 1 shows the payroll tax rate devoted to pensions, and total payroll tax rates, for Central and Eastern Europe (CEE), Russia, and the six European ex-Soviet republics. The median payroll tax rate for both regions is in the range 30-35%. This compares with an unweighted mean of 16.3% for 20 OECD-member countries.[6] The labor market implications of such taxes are highlighted in the vigorous debate now underway in the U.S. regarding ways and means of avoiding a rise in the social security tax from its present 12.4% to 18% by the year 2070.

Table 1 – Social Security Contribution Rates in ex-Communist Countries, 1993-94
(% of gross wage)

A. Central & Eastern Europe

	Albania	Bulgaria	Czech. Rep.	Hungary	Poland	Romania	Slovakia	Slovenia
Pensions - contribution by:								
Employer	26	35-50	20.4	24.5	45	15-35	20.6	n.a.
Employee	10	0	6.8	6	0	0	5.9	n.a.
Total – pension contrib.	**36**	**35-50**	**27.2**	**30.5**	**45**	**15-35**	**26.5**	**n.a.**
Total payroll tax*	42.5	46-52	48.5	62.3	52	35	50	44.7

B. Russia & Six European Former Soviet Republics

	Belarus	Estonia	Latvia	Lithuania	Moldova	Russia	Ukraine
Pensions - contribution by:							
Employer**	5-41	20	37	30	26	28	37
Employee	1	0	1	1	1	1	1
Total – pension contrib.	**6-42**	**20**	**38**	**31**	**27**	**29**	**38**
Total payroll tax	6.7-42.8	33	38	31	28	40	41

* Covers health and other social benefits in addition to pensions, except that in Albania, Poland and Romania, health benefits are financed by the state budget.
** Covers sickness, maternity, and work injury benefits, except in Belarus, where work injury is covered elsewhere.
Source: Adapted from Holzmann (1997), who cites Topinska (1996) as source.

Notwithstanding values of *t* exceeding 30%, high values of *d* and low values of *c* have reduced pensions in a number of transition economies to low multiples of the poverty level, in effect converting pension systems into social safety nets/social assistance arrangements. A number of systems have even been forced into arrears. For example:

- In October 1990 Romania's *average* full-service old-age pension was 88% above the *minimum* pension; within 26 months the differential had collapsed to 18%.
- During 1994-95 Ukraine's average pension was a mere 2.5-2.6 times the average "social" pension, i.e., (in U.S. parlance) the average welfare payment.[7]
- As late as 1997 Moldova was nearly current in payments to urban pensioners but eight months in arrears *vis-à-vis* their rural counterparts; justifying this to a World Bank mission, the country's labor and social affairs minister noted that rural pensioners had direct access to food and were more apt to enjoy family support.[8]

Projected evolution of transition economy systems under the *status quo*

Medium- to long-term projections of the PAYGO fiscal balance have been undertaken for every transition economy pension system, often with assistance from the World Bank. The baseline projection invariably assumes retention of existing system parameters; each exercise has also involved testing variants with gradually lengthening average retirement ages. Often this has assumed legislative enactment of older minimum and standard retirement ages (MRAs and SRAs). A number of exercises have gone beyond this in simulating reforms that no longer specify SRAs, but embody inducements to continue working (and paying social insurance contributions) beyond traditional SRAs.

Several projections have taken into account observed increases in mortality and declining life expectancy, especially for males in Russia and other former Soviet republics, which in some countries are temporarily easing the burden on pension systems. However most of these projections also assume reversal of these trends, such that before 2010 the ageing of populations characteristic of OECD countries is expected also to occur in transition economies.

The remainder of this section reviews projections of the no-reform option in a sample of four transition economies.

Ukraine. Projections for this country are taken from Riboud and Chu's (1997) simulation model. World Bank demographic projections foresee the percentage of persons over 60 rising from 18% at present to 25% in 2030, with a consequent rise in the old age dependency ratio from the 0.49 cited above to 0.59 in the latter year.

With the replacement rate remaining at slightly above 0.30, and no change in the contribution rate (t = 33%), the compliance rate (c = 60%), or standard retirement ages, the model foresees the pension fund running a fairly constant 10% deficit on current operations up to 2030. This is equivalent to about 1% of annual GDP. However the authors argue that such a low replacement rate, tantamount to a social assistance pension, will strike workers as a miserable return on the payroll tax and motivate an increasing number to choose informal sector employment in order to evade the tax. Hence, the compliance rate will deteriorate, aggravating the deficit.

Conversely, if the replacement rate is raised gradually to its early 1990s level of 50%, the compliance rate is assumed to remain constant. However by the year 2005 this produces a deficit of 39% on current operations (portion of benefits uncovered by revenue), and rises to 44% by 2030. These deficits amount to 6.4% and 8.3% of projected GDP, respectively; clearly, an unsustainable outcome.

The World Bank authors then test a number of scenarios involving parametric adjustments in system

terms and conditions, notably increasing the SRA for men (currently 60) to 65 and that for women (currently 55) to either 60 or 65, either in one stroke or by one or two years annually. No option that returns the replacement rate to 50% succeeds in restoring fiscal balance. The one that comes closest, raising SRAs to 65 for both men and women and virtually eliminating early retirement for persons in privileged occupations—those viewed as hazardous and/or strenuous—still leaves the pension fund with a deficit of 13%, close to 2% of projected GDP.

The authors conclude that a "more radical" reform is needed, notably one that strengthens the link between contributions and benefits, thereby inducing workers and employers to remain in or return to the formal sector. They simulate a gradual transition to a mandatory funded system, which they assume will raise formal sector participation from 60% to 72% by 2020. The preferred scenario lowers the social security tax to 23% by 2006, with 17 points comprising the contribution to the funded tier and 6 points allocated to financing the transition deficit. A variety of options regarding the speed of the transition, i.e., the rate of enrollment of workers of different ages, all yield a positive fiscal balance.

Hungary. At 0.44, this country's old-age dependency ratio in the mid-1990s was about five points below Ukraine's. By 2030, World Bank demographers foresee it rising ten points to 0.54. Palacios and Rocha (PR - 1998) carry their analysis of Hungary's pension parameters to 2050, as of which time the ratio is projected at 0.64.

Availability of data enables Hungary's compliance ratio to be estimated more exactly than has so far been the case in most transition economies. PR report that about one-fourth of the formal-sector wage bill (26.9% in 1996) is untouched by the payroll tax; this they attribute to arrears, exemptions (especially of nonmonetary compensation), and the ceiling on taxable earnings. In addition, the formal sector share of labor income is estimated at 58.3% for 1996, falling from 66.5% in 1991. Thus, income subject to the payroll tax in 1996 was $0.731 \cdot 0.583 = 42.6\%$, or less than half of total labor income.

Largely resulting from a significant increase in labor productivity, i.e., rising GDP notwithstanding decreases in labor participation and employment, Hungary was able to keep its replacement rate substantially above Ukraine's, although it declined from 64.4% to 57.9% during 1991-96.

Projecting the pension fund balance, PR use a payroll tax of 35.5%, the equilibrium rate as of 1992. Keeping other system parameters constant, they project a pension fund deficit of 2% of GDP by 2010, 3.1% by 2030, and close to 6% in 2050. In order to maintain fiscal balance in 2050, either the payroll tax would have to rise to 61%, or the replacement rate would have to drop to 35%. Given widespread recognition that none of these outcomes was sustainable, parliament ultimately approved a reform that includes a mandatory, fully-funded second pillar.

Poland. Among transition economies, Poland faced the heaviest burden of pension spending as it began considering its pension reform options. As of 1995, the ratio of pension benefits to GDP, 14.4%, was fifth highest in the world.[9] Ahead of Poland were only Germany (15.1%), Uruguay and Italy (15.0%), and Austria (14.9%); the unweighted average for 23 OECD-member countries was 9.9%.[10] Among CEE and former Soviet Union (FSU) countries the only one close to Poland was Slovenia at 13.6%; next came Bulgaria and Macedonia at 11.1%.

The high rate of expenditure prevailed despite Poland's relatively low old age dependency ratio, estimated at only 0.235 in 1995.[11] This was due to the fact that, more than any other transition economy,

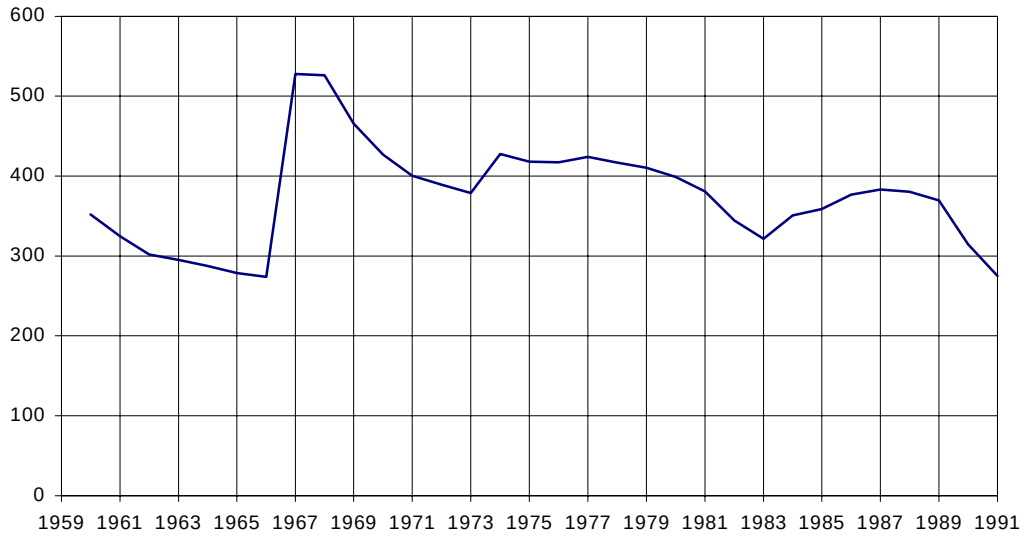
Poland has maintained the real value of pensions close to their 1989 level—as of 1996 the ratio was about 96%, higher than the corresponding index of real wages in the formal sector (80%). Suffering, like other transition economies, a decline in contributing workers—the number fell by 14% between 1989 and 1994, before starting a partial recovery—Poland was forced to raise an already high payroll tax rate of 38% to 45%, where it stood in 1998.

According to Góra and Rutkowski (1998), projections in the absence of reform showed an increase in pension spending to 22% of GDP by 2020, and 27% in 2050, as against an OECD 2050 projection of 18% for its member countries. Accepting that so high a burden was not sustainable, parliament approved a reform labeled "Security through Diversity". Initially the 45% contribution would be maintained, but with the share allocated to pensions divided between an NDC/PAYGO account and a mandatory funded second pillar. Once the earning power of the second pillar proved itself, and the reform's impact on incentives brought workers back into the formal sector, it was assumed the contribution rate could be reduced.

Romania. Over a 30-month period following the consolidation of the *junta* that overthrew Ceausescu, this country saw a nearly 50% decline in the real average pension to a monthly equivalent of about $35 in 1993.[12] The average replacement rate was about one-third. With the above-cited shrinkage of the range of benefit payments, the national retirement program deteriorated into a social assistance scheme.

At 0.347, Romania's 1995 old age dependency rate was intermediate between those of Poland and Hungary. Ironically, in the absence of a brutal pro-natalist program launched by Ceausescu in 1966 and enforced with varying degrees of intensity until his downfall at the end of 1989, the rate would have been at least five points higher. Chart 1, tracing live births during 1960-90, shows the declining trend through the mid-1960's, from a post-war peak in 1955 (not shown). Births nearly doubled in 1967, remaining above their 1966 level until 1991. Attributing, conservatively, all live births above 300,000 annually during 1967-90 to the government program, without it the working age population would have been 1.6 million or 12% smaller in 1995. By 2005, when all the surviving Ceausescu "baby-boomers" will have entered the working-age population, this will be 2.2 million larger, and the currently projected old age dependency ratio of 0.36 would be 0.425 without them.[13]

Chart 1 - ROMANIA, LIVE BIRTHS, 1960-91
('000 births)



At the prompting of the World Bank, in 1993 the government prepared and published a White Paper on social insurance and pension reform, seeking popular and parliamentary support for changed terms and conditions, starting with a phased rise in the retirement age. Without the proposed reforms, the paper foresaw the system dependency ratio rising from a 1995 level of 0.68 to 0.83 in 2020.[14] The payroll contribution required to support a 50% replacement rate was projected to rise to 45% by 2020; conversely, at the existing 29% average rate, the mean pension was projected to fall to $26.50/mo. in 1993 prices.

Conclusions and a caution *re* projection methodology

In summary, the state-run pension systems inherited from central planning posed a severe threat to economic growth by laying unsustainable burdens on transition-economy government budgets. In the absence of significant reform, financing the resulting deficits promised to aggravate inflation, raise the tax burden on nascent private business, and/or divert budget resources from public goods in short supply.

The short-run fiscal stress of these systems was real enough, exemplified in poverty-level benefits, payment arrears, punitive payroll tax rates in economies desperate to revive employment, and so on. Moreover, projections in every country, by locals as well as foreigners, foresaw worsening long-run scenarios in the face of ageing populations. In some cases, Russia being the most notable example, a decline in longevity, especially of males, partially eased the pressure, but most analysts foresaw a recovery early in the new century, *pari passu* with putative restoration of economic growth.

In a background report prepared for this paper, Charles Becker (1999) sounds cautions about methodologies used in making these forecasts. He finds that conventional actuarial forecasting models, by assuming constant or time-trended demographic and labor force parameters, discard much critically important information. He states:

> Many transition economies are likely to be characterized by recovering adult and elderly life expectancy, declining fertility, recovering wage shares, and modest real economic growth. If these patterns are in fact realized, conventional actuarial models will greatly understate impending deficits under current PAYGO systems, and are likely to overstate the efficacy of moderate reforms…

At right, Becker illustrates the potential for recovered life expectancy by comparing nine FSU republics with respect to the likelihood of a 35-year old male dying prior to retirement age (60 years) as the probability stood in 1987, and in a more recent year (in most cases 1994).

Looking at Kyrgyzstan's pension system, Becker compares the options of no recovery *versus* eventual recovery to the 1987 level (21%) with life expectancy rising at 0.15 years p.a. The difference—assuming the current SRAs of 60 for men and 55 for women—translates into a 0.6% increase in the projected pension fund deficit, from 2.8% to 3.4%.

	1987	1994	
Russia	25%	41%	(1995)
Latvia	24%	41%	
Ukraine	23%	41%	(1993)
Estonia	23%	36%	
Kazakhstan	29%	34%	(1996)
Lithuania	22%	33%	
Kyrgyzstan	21%	32%	
Belarus	22%	31%	
Uzbekistan	19%	22%	

Considering the impact of choice of projection methodology on

calculated performance of alternative reform options, Becker argues:

> Because conventional models omit any macroeconomic impact of increased savings associated with mandatory defined contribution systems, as well as labor supply effects associated with perceived reductions in taxes, they are inherently biased against defined contribution reforms, notional or otherwise. More broadly, these models are biased against reforms that use incentives to enhance labor force participation rates, delay retirement, or increase savings, mainly because these effects cannot be easily captured in actuarial models.

In conclusion, Becker cites the "vast uncertainty underlying key parameter forecasts…(M)odelers need to perform extensive sensitivity analysis, and ideally will use underlying parameter distributions to generate a (pseudo)-distribution of forecast outcomes for the pension system."

III. PENSION REFORM OPTIONS AND ECONOMIC GROWTH – OUTLINE

The rest of this paper examines the putative implications for DTE economic growth of a subset of pension reform options. The present section outlines and summarizes the options in question and three main facets of economic growth on which the literature finds them exercising a positive or negative impact. The three following sections then consider in some detail each of the three facets of growth.

All reform options are assumed to include establishment and/or expansion of some variant of Pillar 3. This is presumed to have a positive impact on growth, simply because Pillar 3 is an outcome of market forces. Through regulatory measures, government can influence the pillar's rate of expansion and the magnitude of its contribution to growth. In the limit, inadequate or inept regulation can undermine this contribution. Where voluntary pension funds take on characteristics of pyramid schemes and ultimately collapse, the resulting social disruption and discouragement of financial saving is anything but favorable to growth—witness the 1997 Albanian crisis.

Leaving aside Pillar 3, the reform options we consider here are four-fold:

1. Retention of defined-benefit PAYGO as the sole mandated component of social insurance. Government seeks to correct the shortcomings identified in section II by patchwork measures such as raising minimum and/or standard retirement ages; reclassifying job categories to reduce coverage of "hazardous" occupations; amending benefit calculation formulae to take greater account of indexed lifetime—rather than end-of-career—earnings; improving payroll tax collection (may involve either increasing or reducing rates); etc. Suggested shorthand for this option: "PAYGO piecemeal reform".
2. Reform of PAYGO to strengthen the link between payroll contributions and benefits by introduction of "notional defined contributions" (NDCs), i.e., individual accounts credited with workers' accumulated contributions plus an imputed real return. In fact, benefits are paid out of current contributions, supplemented by the surplus (if any) of aggregate past contributions over payments. Shorthand: "PAYGO/NDC."
3. Retention of Pillar 1 but addition of a mandatory, funded Pillar 2, such that payroll contributions are divided between the two pillars. Shorthand: "Combined PAYGO-DC/FF."
4. Replacement of Pillar 1 by the mandatory second pillar. Transitional arrangements are put in place to finance the PAYGO system's ongoing liabilities in respect of current pensioners and workers with accrued benefits under the old system. Shorthand: "Exclusive DC/FF."

Next, the three facets of economic growth in whose light these reform options are evaluated:

1. *Removal of labor market distortions.* Growth is enhanced when workers are induced to view their payroll contributions less as taxes on earnings and more as savings on which they earn positive real returns towards retirement or disability. As a result, workers increase their labor supply, defined to encompass number of hours worked, whether by existing workers or new entrants to the labor force; effort devoted to work; choice of occupation (less preference for jobs that evade social insurance); and, for the same reason, less preference for informal *versus* formal sector employment.[15]
2. *Increase of private and public saving and investment.* Here the objective is three-fold: (i) to attract contributions in excess of what workers would voluntarily save, thus augmenting national saving; (ii) to reduce or eliminate social insurance deficits that must be covered by general government revenues; and (iii) to ensure a surplus of contributions over benefit payments, channeling it to private investors and thus augmenting capital formation and productivity.
3. *Strengthening financial market institutions.* The availability of these additional resources, and the experience gained by the financial intermediaries that administer them, expand the scope and efficiency of financial markets, with a resulting stimulus to productivity and growth.

Table 2 on the following page gives a capsule summary of estimates on the growth-inducing impact of a strong second pillar (DC/FF), taken from James (1997).[16] Only the estimates for Switzerland and Chile result from analysis of recorded data, the others being the outcome of simulations. Additional qualifications cited by James:[17]

> Several caveats are essential in interpreting this evidence. First, because it is difficult to specify the counterfactual, these results are highly sensitive to the assumptions that are made, and each study typically contains a different set of assumptions. In particular, the econometric analyses for Chile are subject to omitted variable bias and the simulation results depend heavily on assumptions about crowd-out and rates of return. Second, they also depend heavily on key policy decisions, such as the question of how high the required contribution rate and target benefit rate will be, what proportion of the multi-pillar system should be funded and DC, and how the transition will be financed. While debt finance may be necessary for political purposes some degree of tax finance in necessary to meet the economic objectives, and of course some taxes have better efficiency properties than others.

Notwithstanding these qualifications, James believes the evidence supports the growth-enhancing impact of the second pillar. She adds:

> Third, it is important to remember that, even if it claims to use a general equilibrium model, each study typically deals with only one possible source of growth, so that many of these results are additive that is, the total growth effect is the sum of the separate effects on labor market distortions, early retirement, escape to the informal sector, capital accumulation, financial market development and other sources of growth. So if each separate effect increases GDP in amounts ranging from 1-10%, their sum may increase GDP 10-30%.
>
> Finally, in situations where we do not have evidence that reform has enhanced growth, as with respect to evasion and early retirement, it appears likely that it has enhanced the financial sustainability of the pension system, as the funded DC pillar expressly requires individuals to internalize these costs rather than passing them on to others.

The following three sections examine the labor market, savings/investment, and financial institutions.

Table 2: The Growth Impact of Pension Reform

Country	Author	Size	Comparison
		Increased output due to removal of labor market distortions	
*U.S.	Feldstein	2.5% covered wages or 1% of GNP in steady state	Projected exogenous real wage growth is 1% per year
*U.S.	Kotlikoff	4% gain in consumption or leisure for all generations	
		Increase in saving rate due to mandatory saving plan	
*U.S.	Feldstein	Saving increases 1% of covered wages or 0.4% of GDP. Annual output increases 4.1% of GDP in steady state.	current national saving rate = 6.4% #
*Australia	Bateman & Piggott	1.5% of GDP in long run	current net national saving rate is 2.2% of GDP. Gross saving rate is 15% of GDP.
*Mexico	Ayala	0.4 - 2.1% of GDP	current gross national saving = 14% of GDP
**Switzerland	Hepp	2.5% of GDP increase in national saving rate after 10 years	saving was 6% of GDP before pension reform, 8.5% after
**Chile	Haindl Rondonelli	6.6% of GDP after 14 years	gross saving was 16.7% of GDP pre-reform, 26.6% post-reform
		Increased productivity due to financial market development after pension reform	
**Chile	Holzmann	1% per year increase in total factor productivity	total increase in TFP was 2% per year after pension reform

* = projected before reform
\# = omitted in orginal; 6.4% figure given in *Economic Report of the President – 1998*
** = actual, after reform

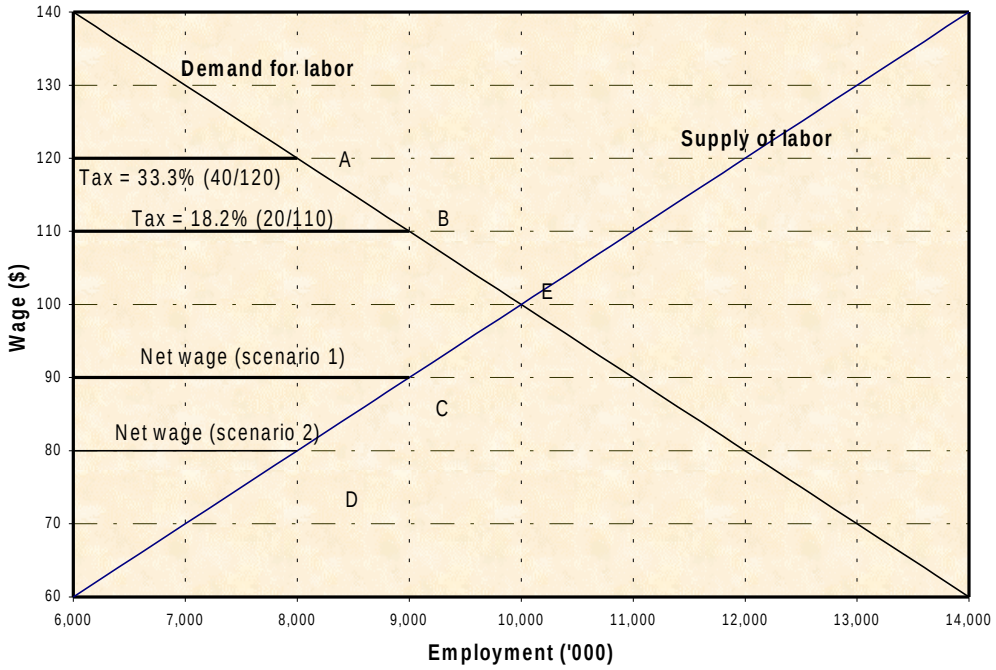
From Estelle James, "New Systems for Old Age Security--Theory, Practice and Empirical Evidence," World Bank *Working Paper* No. 1766, May 1997, p. 40.

IV. PENSION REFORM AND THE LABOR MARKET

Taxes levied on economic activity—i.e., taxes other than lump-sum, which are rarely acceptable on equity grounds—distort economic incentives, bias resource allocation and thus occasion deadweight economic loss. The impact of payroll taxes is illustrated in Chart 2, which plots demand and supply in the labor market.

Chart 2

IMPACT OF PAYROLL TAX ON LABOR MARKET



In the absence of a tax—workers save for retirement and disability voluntarily, if at all—equilibrium is at point E, where 10 million workers are employed at a wage of $100, yielding an aggregate payroll of $1 billion. With imposition of an 18.2% payroll tax, equilibrium shifts to points C and B, such that a million fewer persons choose to work at a net wage of $90, while each worker costs his/her employer $110, including a tax of $20, deducted by the employer.[18] (The 18.2% rate corresponds to the fact that the $20 is levied on the gross-of-tax wage of $110.) The deadweight loss (DWL) is measured by the area of the triangle BEC, which is one half of the surrounding rectangle, or ½ of 1 million times $20 = $10 million, i.e., 1% of the initial payroll.

Now assume the tax is raised by 83% to 33.3%. The new equilibrium comprises points D and A, such that 8 million persons choose to work at a net wage of $80, and each costs his/her employer $120, including a tax of $40.[19] The DWL becomes the area AED, which is ½ of 2 million times $40 = $40 million, or 4% of the initial payroll. In other words, a less than 100% rise in the tax rate increased the loss by 300%.

To illustrate the impact of such a loss on total output, assume that earnings covered by social security account for 40% of GDP, the current U.S. level. Total covered earnings at equilibrium were 10 million X $100 = $1 billion, corresponding to GDP of $2.5 billion. The first DWL of $10 million amounts to 0.4% of GDP, the second of $40 million equals 1.6% of GDP.

The actual shape of an economy's labor demand and supply functions depends on levels of marginal product of labor (which determines employers' willingness to hire at varying wage rates) and the elasticity of labor supply with respect to net wages in that economy. Based on their estimates of these coefficients for the U.S., Feldstein and Samwick (FS – 1997) arrive at 2.5% (of payroll) as the DWL caused

by the distortionary effects of the present 12.4% U.S. social security tax on workers' choices *re* labor force participation, hours worked, choice of job and location, degree of effort, compensation in cash *versus* kind, etc. This amounts to 1% of GDP.

FS propose replacing the social security tax with a DC/FF scheme where mandatory savings would be invested in portfolios of equity and bonds designed to yield the 9% real pretax return on capital recorded in the nonfinancial corporate sector during 1960-94. These accounts would be supplemented by government payments equivalent to rebate of corporate taxes generated by the higher capital stock resulting from increased saving under the scheme (see following section). Including the government payments, FS estimate that a mandatory saving rate of approximately 2% would support pension benefits at the levels currently legislated under social security.

The FS and related proposals for reform of U.S. social security raise two issues from the viewpoint of reducing the distortionary impact of social insurance on labor market incentives:

- If a given DTE capital market is felt to be not yet ready for a fully funded scheme, is there any option for reforming Pillar 1, while retaining its PAYGO character, that will cause the payroll contribution to be viewed less as a tax and more as an income-earning deposit, even if mandatory?
- Any mandatory scheme, fully funded or not, will be viewed at least in part as a tax by a portion of the labor force. What evidence is there on the perception of workers enrolled in existing DC/FF schemes?

Reform of PAYGO to minimize tax aspects

Payroll contributions will avoid distortionary features of a tax on labor under either of two conditions: (a) the mandatory contribution is no greater than what a worker would save voluntarily at the rate of return he or she expects to receive on contributions, or (b) even if it is greater, the worker can borrow frictionlessly (albeit at a market interest rate) against eventual pension benefits in order to finance additional consumption today.

Practically, neither of these conditions is likely to hold, for the following reasons:

- Much of the working population is myopic, such that voluntary savings are insufficient to finance a retirement income that society collectively regards as "adequate" replacement of pre-retirement earnings. If this were not true, the rationale for state intervention in the old age pension system would largely disappear, and the government could limit itself to supporting a safety net in the form of a minimum income guarantee.
- It would be a rare public manager of a pension fund whose earnings performance could approach the market rate of interest. Hence, a nonmyopic worker might still regard mandatory contributions to such a fund as partly a tax.
- The market for consumer credit is not frictionless, hence workers desirous of saving less and consuming more today than the level of their mandatory contributions would allow, find borrowing against eventual pension benefits too costly to support the level of consumption in question.

Nonetheless, a PAYGO system can be restructured so as to reduce the tax features of payroll-based

contributions. Such is the intent of the previously cited notional defined contribution (NDC) arrangement. Under this system, a worker's contributions are credited to a personal account on which an annual return is declared according to a reasonably transparent formula. The return is made positive in real terms by indexing account values annually according to the consumer price index. Clearly, the higher the contractual return, and the more explicit government's obligation *vis-á-vis* account holders to credit this return throughout the accumulation phase, to the point that account holders could sue in court, the greater workers' perception of PAYGO/NDC as a saving scheme rather than a tax.

The yield formula most often linked to NDCs is the growth rate of the contribution wage base, i.e., the sum of the growth rates of (a) the contributing work force and (b) the average wage.

This is essentially what Samuelson (1958) showed 40 years ago to be the implicit yield that each cohort of participants in an unfunded PAYGO system with a constant payroll tax rate will receive on their tax payments. Barring significant discrepancies between the overall wage base *versus* that on which contributions are paid, and the increase in the average wage *versus* productivity growth of the economy, the yield in question will be the economy's overall growth rate. This raises the question: what is the relation between that rate and the market interest rate?

Hemming (1998) shows that the real interest rate can be lower than the economic growth rate temporarily, but not in the long run, because the resulting incentive to borrow would steadily raise the ratio of debt to GDP, eventually forcing the interest rate back up above GDP growth. Hence the real rate of return on NDC accounts will unavoidably be lower than the real market rate of interest, and financially sophisticated workers will view their mandatory payroll contributions partly as a tax.

There is no guarantee that a value believed to reflect an economy's "underlying" growth rate at the time an NDC scheme is established will persist. Moreover there is every reason to expect the growth of the contribution base to fluctuate over time, which includes the possibility it will drop in some periods. Thus, it is not possible to guarantee that an NDC scheme will achieve financial balance from year to year while crediting workers' accounts with any constant real rate of return that workers would find attractive. This in turn means that fulfilling the desired impact of an NDC scheme on the labor market would require periodic transfers from general government revenue.[20] From workers' perspective this creates a political risk, that future governments will choose not to honor commitments made to earlier generations. (This recalls the outcome of recent public opinion polls according to which younger U.S. workers do not believe that social security will cover a significant proportion of their subsistence needs in retirement.)

To offset these risks, a government seeking to mobilize support for a new NDC scheme from workers and employers could consider the option of guaranteeing those subscribing during the scheme's initial years a higher lifetime rate of return than it would be prudent to retain for oncoming generations. The goal would be to observe limits such that subsidies that might eventually be needed out of general revenues would not be infeasible. Certainly in some DTEs that continue to feature volatile capital markets, a portion of the working population is likely to regard government's promise regarding the return on NDC pension accounts as conveying greater security than a volatile capital market. The experience of western democracies shows that the elderly can form potent lobbies, especially given a steadily rising share in the population.

In sum, the NDC revision of Pillar #1 remains a PAYGO scheme, but one where the modality of calcu-

lating benefit entitlements differs significantly from any of the options associated with traditional PAYGO systems. As with any such system, the parameters of an NDC scheme may allow (or be manipulated to allow) the scheme to accumulate a surplus over a period of time, subject to investment wherever the authorities choose, i.e., in government or private securities. But the existence of such a fund does not vitiate the scheme's PAYGO character.

Latvia: A case study of the NDC approach. Like most transition economies, on gaining independence in 1992, Latvia was saddled with a Soviet-style PAYGO system involving a payroll tax close to 40%; dwindling real receipts as state-owned enterprises closed or down-sized and workers emigrated or shifted to the informal sector; and increasing liabilities associated with a system dependency rate of 51%, arising from the 55-60 year standard retirement ages for women and men, respectively, earlier retirement privileges for sizable job groups, and an ageing demographic scenario. The outcome was a compression of pension benefits near subsistence, with benefit payments in arrears even at that low level.

Not surprisingly, further burdening enterprise payrolls and/or system accounts with the cost of financing transition to a DC/FF scheme in the foreseeable future did not strike Latvian administrators as feasible. However, within the framework of a tripartite collaboration with the World Bank and Swedish pension managers, they were attracted to the NDC approach then evolving in Sweden, and legislation passed in 1995 pointed towards introduction of the NDC element in January 1997.

The designers of the Latvian reform made two key assumptions about labor market response to NDC:[21]

1. The proportion of the labor force paying contributions would rise from an estimated two-thirds in 1996 to 85% by 2005;
2. The fact that their accounts would grow *pari passu* with contributions, irrespective of any minimum or "normal" retirement age, would motivate people to work longer, increasing the effective pension age by six months p.a. over ten years and resulting in an average retirement age of about 63 by 2005 (65 for men and 60.5 for women).

In addition, the designers assumed that improved efficiency of tax administration would enable the social insurance authority to reduce arrears in collection of payroll contributions from a current 13.5% to 6% in 2005.

Taking these measures together, it was estimated from a simulation model that, even with the total social tax/contribution rate dropping to 33% in 2001, the existing structure of benefits under PAYGO could be maintained largely intact, while a significant share of contributions on behalf of new entrants to the labor force, as well as current workers below age 50, could be steered into Pillar #2 funds. With the notional pension contribution rate fixed at 20%, it was estimated that about 5% of the contribution base could be moving into such funds after five years, and 9-10% after ten years (Fox, Palmer, and McIssac, 1996).

The new system set a minimum retirement age of 60 for nearly all workers, replacing the previous male/female SRAs of 60/55 years (and sharply reducing the number of occupations eligible for earlier retirement). The very concept of a standard retirement age was abolished, workers being allowed to augment their NDC accounts indefinitely. It was estimated that each ten years of work beyond the previous SRA would enable a worker to triple his/her pension.

During the system's first two years of operation there were signs that workers were voluntarily choosing later retirement ages (apart from the higher minimum established for most occupations).

Provision was made for a second pillar to take up the slack in the new pension scheme, with first priority going to meet PAYGO liabilities. It was initially planned to inaugurate privately managed, personal savings plans (PSPs) in January 1998, however this has been delayed. Projections for Latvia's Pillar #2 are still subject to a high degree of uncertainty.

Notwithstanding, the PAYGO/NDC reform is viewed as having prepared the ground for Pillar #2 (as well as #3) in several beneficial ways:

- Workers have been sensitized to anticipate future benefits from savings accounts, even if the latter are mandatory and yield returns less than those promised by speculative private funds.
- The social insurance bureaucracy has established from scratch the administrative machinery necessary to create, credit returns to, monitor and report regularly (once a year) on, individual pension accounts.
- The system has flexibility to allocate financial surpluses to Pillar #2 as soon as the authorities are satisfied that a minimum framework for a financial market and its regulatory apparatus exists, or alternatively to retain them for an additional period within the NDC scheme, augmenting the prefunding of benefits under PAYGO.

Meanwhile the scheme has the advantage of operating without recourse to a pool of experienced financial intermediaries or regulators to supervise them.

Perceptions of workers covered by DC/FF arrangements

Chart 3 (next page) illustrates what happens in the labor market when workers come to regard a portion of their social insurance contributions as equivalent to cash earnings. The lower (dashed) version of the labor supply curve from Chart 1 signifies greater willingness to work at any given wage level notwithstanding a mandatory social insurance contribution of 33.3% of the gross wage, because workers now perceive half of that contribution as equivalent to cash compensation. Since net pay is 66.7% of the gross wage, the gross wage = 1/0.667 = 150% of net pay, and the contribution is 50% of net pay. Workers perceive half of that, or 25% of net pay, as compensation supplemental to the net wage.

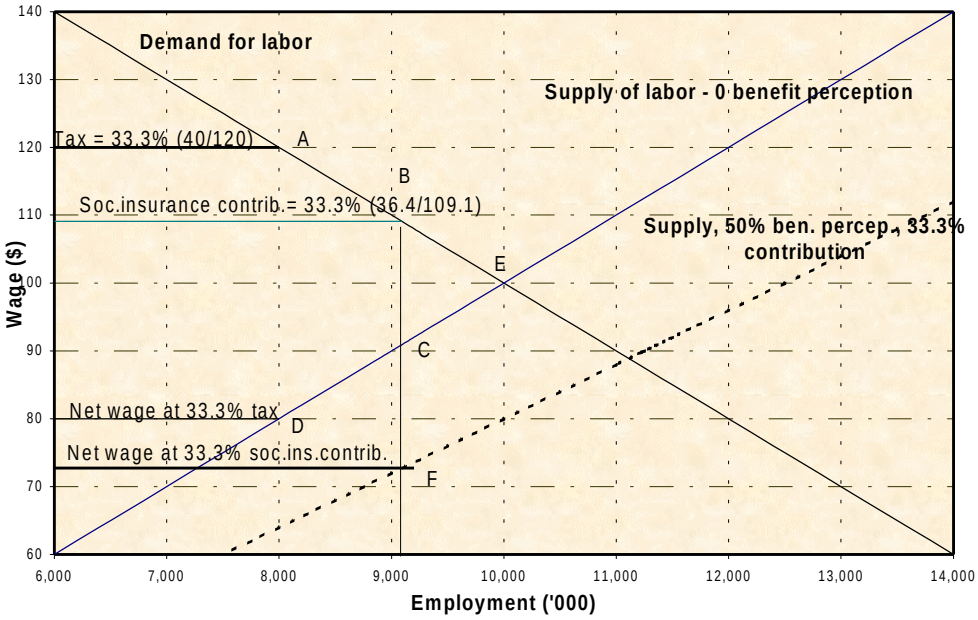
Thus, each wage value on the original supply curve is 25% above the corresponding value immediately below it on the new supply curve. That is, the labor force is now willing to provide a given level of effort at a wage 20% below that previously required to induce that level of effort ($x = 125\% \cdot y$ means that $y = x/1.25 = 80\% \cdot x = (1 - 20\%)x$).

As we saw above, perceiving no benefit from a payroll tax of 33.3%, only 8 million persons chose to work at a gross wage of \$120, which netted them \$80. If the tax is converted to a social insurance contribution, 50% of which is perceived as compensation, the market equilibrium shifts to the point pair BF, where approximately 9.1 million people work for a gross wage of \$109.10.[22] About \$36.40 is deducted for social insurance, leaving net cash earnings of \$72.70. The \$40 million deadweight loss under the payroll tax (AED) drops to slightly over \$8.2 million (BEC), with a corresponding increase in GDP.

Since 1983 Chile has been replacing its former PAYGO scheme with a DC/FF system operated by some 20 private pension fund administrators (AFPs). At present, approximately 50% of the labor force is enrolled in the new scheme. Enrollment is compulsory for all employees of enterprises above a minimum size, although survey data indicate that 12% of that population is not enrolled. Moreover, in 1991 deductions were paid for only 71% of enrolled participants. Participation is voluntary for the self-employed.[23]

Chart 3

LABOR SUPPLY IMPACT OF SOCIAL INSURANCE BENEFIT PERCEPTION



A recent study based on nationwide samples of Chile's labor market (Torche and Wagner 1997) compared workers' choices between jobs for which payroll deductions were being made, and other employment opportunities. The point of departure was an assumption that earnings of persons with given human capital endowment would be equalized as between occupations covered and not covered by public insurance, after taking account of intangible preferences for independent work.

Comparing net remuneration in the two job categories, the researchers found a surplus of gross emoluments in covered occupations only explicable by the supposition that persons in those occupations considered half of their 21.5% insurance deduction to be a tax rather than a component of remuneration.[24] If this perception applies to the best-established DC/FF scheme in any DTE, then, with respect to curbing deadweight economic loss in the labor market, the difference between a PAYGO/NDC scheme and a DC/FF arrangement may not be very significant.

V. PENSION REFORM AND SAVINGS/INVESTMENT

The perception is widespread that shifting from a PAYGO/DB arrangement to DC/FF lays the basis for a significant boost to national saving along with corresponding additions to capital stock, GNP, and ultimately consumption of both the working and retired population. This supports the World Bank's argument for a strong Pillar 2 as a component of pension reform.

However, an unpublished note by Jeffrey Sachs (1997) shows that a PAYGO scheme extracting the same contributions/payroll tax as a funded scheme *à la* the World Bank could achieve the same level of saving, capital formation and growth under two conditions: (1) funds surplus to current SS liabilities, i.e., contributions/payroll tax less current payments to pensioners, are invested at the market rate (Sachs' illustration uses 5.64%); and (2) labor market behavior is assumed to be invariant to the nature of the

scheme; that is, labor force participation and other aspects of worker behavior are unresponsive to differences between (a) payroll taxation that is unrelated to retirement benefits, and (b) a scheme that generates contributions on the basis of payroll, but then creates a close link between those payments and eventual retirement benefits.

In fact, Sachs believes that labor responds strongly to such differences, and hence that schemes linking contributions closely to benefits promote efficiency and growth. Indeed, he strongly supports funded DC pension plans with regulated private managers trading on global financial markets. But, as already noted, the efficiency *cum* growth differential arises from the behavior of labor, not funding *versus* PAYGO.

Without sidetracking the discussion in order to reproduce Sachs' calculations, it is worth summarizing the intuition involved. Most governments, of industrial as well as developing and transition economies, have acquired an implicit social security debt (ISSD) by virtue of commitments made to current pensioners and workers which exceed, in most cases by a wide margin—several tens of percentage points of GDP—any existing social security trust fund built up on the basis of historical payroll taxes/contributions. (In the U.S. case the current ISSD is estimated at around 110% of GNP).[25] This debt must be 'serviced' by the current working population, whether through a greater or lesser portion of payroll taxes under PAYGO, a greater or lesser portion of payroll contributions under a new funded scheme, or general taxes not directly related to payrolls.

Country evidence: Chile and Switzerland

While only one set of estimates figures in Table 2, that of Haindl and Rondenelli (HR 1996), James (1997) cites four other econometric studies of the impact of Chile's 1981 pension reform. HR 1996 attribute two-thirds of the 9.9% increase in Chile's saving rate (see Comparison column in Table 2) to pension saving, even after allowing for a modest crowd-out of voluntary saving by mandated contributions.

Corsetti and Schmidt-Hebbel **(**1997) estimate that Chile's private consumption ratio (PC/GDP) declined by 21 percentage points from 1971 to 1992, and attribute half of it to pension reform *cum* financial market deepening. Agosin, Crespi and Letelier (1996) estimate a more modest 4 point increase in S/GNP during 1981-94. They also found a minimal saving substitution ratio (SSR) or crowd-out because households had little voluntary saving to begin with (Feldstein and Samwick (1997) make this point in regard to the U.S.) Morande (1996) also found a significant positive effect on saving.

These four contributions identify a positive impact of pension reform on Chilean saving in the short-to-medium term. How intriguing, then, to find James' fifth authority on Chile, Robert Holzmann, a pre-eminent student of pension systems and currently director of Social Protection in the World Bank's Human Development Network, asserting the opposite. His analysis finds that the direct effect of financial market developments on the private saving rate was negative. "The data indicate that net pension savings were negative until 1989 and small afterward." Two alternative analytical approaches applied by Holzmann

> independently suggest that the conventionally assumed Chilean-type pension reform on private (and national) saving may not hold. The suggested alternative causality is twofold: (1) economic growth owing to higher total factor productivity and capital accumulation and better labor market performance is

at the heart of the higher private saving rate; and (2) the increase in the private saving rate is strengthened by higher public saving.

What about the longer term? Here the well-known Life-Cycle Hypothesis of consumption raises a different possibility of negative impact on saving. In its pure version this hypothesis has consumption depending only on life-time income, not its distribution over time. Households are assumed to distribute their consumption over time by saving income in years of surplus and borrowing to sustain consumption in lean years. In practice, of course, the market for consumer credit is anything but frictionless. Nonetheless, Holzmann finds evidence that the Chilean pension reform's mandatory saving feature induced a rise in consumer credit, suggesting that households plan to dissave by eventually refunding the credit out of a mandated pension income that is larger than they would have chosen to sustain through voluntary saving.

As with Chile, Switzerland's funded pension schemes have been in effect long enough to warrant time series analysis. According to Hepp (1997), Swiss saving rose from 6% of GDP pre-pension reform (1982) to 8.5% after ten years, with the entire increase attributed to pension funds and insurance companies.

Simulations for other economies

Table 2 gives simulation results for three countries, the United States, Australia and Mexico.

For the *United States,* Feldstein and Samwick (1996) and Feldstein (1997) cite estimates yielding 9% as the average annual return before all taxes (including state and local government), whether calculated post-World War II or over nearly 70 years since 1926, on a stock and bond portfolio reflecting the proportions firms use to finance themselves. They calculate that investment in such a portfolio, through 'Personal Retirement Accounts' (PRAs), of a 2% contribution on payrolls up to the current (individual) salary ceiling would expand the U.S. capital stock by 34% in 75 years.

Responding to scepticism about the 9% figure, Feldstein's most recent paper (1997) acknowledges several factors possibly yielding a lower return: declining marginal productivity of capital (he accepts a reduction to 7.2% before tax); other demands on corporate tax revenue, particularly that collected by state and local governments; costs of administering PRAs and annuities (Feldstein cites a possible 1% decrement on this account); flow of funds into lower-yielding owner-occupied housing; leakage of up to 20% of new saving into foreign assets not taxable in the U.S.; etc. Allowing the return to drop to 5.4%, he calculates an eventual maximum contribution rate of 6.8% as sufficient to support current SS benefits, still little more than a third of the equilibrium PAYGO payroll tax.

Table 2's figures for *Australia*, taken from Bateman and Piggott (1997) and Bateman (1997), emanate from 1993 projections by a Retirement Income Modelling Task Force. This group assumed a 50% saving substitution rate (SSR), i.e., that one dollar of saving under Australia's mandatory funded pillar ("Superannuation Guarantee") would reduce existing private saving by 50%. This contrasts with FS' position that "the vast majority of Americans have too little in financial assets to do any such offsetting" (FS 1998, p. 9). Specifically, "median financial assets of households in their immediate preretirement years are equal to only about six months of income", properly regarded as "precautionary savings" (FS 1997, p. 36). FS 1998 invites the reader, if desired, to assume an offset of up to 25% corresponding to the proportion of PRA assets representing net wealth of individuals.

It seems unlikely that Australians' behavior would be very different from that of Americans. Hence the Australian analysts' 50% SSR may be on the high side, suggesting that the 1.5% projected increment to the national saving rate is an underestimate. Moreover it is unlikely that a significant number of pension scheme participants in DTEs would have as much liquid private savings relative to income as Americans or Australians, hence a case exists for ignoring saving offset.

The 0.4 - 2.1% (of GDP) figures for Mexico cited in Table 2 (Ayala 1996) assume a 30-40% SSR. The figures represent the upper end of a range of estimates that depend on the mode used to finance the transition from PAYGO to funded, i.e., benefits previously accrued by current pensioners and workers. The higher range holds if these benefits are financed (a) by incremental taxes, or (b) by government borrowing such that the incremental debt attracts incremental private savings (so-called 'Ricardian equivalence'). Conversely, if purchasers of the government debt simply switch out of other assets, Ricardian equivalence does not hold, public dissaving is not offset by new private saving, and the impact of pension reform on overall saving is even negative in some years, although on balance positive over a 30-year period.

Impact of pension reform on public saving

Apart from Holzmann's, the contributions cited above restrict themselves to the behavior of household saving, whether voluntary or mandatory. Another dimension of the response of saving to pension reform is the behavior of government's own saving and dissaving, reflecting some measure of the difference between revenue and government consumption.

A gross measure of revenue includes not only general taxation and nontax revenues but also payroll taxes earmarked for pensions, health care and other social benefits. The current debate about U.S. federal budget policy includes the question of whether SS revenue and benefits financed by it should be taken into account in calculating the overall budget deficit. Because social security revenue has thus far exceeded benefits—increasing the Social Security Trust Fund (SSTF) to the point where, at end-1997, the old age portion was equivalent to 1.8 years of projected benefit payments[26]—taking SS revenue into account yields a smaller deficit (and now that surpluses are in the offing, it will make the FY 1998 and future surpluses correspondingly larger).

Holding to the view that social security should be largely self-financing over the long run, many analysts argue that SS revenue and payments should be netted out in defining the U.S. budget outcome. A major concern is that, in periods where the demographic situation allows the SSTF to grow, defining the budget to include SS revenue and payments tempts Congress to curry political favor by drawing on the surplus to finance additional expenditure. Moreover in economic conditions that ease fiscal pressure, such as the U.S.' present situation, the inclusive definition lessens pressure on politicians to adjust the system—raising payroll taxes, raising the normal retirement age, otherwise curbing benefits—so as to equip it sooner or later to cover rapidly growing pension claims of an aging population.[27]

For some analysts these concerns add to the rationale for privatizing and funding the pension system. Channeling payroll contributions for a truly privatized, funded pension system into unrelated public expenditure, even if government initially collects the payments, is effectively precluded (except to the limited extent independent trustees decide, as a matter of investment policy, to place part of their receipts in government securities).

The confluence of pension reform and changes in government expenditure in some countries has been subjected to econometric analysis. Munnell and Ernsberger (1990) found that increases in SS reserves in Japan and Sweden did not prompt expansion of public expenditure, whereas the opposite was true in Canada. In the contribution cited above, Holzmann (1997) asserts that "including the financing of the transition costs of the reform, [Chile's] public saving increased by some 10 percentage points of GDP, about one-half of which was used to finance the reform" (p. 175).

How likely are today's DTEs to emulate Chile's fiscal discipline? In most DTEs with IMF programs the conditionality under greatest pressure is that calling for reduction of the fiscal deficit. DTE governments face domestic social and political pressure to absorb un- and underemployed workers, increase civil service salaries, sustain deficit-ridden state enterprises, expand social and physical infrastructure, subsidize wage goods, and relieve client groups from tax burdens, while tax evasion is rampant and politicians exploit every opportunity to divert revenues and otherwise extract rents.

It is partly in this context that few DTE PAYGO pension funds are in current surplus, indeed in many countries payment arrears are imposing dire hardship on pensioners. In DTEs that operate supposedly "funded" systems such as national provident funds in lieu of PAYGO schemes, the state-appointed heads comply with ministerial demands to channel receipts into government securities whose real purchase value they have every reason to believe will not be sustained.[28]

What is the bottom line? The evidence suggests that classical PAYGO arrangements, especially in DTE conditions, carry a bias against government saving, placing a premium on modes of pension reform that counteract this bias.

Findings from generational accounting. This creative approach to analysis of the net burden of government expenditure, including transfer payments such as social security benefits, was pioneered by Laurence Kotlikoff and associates in government and academe. The core of the analysis consists of calculating the present value of the net tax burden (taxes paid less transfers received) that will be borne by succeeding generations under alternative scenarios for financing government expenditure, one scenario being continuation of the existing social insurance system. Generational imbalance arises when future, as yet unborn, generations are projected to face a higher or lower net tax burden than the currently living population, i.e., generations born up to and including the present year.

An NBER study coordinated by Kotlikoff, Willi Leibfritz and Alan Auerbach (KLA; see Kotlikoff and Leibfritz 1997) compares generational accounts for 17 countries, of which three are customarily classified in the developing world: Argentina, Brazil, and Thailand. Five countries, including Brazil (89%), are found to face imbalances above 75%, meaning that, if present tax-transfer policies are maintained, future generations face net tax burdens at least 75% higher than those facing citizens born in 1995, the base year for the projections. Japan occupies the peak at 169%. Another five countries, including the U.S. (51%) and Argentina (59%) face imbalances between 50 and 63%.

Three countries, including Thailand (-88%), show negative imbalances, meaning that, with unchanged tax-transfer policies, future generations will face a lower net tax burden than 1995 new-borns. In Thailand's case this arises because the country has as yet no public social security system, hence under current policies payment of social security benefits to an ageing population poses no burden for oncoming generations.

The foregoing percentages refer to a variant of the KLA analysis whereby education expenditure is treated as a government consumption expenditure, rather than a transfer. Treating this expenditure as a transfer reduces the net tax burden of both 1995 new-borns and future generations. However the reduction is greater for the 1995 new-borns because they receive the transfer in the relatively near future, whereas future generations receive it later, so that discounting makes the 1995 discounted present value for future generations relatively smaller. Hence the transfer variant for treating education expenditure increases the absolute and percentage values of the imbalance.

Looking at the countries of concern to us, Argentina's imbalance rises from 59% to 75% and Brazil's from 89% to 117%. Thailand's becomes a larger negative figure, but given the likelihood that some form of social insurance will be introduced there in the not distant future, its figures have little meaning.

What import does this analysis have for pension reform? Kotlikoff *et al.* (a) draw a normative inference and (b) make a positive prediction: (a) a social insurance system that poses a significantly higher net tax burden on future generations than that borne by present cohorts is unfair, such that today's voters and their leaders, largely comprising or representing the current working and retired population, should not impose such a burden on their descendants; and (b) the future generations in question will probably find the burden handed down to them intolerable, with the result that, as they gain political power, they will reduce it, *inter alia* by reducing pensions and other benefits paid to disabled persons, retirees, etc. Moreover, as the trends become increasingly the object of public debate, today's working population will anticipate this development and its confidence in the protection offered by the social insurance system will diminish.

What kind of reform does Kotlikoff recommend? For the U.S., his proposals are akin to those of Feldstein and Samwick, namely, privatization of mandatory social security within a DC/FF framework. Kotlikoff *et al.* assume a pre-tax private rate of return on contributions of 9.7%, close to FS' 9.0% (Kotlikoff, Smetters and Walliser, 1997). Keeping the contribution rate at 9.9% for old age pensions plus 1.9% for disability insurance, or close to the current payroll tax rate of 12.4% excluding Medicare, their simulations generate a steady-state increase in capital stock ranging between 12.4% and 39.8%, depending on which of three privatization options is chosen—flat minimum benefit, progressive matching of contributions by the government, and neither of those[29]. The range of steady-state increases of wage income is 1.2%-5.2%, and of GNP, 3.9%-12.7%.

For DTEs Kotlikoff emphasizes the importance of risk diversification in pension fund investment, and hence the desirability of investing in global rather than national instruments. He challenges the Chilean claim of high returns in their privatized system, where offshore investment was prohibited until 1997, and such investment still accounts for less than 6% of pension fund assets. As of nearly two years ago Kotlikoff was predicting a day of reckoning.[30] In the event, average rates of return of Chilean pension funds have declined by only one percent since late 1994, while the country's main stock index has fallen 46% in real terms.[31]

Kotlikoff is also critical of advertising and other transactions costs associated with some 20 Chilean AFPs bidding customers away from one another.

Instead, Kotlikoff urges DTEs to invest pension assets in international index funds, relying on the regulatory structure of world financial markets in lieu of expecting domestic regulatory institutions to perform effectively in the foreseeable future. He would invite reputable international portfolio managers

to compete for a country's business, expecting that management fees could go as low as 0.2% of assets.

VI. PENSION REFORM AND FINANCIAL MARKET DEVELOPMENT

While the econometric evidence underlying the figures in Table 2 attributes one-half of the increase in total factor productivity during 1983-94 to the impact of pension reform on financial market development (FMD), Holzmann is circumspect in asserting this conclusion, claiming only that his "empirical findings are seemingly consistent with the claim that [FMD] enhanced economic growth and that pension reform has contributed to this development...However, the question of how the financial market in Chile would have developed had the pension reform not taken place may never be answered." (Holzmann 1998, p. 175).

Holzmann's bottom line is that "pension reform as implemented in Chile requires a comprehensive reform package covering essentially all areas of macroeconomic and microeconomic policy and institution building, supported by a tight fiscal policy." If a government succeeds in implementing such a package, "pension reform and a shift from an unfunded to a funded scheme may create positive externalities (on labor and financial markets), thereby accelerating the growth rate." (Holzmann 1998, p. 176).

This section focuses on issues of investment policy and domestic capital market development that result from establishing funded pension schemes, also known as participant accumulation schemes. A key issue is that most governments that have instituted funded pillars authorize at most a small fraction of participants' assets to be invested abroad. This policy needs to be examined as it places future retirees' assets at risk to domestic economic and financial crises.

The role of institutional investors, notably pension funds and life insurance companies, is critical in promoting and leading the evolution of DTE capital markets. This section reviews pension asset management objectives, based on contemporary portfolio management theory, and assesses capital market histories in light of portfolio optimization requirements.

Of particular concern are potentially disruptive crises that could undercut retirement income. Most countries implementing funded pension schemes have adopted regulations constraining licensed pension funds to narrow target allocations, resulting in essentially one portfolio option for all participants. In the interest of protecting participants, licensed pension funds that perform poorly in relation to their peers may be required to contribute capital to participants' accounts to compensate for under-performance. In this way licensed pension funds can put themselves at risk when making portfolio allocations that differ significantly from their peers. These regulatory rules can lead to potential risks for older workers.

The section concludes by developing model portfolios for pension funds in emerging capital markets, based on contemporary portfolio management standards. The recommended model portfolios depart significantly from current practice: first, by authorizing significant allocations to foreign investments; and second, by proposing different portfolios for participants by age group.

Role of institutional investors

A major policy objective of funded pension schemes is to mobilize institutional investors to help develop the domestic capital market. Among all capital market participants, it is pension funds and life

insurance companies, with their long-term liabilities, that bring the longest investment horizon to the table. In contrast, the goals of banks and brokerage firms are dictated by transaction concerns and short-term investment horizons.

Hence, institutional investors, with their unique focus on long-term economic growth and development, are key participants in emerging capital markets. In addition, the institutions' need to move assets into and out of specific investments offers valuable support for development of money markets. Even without a requirement that all pension funds be invested domestically, domestic pension funds can contribute to this policy objective. Thus, constraints on institutional investors should be balanced, especially during the early stages of market evolution.

Money markets typically evolve before capital markets. Temporary cash balances of businesses and financial institutions can be invested in a variety of short-term securities. Short-term credit is needed to finance imports and exports, government debt helps finance short-term cash flow differentials. Once funded pension programs are in place, participants' contributions need to be invested in short-term securities before being committed to long-term portfolio investments. Likewise for funds being transferred as pension payments. Thus, funded pension systems support the development of money markets and thereby short-term credit.

Sachs and Kotlikoff have proposed investing DTE pension assets exclusively in international index funds. While this approach would minimize risk, it would also preempt, or at least slow, the development of domestic capital markets, leaving life insurance companies as the only major domestic institutional investors. Bypassing domestic investment altogether goes to the opposite extreme compared with mandating it exclusively. Balance with respect to domestic and foreign investment helps to strengthen domestic markets.

Pension funds fill several functions within a capital market. The sheer scale of their assets enables them to participate in major financing activities, e.g., as lead investors or underwriters. Institutional investors also help provide a "floor" for pricing securities based on their asset size and internal analytical capabilities, which is particularly important if foreigners are trying to sell at any price. In this way, the institutions provide protection against volatility caused by "hot money". They also provide an inventory of securities for the broker/dealer community to access (at a fee). Broker/dealers typically retain small inventories and thus need to acquire securities to fulfill specific orders. Institutional investors engage in security lending and bond swaps to provide access to securities for the broker/dealer community.

It is important to recognize that assets invested abroad can readily return when fund managers determine that superior investment potential exists locally. Favoring foreign investment during the early days of domestic capital market evolution is a prudent policy. Over time, as market capacity grows, limits on domestic placement can be raised. As noted above, institutional investors can move large sums quickly when investment opportunities exist. Their ability to move in and out of the domestic market helps keep government policy in line.

Furthermore, allowing domestic assets to be invested in foreign capital markets (along with appropriate domestic laws and policies governing domestic capital markets) should encourage foreign investment locally (particularly long-term investor capital. A country that has liberalized capital flows for its own pension fund participants thereby demonstrates its support for open capital markets. Foreign investors view this policy favorably and are more willing to place their assets in a country that has liberalized

capital flows across its border. The existence of a domestic institutional investor base further assists foreign investors in entering a newly emerging capital market.

Portfolio management principles and investment policies

Pension fund managers in emerging market (or pre-emerging market) countries need to recognize their obligation to invest participants' assets so as to insure future retirement income. This fiduciary obligation requires managing the asset pool to maximize return at a prudent level of risk. However, the obligation may conflict with policies restricting investment to the local capital market to the exclusion of international markets. It is worthwhile reviewing this investment policy in light of modern portfolio theory.

Reviewing standard fiduciary guidelines is particularly important as they are widely recognized principles for investment of trust funds. The following points capture the relevant issues for this discussion:

- To invest exclusively in the interests of beneficiaries and for no other purpose.
- To maximize return at a prudent level of risk, not for speculation, but for investment.

Investment policies for pension funds must also recognize the degree of development of the domestic capital market. Historically, most DTEs have not authorized investment of pension funds in foreign securities or, at least restricted the allocation to relatively small amounts (e.g., 5-15%). Of all DTEs Chile has the longest history of private pension fund management. Currently, it allows up to 12% of assets to be invested abroad. However, as of year end-1998, only 6% of pension fund assets were so invested, primarily by the larger pension funds. Most other Latin American countries with funded pension schemes have not allowed the funds to purchase foreign securities (e.g., Argentina, Peru and Uruguay).

Other than supporting the development of domestic institutional investors, restricting pension fund investment abroad is essentially a political issue and not one of financial or portfolio management. Most DTE governments see capital flight as a threat to domestic investment in a capital-poor economy. Notwithstanding the need to foster investment, it is important that market forces play a major role in the allocation and control of capital. Aligning the interests of ownership, management, and control (corporate governance) yields the most favorable returns to investors. Thus, the demand for capital should be managed by the global capital market and not by restricting the investment of the workforce's pension assets. Foreign investment can provide much greater resources to a properly managed domestic capital market than can be expected from domestic pension funds in the foreseeable future.

Given the large accumulation of assets in funded pension programs, many governments are tempted to direct part of these assets into investments for domestic political purposes, e.g., low-income housing, favored companies needing additional capital, start-up business finance, and/or bypassing of asset classes such as alcohol and tobacco companies. While well intentioned, this targeting normally leads to less than market rates of return and thus violates fiduciary principles. The capital markets allocate investment capital most efficiently, and targeted investment programs should be avoided.

Another important principle affecting portfolio structure concerns the nature of liabilities. A participant contributes to a pension fund throughout his/her working life. New entrants to the labor force will contribute toward their retirement over a 30 to 40-year working life. The type and maturity of assets

must be carefully selected to be consistent with liabilities. Young workers will be less affected by portfolio volatility and their portfolios should contain a larger proportion of equities. As workers approach retirement, it is important to reduce their portfolio risks (volatility) and hence a greater proportion of the portfolio should be invested in fixed income instruments. Many pension schemes do not recognize these divergent liability structures. Given the importance of this concept, it is discussed further below.

Choice of appropriate maturities for a pension fund portfolio affects the optimal allocation of assets between foreign and domestic securities. Thus, developed capital markets have fixed income (debt) instruments of long duration, e.g., 10 to 30-year bonds. Emerging markets are generally limited to shorter maturity bonds. Also, more companies have their stocks listed in developed markets than in emerging markets. The latter thus have fewer options for constructing portfolios consistent with participants' liabilities. Pension funds should be allowed flexibility to select foreign securities that meet specific portfolio objectives.

During the 10 to 20 years following introduction of a funded pension scheme, the aggregate system will receive positive cash flows. This ongoing demand for investment opportunities must be considered in establishing investment policies and regulations. Does the domestic market have the capacity to absorb these pension contributions efficiently? As the system matures, benefit payments increasingly offset contributions, thereby reducing net investment demand. Depending on participants' age distribution, mature systems can easily experience negative cash flows, with investments being liquidated systematically over an extended period of time to pay retirees.

Modern portfolio theory provides statistical tools to help structure efficient investment portfolios. These tools help to optimize allocation across the asset classes selected for inclusion in a portfolio. For alternative levels of risk, optimal portfolios can be developed based on historical returns by asset class, risks (volatility), and correlations. These tools can also be useful in designing investment policies and regulations with regard to limits for selected asset classes, both minima and maxima.

Control of risk through diversification is a *sine qua non* of portfolio optimization. Pension fund portfolios need to be spread across several asset classes and, in the case of emerging markets, across regions and countries. Supporting evidence is given below. The impact of diversification can be clearly demonstrated, i.e., risk – return results can be readily compared and the benefits of diversification quantified.

Capital market histories

Looking at outcomes over the past 30 to 40 years for which data are available (Table 3, next page), emerging markets exhibit relatively extreme cycles that are clearly reflected in comparing risk (standard deviation of investment performance) with more developed capital markets. However, historically, the higher volatility is compensated by higher total return—emerging markets are among the highest-return asset classes, at least until recently (1998). Factors that help explain the higher return and volatility of emerging markets are discussed below.

Evaluating long time series helps understand the concept of relative volatility across capital markets. Five charts are presented in this section to explain the impact of various events on capital markets and selected indexes representing the major world markets and asset classes. Chart 4 (next page) shows the most developed capital markets, namely, the U.S. (represented by the S&P 500), Europe, and the Pacific (both parts of MSCI indexes). The Pacific includes Japan, Australia, New Zealand, Hong Kong, Singapore

and Malaysia. This chart covers nearly three decades and hence is shown in logarithmic scale for easier interpretation of growth trends.

Even the most developed equity markets can be volatile. The 1973–74 stock market correction, caused by the OPEC oil embargo and resulting oil price increase, affected most developed economies. The October 1987 stock market crash was equally felt in the U.S., Europe and Asia. The Pacific, dominated by Japan, shows robust stock price appreciation during the 1980s followed by the weak 1990s. As can be seen, even in well-developed, large economies (e.g., the U.S. and Japan), equity markets exhibit volatility. However, the most important observation is that equity markets produce consistent, positive returns over longer market cycles (10 years or more).

Table 3
Historical Rates of Return and Risk
(All Returns in U.S. Dollars)

Asset Class	Index	Initial Date	Return	Risk*
Cash Equivalents	Sol Bros. World Money Mkt	1978	8.2%	8.3%
U.S. Bonds	Lehman Aggregate Corp/Govt	1976	9.7	7.7
Global Bonds	Sol Bros. World Bond (Hedged)	1985	9.6	4.5
U.S. Equities	S&P 500	1960	11.9	14.6
International Equities	MSCI EAFE Index	1970	12.0	18.0
Emerging Market Bonds	JP Morgan E.M. Bonds	1991	17.9	17.3
Emerging MarketEquities	MSCI Emerging Mkt - Free	1988	14.9	26.9

* Risk, or volatility, is the standard deviation of returns

Chart 5 (next page), covering the 1990s, presents the same market indexes as Chart 4 (also next page) and adds emerging market indexes for both bonds and stocks. It illustrates the significantly greater volatility of these markets. Since these indexes cover about 20 countries, volatility within any given country is even higher. The record-setting worldwide volatility in most asset classes during the third quarter of 1998 is not included in any of these charts. However, the impact of the Asian financial crisis beginning July 1997 is clearly evident.

Chart 6 (page 30) shows emerging market equity indices for three regions – Asia, Latin America and Europe, Middle East, Africa. These three regions have clearly shown different patterns and reactions to various events impacting these regions. While differences begin to emerge when emerging markets are dissected into regions, note the scale of this graph compared to the following charts for individual countries. Regions are more stable than countries.

Charts 7 (page 30) and 8 (page 31) break down the emerging market equity index for selected countries. Chart 7 presents indexes for three major Latin American countries, and Chart 8 shows four Asian countries. In Latin America, Chile has posted relatively good results over a fairly long time period, following its pension reform and financial sector liberalization in the early 1980s. However, the Mexican debt crisis of 1995 and the Asian financial crisis beginning in 1997 also affected Chile. Mexico shows steady recovery from its debt crisis but has not reached the peak achieved in early 1994. Brazil is relatively unique based on its inflationary record and repetitive devaluations. In spite of substantial control of Brazil's inflation, the 1997 Asian crisis increased investors' concerns about domestic economic policies and Brazil's fiscal woes.

Chart 4

Major Equity Markets

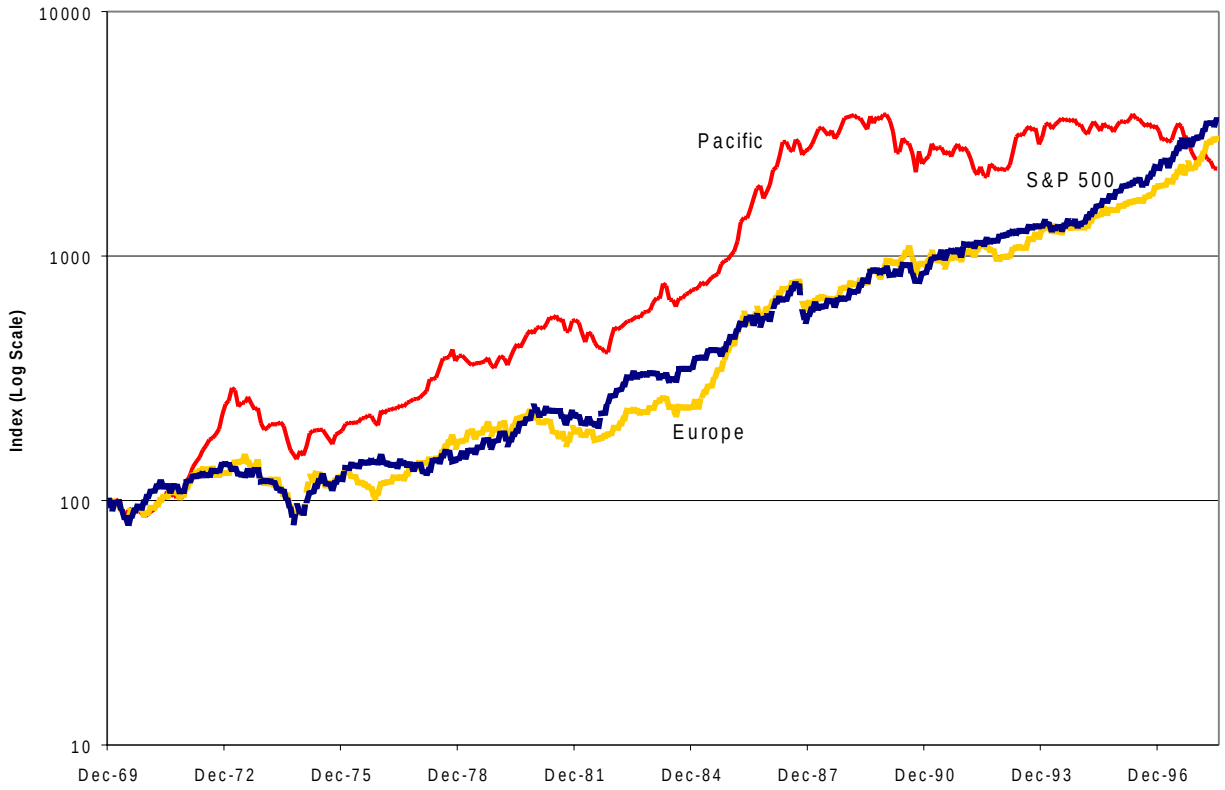


Chart 5

Major Asset Classes

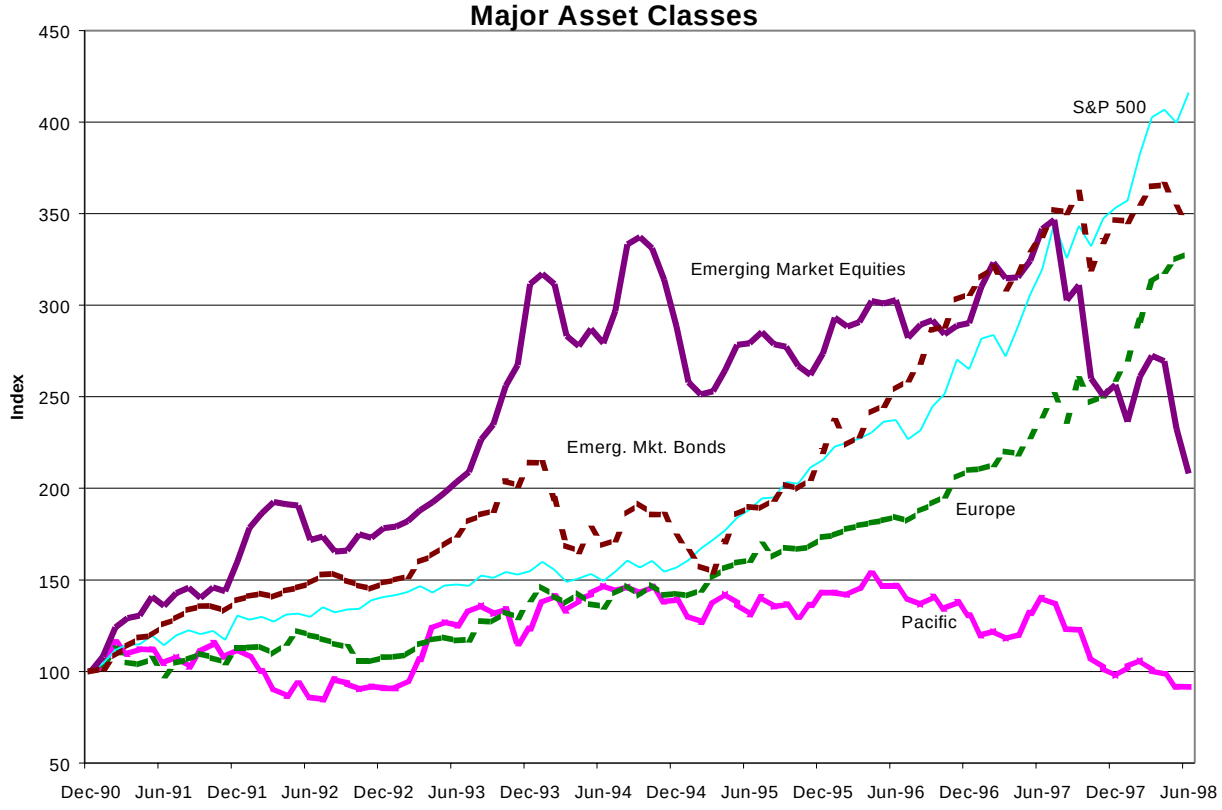


Chart 6

Emerging Markets:
Regional Equity Indexes

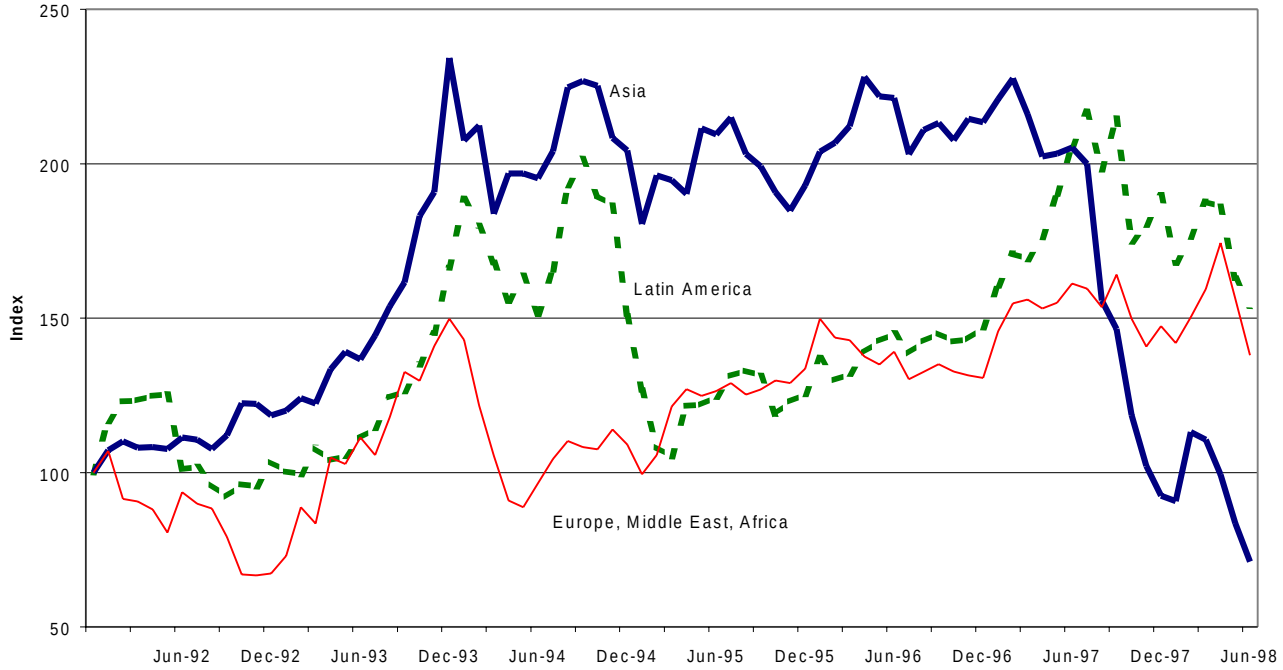


Chart 7

Latin American Countries Equity Indexes

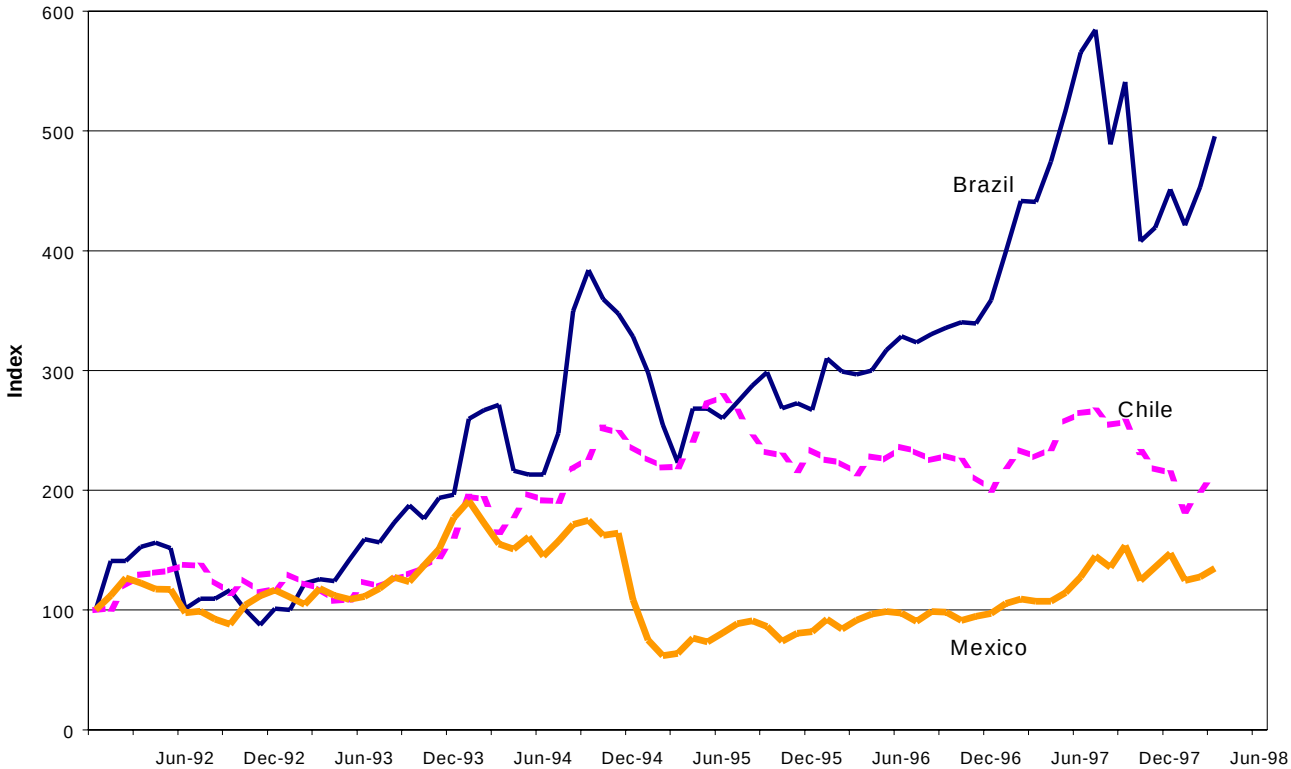
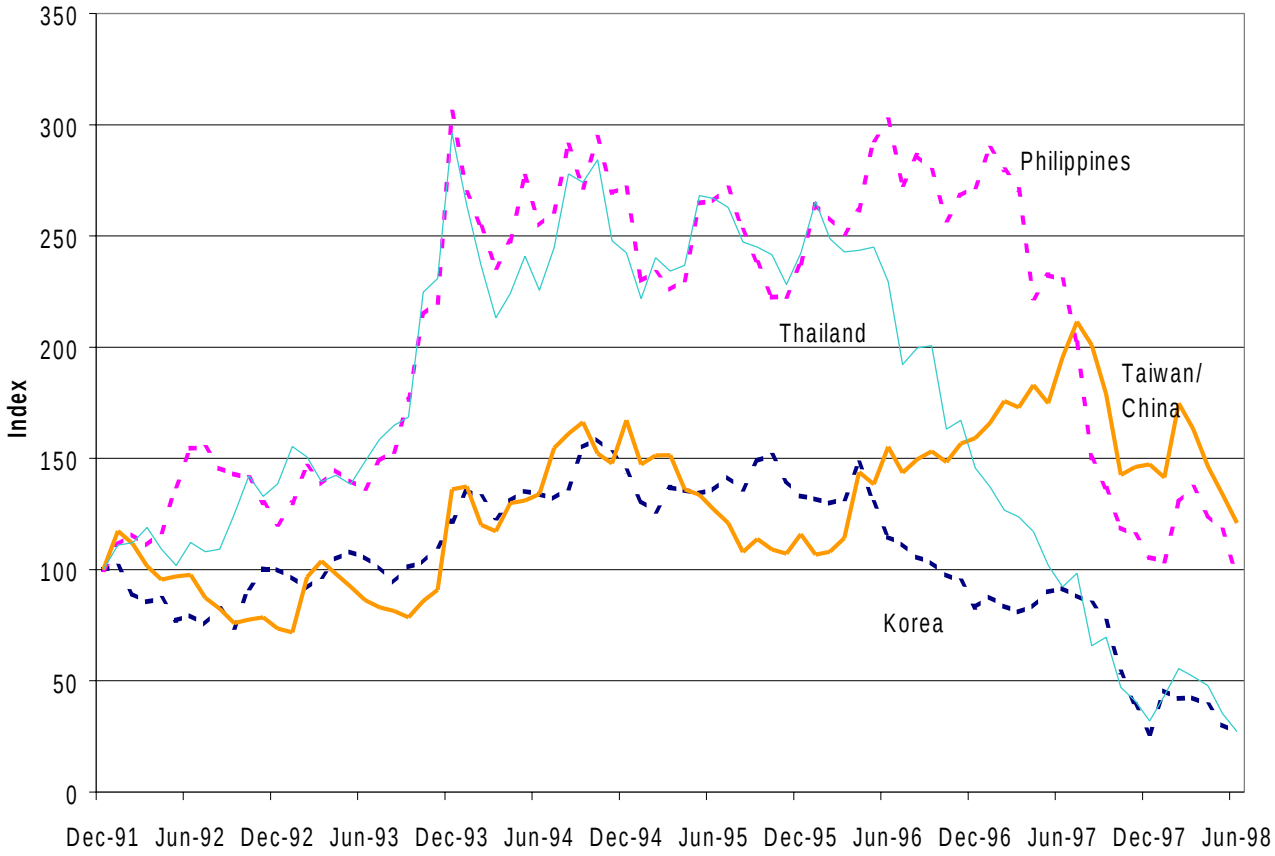


Chart 8 reflects the more developed economies and capital markets of Korea and Taiwan compared to the

Chart 8

Asian Countries Equity Indexes



Philippines and Thailand. Interestingly, investors were showing concerns about Korea's and Thailand's economic outlook well before the July 1997 baht devaluation, triggering the Asian Contagion. Clearly, no country is immune to financial crises or volatility.

Also helping to explain volatility of emerging markets is their relatively small combined capitalization, compared to developed markets and even large multinational companies. Accordingly, when financial crises occur in one market and investors wish to sell, pressures are readily transferred to other emerging markets. This phenomenon is clear from the country charts.

The limited liquidity of these markets is reflected in increased selling pressure, and entire country markets can decline in price even when no specific financial problems are evident. The Mexican crisis had its "tequila" effect that was not restricted to Latin America only. The Asian Contagion led to com peting devaluations throughout Asia which impacted virtually all emerging markets and even companies on developed market exchanges. The Russian crisis has similarly affected all emerging markets and contributed to a worldwide credit crunch.

Causes of these financial crises are many and varied. Investors are concerned whether the initial crisis is symptomatic of similar problems that could emerge elsewhere. In some cases, the problem is endemic and is expected to spread to other countries. Economic relationships exist that explain sympathetic effects. However, the most recent crises have also revealed liquidity effects that reverberate in other

impacted" markets, leading to price declines. In fact, the Asian financial crisis caused selling of Latin American equities.

Compared to developed capital markets, emerging markets have not only less liquidity but also limited liquidity. That is to say, compared to total market capitalization, there is less trading of shares. Liquidity measures the ability to sell (buy) a security and at what cost. Thus, the more trading days it takes to buy or sell a large position in a specific security, the less the liquidity. When widespread buying or selling pressures occur within a market, normal liquidity conditions are even more constrained. Following the Russian default, devaluation, and moratorium on debt repayments in August 1998, Russian debt securities did not trade in any significant volume for several weeks. Russian debt became illiquid.

An oft-cited humorous definition of emerging markets is "markets from which you cannot emerge in an emergency". Particularly during financial crises, emerging markets have few buyers and more sellers. Even when bids and offers are indicated during critical periods, there may be no buyers or sellers at these prices or they are restricted to small amounts. Contributing to the limited liquidity, many emerging market countries have not adopted laws that allow for corporate reorganization, especially bankruptcy. Thus, financial crises can lead to structural gridlock, hampering market-clearing activities.

Emerging market economies typically are not fully diversified across industry segments, hence neither are their capital markets. Thus, investment in a single emerging capital market inherently involves exposure to selected commodity or industry risks. For example, in 1998, Chile's economy suffered due to a copper price decline attributed to the Asian financial crisis, while weak oil prices have impacted Venezuela's financial market.

Most emerging markets do not yet offer derivative products (futures and options). The existence of derivatives can work in both directions, increasing or reducing volatility, depending on how investors use these instruments. Derivatives provide a source of market liquidity that can ease market pressure during times of crisis. Also, selling short is not allowed in some emerging markets, limiting brokers' ability to participate in market-clearing efforts.

The combination of small financial markets concentrated in a few industrial sectors or commodities, foreign investors with less tolerance for risk, limited daily trading volumes, and limited capacity to handle financial distress, makes emerging capital markets subject to greater volatility than more mature markets. Not much can be done to improve these conditions other than to wait for each emerging market to mature. Thus, pension funds in these countries need to diversify and invest abroad. Diversification across capital markets and asset classes is the best solution to controlling volatility inherent in emerging capital markets.

Model portfolios

Effective pension fund management requires that investment policies and guidelines, especially fiduciary standards, be specified in law and regulations. The volume of accumulated pension assets creates financial power that should not be subject to political interference. Codifying fiduciary standards in law gives managers the legal basis to challenge political interference. These standards must also guide asset managers' decisions in structuring and managing investment portfolios, i.e., for investment purposes and not for speculation. Regulations, on the other hand, capture more specific investment guidelines and traditionally take the form of specifying minimum and/or maximum allocations by asset class.

Another key policy guideline for emerging capital markets governs the handling of risk or volatility. Fiduciary standards for pension funds must take into account the high risks inherent in emerging market debt and equities. According to modern portfolio theory, the best way to control risk is to diversify across asset classes, especially classes not correlated with one another. For emerging capital markets, optimizing expected returns at reasonable risk implies significant investments in developed capital markets (e.g., U.S., Canada, Europe, Australia, and Far East). Capital market volatility has increased in recent years, making diversification across markets even more important.

Asset allocation planning provides a systematic and disciplined approach to structuring portfolios, incorporating long-term objectives and optimizing portfolios based on historical relationships. Here we look at five broad asset classes: developed market equities and bonds; emerging market equities and bonds; and cash equivalents, which figure here because many emerging bond markets have not developed beyond one-year maturities.

Appendix Chart A-1 and Table A-1 map indices for each asset class, showing historical returns and risk. Again, risk or volatility is the standard deviation of historical returns of the asset class in question. The correlations between asset classes (Table A-2) show that these have behaved differently, i.e., they are not highly correlated. As returns increase for each asset class, risk also tends to increase.

Before letting the mathematics of minimal mean variance determine optimal portfolios, a few constraints must be imposed. The purpose of asset allocation planning and pension system guidelines is to manage the volatility of participants' retirement accounts. Another policy objective is to foster development of domestic capital markets. Taking all objectives into account, minimum and maximum allocations by asset class can be incorporated into the optimization process. Table A-3 presents five alternative asset allocations that reflect increasing levels of risk. Table 4 interprets these results for three model portfolios.

Table 4
Model Portfolios by Age of Participant
(Percent Allocation by Asset Class)

Asset Class	Older	Middle Age	Younger
Emerging Market fixed income	10-30%	20-25%	20–25%
Foreign fixed income	50-70	40-50	15-35
Emerging Market equities	5-10	10-20	20-25
Foreign equities	10-15	10-20	15-30

The total allocation to fixed income securities is higher than would be appropriate for developed markets, where the target is typically 60% equity/40% bonds. This is because emerging market bonds have exhibited risk-return characteristics closer to emerging market equities (see Chart A-1).

Emerging market fixed income investments include government bonds and T-bills, corporate bonds, and time deposits in banks. (Note that the designation of emerging markets here is not restricted to the domestic market of one country but includes several countries.) In many emerging markets, maturities of government and, if available, corporate bonds do not exceed one year. This implies additional portfolio restrictions for domestic fixed income investment. Taking into account currency risk and credit quality, foreign fixed income allocations should exceed domestic allocations. The model portfolio may change as domestic capital markets evolve, but the foreign investment component should remain at no less than half the portfolio.

While an infinite number of portfolios could be constructed depending on participants' age and expected work

life, in order to minimize the administrative burden, participants could be offered a few model portfolios. However, it is not good public policy to place large portions of older workers' accumulated retirement savings at risk to market forces just prior to retirement. If a financial crisis occurred close to retirement, then the government might be obliged to subsidize retirement benefits. As a system matures, older workers will have accumulated significant amounts in their pension accounts. Total return objectives become less important than capital preservation. For example, Mix 1 in Table A-3 provides 3 % less expected return but only half the risk of Mix 5.

Charts A-3 to A-6 analyze the alternative mixes from several perspectives. Chart A-3 shows how risk varies with asset allocations. Chart A-4 shows expected returns for the alternative portfolios converging over longer periods of time. Back testing (or simulating portfolio performance over the recent past) shows, in particular, the impact of the 1994 downturn in financial markets. Taking into account the information provided by these charts, asset allocation planning gives policy makers valuable information for regulating pension fund investment.

Conclusions

Institutional investors need to be mindful of the amount of assets invested compared to a capital market's capacity to absorb new capital, i.e., supply versus demand for capital. Domestic pension funds can overwhelm a nascent capital market and actually generate poor investment performance for the participants. Capital markets are like a delicate ecology, particularly during their early evolutionary years, and too much capital could damage a market's development. Hence, asset allocations need to consider a capital market's capacity to absorb pension contributions efficiently.

The principal issue and conclusion is that investment policies need to be less restrictive with respect to investment of pension fund assets in foreign securities. Modern portfolio theory and practice in the structuring of optimal portfolios support this conclusion. The historical experience of numerous capital markets also suggests that pension assets should be diversified across many developed and emerging capital markets. Furthermore, fiduciary principles (where these are applied by law) require that investment policies be determined exclusively by beneficiaries' interests. Accordingly, policy makers need to be aware pension asset managers are legally obliged to diversify their portfolios across foreign capital markets.

Development of domestic institutional investors and markets is a commendable goal. Thus, requiring investment of a portion of pension fund assets in domestic capital markets is acceptable, so long as the restriction is not too constraining and fiduciary obligations can be met.

Investment of participants' assets needs to reflect general risk tolerances, as determined by age group. Portfolios should be invested more aggressively during the early years of a worker's career and with less volatile portfolio characteristics as workers near retirement age. Portfolios of workers on the verge of retirement should minimize risk.

VII. COMPARING PENSION REFORM OPTIONS – A SUMMARY

Pension reform and labor markets

That payroll taxes have a distortionary impact on various facets of labor supply is not disputed by any serious analyst. There is no way of taxing payrolls to fund Pillar 1's redistributive object that avoids

distorting resource allocation and impeding growth, hence the desirability of finding ways to finance this function through general taxation, preferably taxation of consumption (VAT, sales and excise taxes, etc.)

Leaving the issue of redistribution aside, there is everything to be said in favor of linking pension benefits closely to payroll contributions, and to facilitate this while retaining a PAYGO framework, notional defined contributions (NDCs) credited to individual interest-bearing accounts are a serious option.

As shown in section II, transition-economy PAYGO systems have faced (and in most cases are still facing) a severe financial squeeze marked by high and rising dependency ratios along with payroll tax evasion accompanying workers' shift from state enterprises into the informal sector. The outcome has been compression of pensions to some variant of the minimum wage or even below it. Under pressure from donors and/or their own finance ministries, the administrations in question are considering reform options.

A majority of them have yet to opt for the NDC approach or the more radical reform involved in substantially replacing PAYGO with a second pillar (see below). Instead, they are trying to the raise statutory retirement ages, reclassify workers from 'hazardous' occupations to nonpreferential job groups, tighten conditions for disability, and improve collection of payroll taxes.

The consensus in the World Bank appears to be that, in most countries, these parametric adjustments in PAYGO terms and conditions are not working. Occupational interest groups succeed in pressuring legislatures to retain loopholes, notably earlier statutory retirement at multiples of normal replacement ratios. Estonia's system still identifies 26 special job groups. Section II above cites Romania's 1993 White Paper, demonstrating the positive effect on pension benefits of later retirement ages, and calling for SRAs to be increased in six-month increments over a 13-year period. As of early 1999 legislation establishing later retirement ages was still pending in parliament. In some countries increased SRAs have been rolled back.

Hence a widely held view in the Bank that, in order to significantly improve cash flow, a pension reform must be packaged as revolutionary, at a minimum pursuing an NDC approach—strengthening the connection between years of work, contributions and pension benefits, and finding creative ways of inducing workers to perceive the connection.

Choosing between PAYGO and DC/FF (Pillar 2)

Notwithstanding the consensus that Chile has established a feasible model with the DC/FF approach, inspiring several other Latin American countries—notably Argentina, Bolivia, Mexico and Peru—in a similar direction, there is no consensus among experts that the majority of other developing and transition economies should follow it in the near future. Nor indeed is there a consensus among American experts that U.S. social security should be transformed from PAYGO into a funded DC system.

Many analysts associated with the World Bank, discerning an inherent tendency of PAYGO systems to become a severe drag on DTE labor markets while failing to ensure pensioners adequate income, believe that a balanced mix of Pillars 1 and 2 will meet the principal risks facing retirees while providing a strong impulse to financial market development. Moreover the funded DC approach is expected eventually to prove itself as a source of additional saving.

Clearly the cause of economic growth is not furthered by establishment of a DC pension scheme whose funds collapse through embezzlement, imprudent investments, or for other reasons. DTE policy makers are entitled to ask: if Pillar #2 is such a great idea, why have most OECD countries, including the U.S., not yet adopted it, and why do many serious analysts in those countries continue to oppose it?

Moreover, why are IMF writers much less enthusiastic about Pillar #2 than their World Bank counterparts? Recent Fund staff papers on pension reform express skepticism about the net benefit of shifting from PAYGO to a funded system. Some arguments advanced by Fund staff:[32]

- International evidence on the impact of pension funding on saving and capital formation is either inconclusive or suggests a positive impact that is at best modest. (Cf. Holzmann on Chile).
- Some variant of Pillar #1 will always be required to ensure minimum income support. As per capita income rises with economic growth, the share of the work force covered by Pillar #3, i.e., occupational and other voluntary schemes providing supplemental income, will also rise. It is questionable whether government should oblige the work force to contribute to a scheme designed to ensure an intermediate income, between the basic minimum but less than that derived from Pillar #3.
- The younger and "thinner" a capital market, and the weaker the supervisory infrastructure, the higher the risk of loss of pension assets through embezzlement or imprudent investment management, and the greater the expected political cost to government. Up to a certain point in the market's evolution, that cost might be viewed as outweighing the benefits of a DC/FF scheme.
- A DC/FF pillar complicates fiscal management. The fact that contributions are mandated by the state obliges the state, implicitly and therefore politically, to preserve the real value of the resulting investments. This implicitly enlarges the public sector, adding an additional implicit liability to the public debt and therefore to the potential burden on taxpayers.
- Establishing a direct link between contributions and retirement income—one objective of a Pillar #2—is indeed important in order to reduce the distortionary impact, on labor market incentives, of mandatory levies on earned income. However, this can also be achieved within the framework of a "well-formulated" Pillar #1, i.e., one with two major characteristics: (i) it is based on NDCs, and (ii) the redistributive element, comprising benefits that exceed recipients' contributions, is funded from general taxation.

A government considering what role to assign each of the three pillars, and how fast to implement a reform such as shifting from Pillar #1 to #2, will naturally weigh the political cost in the event a given pillar should collapse. Under any of the three pillars, retired and newly retiring workers' expectation of old age support can be vitiated in ways for which they may reasonably blame government. Consider the following scenarios:

1. (PAYGO) Funded by payroll taxes, over a period of years the state social insurance system provides pensions based on a legally established calculus (even though it may be opaque to the majority of workers). The pensions furnish roughly stable purchasing power. Then, within the space of a few years, the government, whether or not run by the same cast of characters, changes system parameters significantly—retirement ages, payroll taxes, benefits, etc.—in ways unfavorable to pensioners, or it debases the currency such that pension purchasing power falls significantly.
2. (Pillar #2) Workers and/or employers pay mandatory contributions into pension funds that are privately managed under state supervision. Then one or more funds undergo a significant drop in (real) value, through fraud or embezzlement, through a global financial crisis that depreciates supposedly blue-chip

investments, or through failure of investments at the risky end of the spectrum.

3. (Pillar #3) The same scenario occurs with private pension funds fed out of voluntary contributions ("voluntary" in the sense of not being mandated by government; an employer may deny its workers choice in the matter). Official responsibility is less than under (2), but participants can and do blame government for failing to enforce laws, nominally in effect, that forbid the behavior underlying the losses

Most transition economies have experienced scenario #1, and several have not yet succeeded in restoring public pensions to levels of the late 1980s. Many pension systems are still little more than crude social safety nets. Votes of disillusioned pensioners have contributed to rapid electoral turnover of governments, but more drastic political upset has been avoided largely because the economic turmoil—collapse of state enterprises, retrenchment, rampant inflation, plummeting purchasing power and government revenue—has affected the population as a whole, including the active labor force. Unhappy as they are, pensioners, and more importantly, their advocates understand that there is little "real" money to go around.

Varying mixes of ethnic conflict, macroeconomic mismanagement and massive corruption have landed some developing countries, along with beneficiaries of their fledgling pension systems, in similar situations. As long as memories of such outcomes linger, it will be difficult to induce workers to regard payroll contributions as anything but a tax, to be evaded to the extent possible. Thus, reducing Pillar #1's distortionary impact on the labor market presupposes a stable macroeconomic environment where workers have confidence in government's intent and capacity to maintain the real value of pensions.

For many reasons a country's political leadership may regard a collapse of Pillar #2 as the worst of the three scenarios, and thus #2 as the riskiest politically of the three pillars. Government has in effect taxed workers' salaries to fund the investments; if the contributors end up with little or no return or less in real terms than they put in, political support will be forthcoming for a demand that government accept responsibility for the loss of assets and for their replacement. Fulfilling such claims could have severe inflationary consequences.

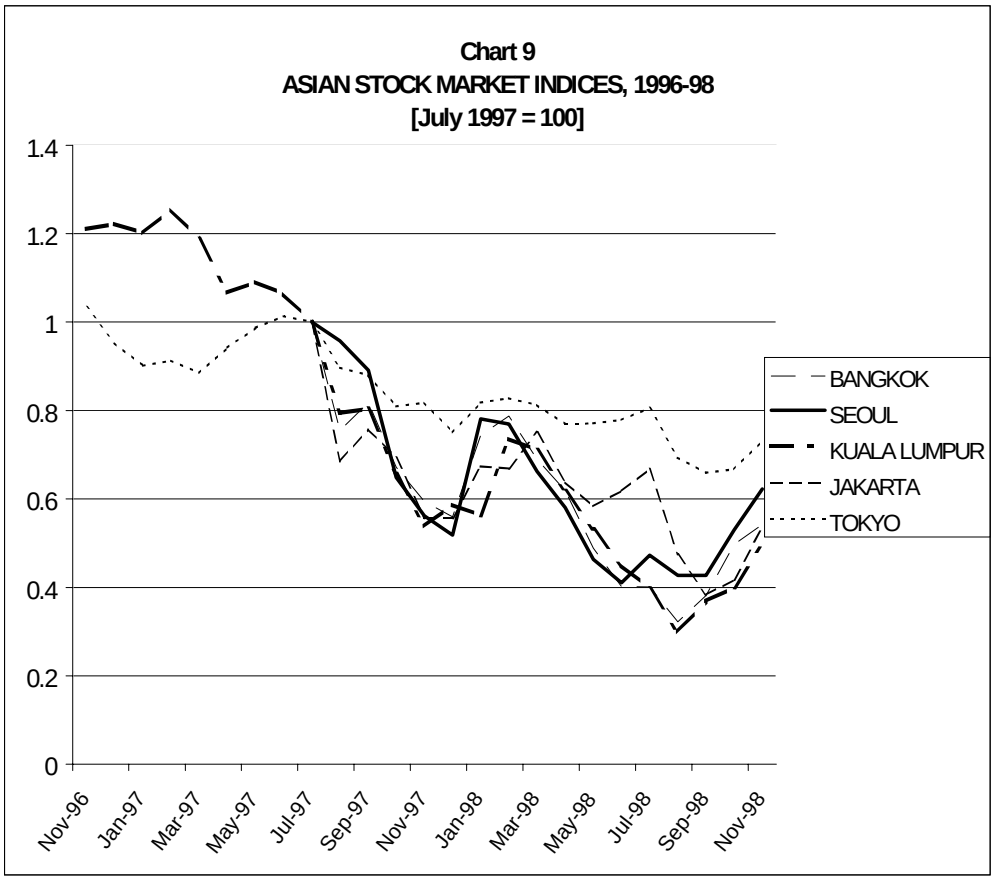
Inevitably, the recent experience of Asian stock markets is on the minds of governments considering whether to institute Pillar #2. Chart 9 (next page) plots indices of stock prices in Indonesia, Japan, Korea, Malaysia and Thailand since the beginning of the financial crisis in July 1997. While stock markets of most industrial countries have been on a strongly positive trend during the past decade, those markets have also experienced deep troughs in the past. According to a Brookings Institution study, had the U.S. instituted a DC/FF scheme in 1870, replacement rates (proportion replaced of earnings subject to Social Security tax) corresponding to annuities paid to pensioners retiring from 1910 on would have ranged all the way from 30% to 100%.

World Bank writers acknowledge that development of funded pillars (2 and 3) in a developing or transition economy (DTE) without strong and transparent capital markets requires a 'draconian' regulatory approach (Vittas 1998, Holzmann 1997). The pension reformer's worst nightmare is a scenario where substantial pension assets accumulated under state authority, whether *via* mandatory contributions or voluntary saving supposedly under protective regulation, are dissipated and/or stolen.

This raises the question: what measures can guarantee security of funded pension assets in a society with weak institutions? Most regulatory systems contain 'draconian' provisions against large-scale theft of public property, yet in many countries corrupt presidents, prime ministers and other political leaders have found their way

around the laws in question.

Partial funding of a PAYGO system. A defined benefit system is partially funded when payroll levies have exceeded current benefit payments, allowing the fund in question to amass a temporary surplus. In most countries, including the U.S., where the SSTF surplus represents close to two years' worth of benefits, it is invested in government securities. Many state governments in the U.S. operate defined benefit plans on a partially funded basis with the assets invested globally, i.e., in commercial as well as government securities.



Possibly the largest accumulated surplus in a DTE's PAYGO scheme is that of Egypt, whose Social Insurance System (SIS) holds assets equivalent to over ten years' worth of current annual liabilities and (as of 1995) one-third of GDP. For many years the SIS' entire surplus was invested in the state-run National Investment Bank, charged with financing public investment, where it earned interest well below market rates. During the 1980s the portfolio lost substantial real value at a nominal return of 5-6% with average annual inflation around 18%.[33]

In 1992 the nominal return was raised and has subsequently exceeded average annual inflation, which in turn has decreased with improved economic management in Egypt. Most recently, partly in response to World Bank recommendations, the SIS has entrusted a small share of its annual receipts—currently around 4%—to three portfolios selected and managed by private investment companies.
The key factors that have enabled the system to build this surplus are: (a) Egypt's youthful demographic structure—in 1990 only 6.4% of the population was over 60 years of age, compared with weighted averages of 18.2% for OECD countries and 15.3% for Eastern Europe/FSU; (b) average effective payroll contribution rates close to 40% in the formal sector; and (c) modest benefits. Clearly, the combination of (b) and (c) encourages few formal-sector workers and employers to view SIS pensions as offering a positive return on payroll levies.

In some transition economies, social insurance reform provides for adding FF/DC pillars to the existing PAYGO systems once the latter achieve fiscal balance. The timing of implementation and/or percentage of payroll to be allocated to the funded pillar are left for later decision. In this way the authorities have

flexibility to modify system parameters, including payroll levies and their allocation among pillars, in accordance with local and foreign experience.

To the extent a PAYGO surplus is not allocated to a funded pillar, it provides limited ability to finance current liabilities during periods when contributions fall below benefits. Partial funding can be compatible with a redistributive formula, an NDC set-up, or a formula that seeks to stimulate continued working for added benefits *sans* NDC record-keeping requirements. However, policy makers should avoid using the partially funded system to raise benefits above the system's actuarial capacity.

Administrative cost. Chile's pension reformers felt that making private fund managers compete to attract and manage workers' contributions would improve the funds' performance. Government licenses the funds (AFPs) and regulates the structure, but not level, of fees and charges.[34]

Valdés recently compared Chilean AFP commissions with those of privately managed pension funds in ten other countries (Table 5). Taking commissions as a percentage of wages subject to pension contributions, he obtained 2.11% for Chile. In other words, with a payroll deduction of 10.7% allocated to pensions, including 0.7% for disability and survivorship, workers pay management fees equal to approximately 20% of the monthly deposit in their pension accounts. As shown in Table 5, commissions are even higher in four other Latin American countries, 37% lower in Mexico, and substantially lower in four other countries, including Bolivia, where government has allowed only two AFPs to operate the DC/FF scheme. This comparative experience raises the possibility that an excessive number of AFPs, and excessive competition among them, may involve a high social cost. Certainly workers perceive the AFP commission as a tax, with its distortionary effect on the labor market. Chilean workers select their AFP, and can switch as frequently as every six months. AFP sales personnel receive bonuses for persuading workers to switch, and are reported to share these surreptitiously with the workers. In 1996, the number of switches equaled half the number of contributors.[35]

Table 5 - Administrative Commissions Charged by Privately Managed Pension Funds, 1997-98

Country (mo./yr.)	% of wages subject to pension contributions
Peru (May 1998)	3.14
Colombia (Mar., Sept. 1997)	2.80
Argentina (September 1997)	2.66
El Salvador (May 1998)	2.63
Chile (May 1998)	2.11
Uruguay (Mar., Dec. 1997)	2.06
Mexico (July 1997)	1.33
U.K. optional plan (1996)	0.79
Bolivia (May 1997)	0.53
Australia (1996)	0.28
Sweden (1999)	0.10-0.21

Investing pension contributions abroad. An alternative to full reliance on domestic regulatory machinery is to contract multinational fund managers who are subject to regulation by authorities in developed countries. Noting the volatility of individual country financial markets and the resulting desirability of diversification, Pillar #2 advocates such as Kotlikoff and Sachs recommend that mandatory pension contributions be entrusted to international managers to invest globally. They argue that an economy that accepts integration into the global economy, taking concomitant measures in regard to trade and domestic and foreign capital markets, can expect capital inflows (including retention of domestic private capital) that, over the medium term, will more than offset any outflow of pension funds.

This is an idea whose time will doubtless come, but at the moment it faces considerable resistance from DTE authorities. On the one hand, jealousy *vis-à-vis* national sovereignty has so far inhibited resort to

multinational fund managers, although some Latin American countries are permitting a limited role for foreign financial institutions in the pension fund industry (see Vestner, 1997).

Secondly, few legislative or executive policy makers in low-income countries are attracted to the argument that export of pension savings from their capital-poor economy will be offset by inflows of global funds seeking diversification. Bolivia's pension law is the most liberal in this respect, allowing the Central Bank to fix a limit of anywhere from 10 to 50% (of total portfolio) for foreign investments by pension funds.[36] Chile currently allows its pension funds to invest up to 12% of their assets outside the country, but at last count only about 6% of the money was so invested.[37]

Pillar 3

Finally, turning to Pillar #3, one presumes that authorities in every country have taken to heart the turmoil inflicted on Albania in 1997 when several pyramid schemes collapsed almost simultaneously, wiping out the savings of enough citizens to overturn the political apple cart. Since Pillar #3 is emerging at a faster or slower pace in almost every country, steadily gaining importance relative to Pillar #1 as a source of retirement income, establishment of an appropriate regulatory infrastructure cannot be postponed. Moreover, since Pillars #2 and #3 require essentially the same infrastructure, experience gained and lessons learned in supervising #3 are directly applicable in the event a government decides to take the plunge to a mandatory DC/FF scheme.

Conclusions

For the moment the fiscal pressures in most transition economies lead public finance (including PAYGO pension) managers to view the thought of an investible surplus of payroll contributions as pie in the sky. Their day-to-day concern is to reduce arrears and, once those are under control, to raise pensions above minimum subsistence levels (few countries are currently paying the majority of pensioners as much as $100/month). Growth in most countries will have to accelerate well above current levels before the managers can start weighing alternative means of financing the transition to a DC/FF scenario.

So far no 'Washington consensus', parallel to the prevailing doctrine on trade and foreign exchange markets, has emerged with respect to the comparative roles of PAYGO and mandatory DC old age pensions and their impact on economic growth. In this circumstance, there is much to be said against doctrinaire adherence to one or another of the schools of thought that are offering definitive prescriptions to DTE authorities, in lieu of assisting counterparts to access and understand the principal alternatives/models under discussion.
Above all, DTE authorities and stakeholders should be made to feel responsible for the choices they make on pension reform. The cause of economic growth with equity will not be served if some large pension funds are gutted ten years down the road.

VIII. CONCLUSIONS AND RECOMMENDATIONS FOR USAID INTERVENTION

As of 1999, USAID-supported interventions in one or another aspect of pension reform were reportedly underway in seven countries: Bulgaria, Egypt, Hungary, Kazakhstan, Macedonia, Poland and Ukraine. Discussions were underway with five more countries: Armenia, Georgia, Kyrgyzstan, Moldova and Romania. Eleven of these twelve countries are ex-centrally planned economies.

The most common focus of the interventions was establishment of "voluntary" Pillar 3 and/or its regulatory machinery. However in at least two countries, Kazakhstan and Ukraine, USAID-supported contractors were advising on the establishment of mandatory DC tiers (Pillar 2).

Apart from countries where USAID has intervened or may soon be invited to intervene directly, given the fiscal, monetary and thus macroeconomic implications of public pension strategy in any country, USAID economists cannot help but interest themselves in the ongoing debate. Murmurs of interest are reported from officials of more than one African country, where public pension systems are in their infancy (and most of those that exist have degenerated into channels for diversion of private savings into public waste.)

In this closing section we suggest a few key considerations, highlighted in the foregoing discussion, that might figure in USAID participation in these debates.

There is no generally agreed set of pension parameters that maximizes national welfare for a given country, and no foreign donor or adviser should claim that such is the case or that any technical assistance can determine an optimal solution. Closest to home, it is appropriate for USAID to point out that the U.S. itself is engaged in an intensive debate on pension policy, with no professional consensus or Congressional majority as yet in favor of introducing a second pillar to complement or replace our well-established Pillar No. 1. Even the supposed positive growth impact of the celebrated Chilean reform, substituting a second pillar for PAYGO since 1983, is ambiguous because of the many other measures accompanying that reform.

Every country must determine for itself how to resolve the trade-offs in pension policy. USAID should not allow itself to become associated, in the public consciousness or the minds of politicians, with advocacy of particular arrangements that further down the road could become controversial, in the extreme even cause a pension fund severe losses through embezzlement or excessive risk. The last thing we should want is to give country counterparts grounds for blaming USAID.

Notwithstanding these cautions, some policy initiatives act unambiguously to improve the efficiency and fairness of any pension system. We recommend that USAID promote those initiatives and stand ready to assist governments in implementing them. Some of these are the following:

- The redistributive element in a PAYGO pillar apart, the disincentive effect of pension contributions on work effort and participation in the formal sector can be countered by use of *Notional Defined Contributions*, whereby workers are credited with a contribution account, yielding a positive real return, even though eventual benefits are paid out of current contributions by the then active labor force.
- Partial funding of a PAYGO system provides flexibility to enhance work incentives by increasing benefits, while laying a basis for financing the transition to a second pillar.
- Establishment and expansion of Pillar No. 3 reflects the initiative of private citizens, with support from their employers, who seek greater pension assets than Pillars 1 or 2 would ensure them, both through supplemental saving and investments from which they expect higher returns. Inevitably, this pillar sooner or later will become important in every country, and USAID can assist strategically by helping build an appropriate regulatory infrastructure. USAID should not, however, substitute its judgment for that of client policy makers on the question of relative roles for each of the three pillars.
- Given current demographic trends, "standard" retirement ages below 65 years, other than in a strictly

limited set of occupations, are incompatible with system solvency at reasonable benefit levels. Current incentives for early retirement should therefore be eliminated and replaced with incentives to work longer, even beyond age 65, notably via offer of an attractive return on delayed benefits.
- Where a mandatory second pillar is introduced, and management entrusted to the private sector, government should protect workers through regulation aimed at ensuring adequate diversification of investments and limits on administration costs.
- Where any portion of pension assets is funded under any of the three pillars, government should refrain from arranging preferential access to the funds for public expenditure.
- Where a mandatory second pillar is introduced, and management entrusted to the private sector, investment portfolios need to be structured considering workers' age. For persons approaching retirement, the imperative is capital preservation, rather than maximizing return.

Focal points for USAID assistantce

We propose the following focal points for USAID technical assistance in pension reform:

- Individual accounts, with regular reporting to account holders, are indispensable to Pillars No. 2 and 3 and desirable for Pillar No. 1. USAID can provide strategic assistance by helping countries to install the information technology and management systems required to administer such accounts efficiently.
- In the interest both of promoting transparency and helping client governments design pension reform programs, USAID can help countries establish methodologies for projecting system finances under alternative scenarios. One such methodology deserving of application to more DTEs is generational accounting.

In individual country situations, USAID can assist strategically through measures such as the following to design and implement pension reform:

- Creation of pension reform working groups comprising policy makers and analysts, pension administrators, actuaries, financial experts, and representatives of stakeholders such as trade unions and associations of pensioners, to frame issues and shape the discussion.
- A public education campaign about pension reform and why it is needed.
- Drafting of pension reform legislation.
- Training in pension administration and management for public and private institutions.

Endnotes

[1] As an exception to its prohibition of emigration, Communist East Germany encouraged those of its pensioners with relatives in the west to pull up stakes and leave.
[2] This is neither the conventional old-age dependency ratio, since pensioners below the usual threshold of 60 or 65 years are included, while persons older than the threshold but not receiving pensions are excluded; nor the "system dependency ratio", since the denominator includes workers in the informal sector. The system dependency ratio equals d/c, which of course exceeds d since $c < 1$.
[3] It is not maintained here that any positive level of inflation is incompatible with a rate of growth corresponding to reasonable aspirations, but few if any DTEs of concern in this paper are not currently experiencing a level of inflation in excess of that conducive to maximum growth.
[4] Data on Ukraine are taken from Riboud and Chu (1997).
[5] The figure 0.72 is the product of c (= 0.6) times Riboud and Chu's estimated 1.2 for the system dependency ratio.
[6] World Bank (1994), p. 368. Countries relying primarily on universal flat or means-tested pensions are excluded from the computation.
[6] Projection by Social Security Administration actuaries based on current system parameters, cited in Feldstein (1998).
[7] Riboud and Chu (1997), p. 11.
[8] One of the authors (Gray) participated in the Bank mission in February 1997.
[9] Figures in this paragraph are taken from World Bank (1999).
[10] Calculated from country figures in *ibid.*
[11] Góra and Rutkowski (1998), p. 5.
[12] Calculated at the average 1993 exchange rate according to *International Financial Statistics.* Data for Romania are taken from Government of Romania, Ministry of Labor and Social Protection (MLSP - 1993).
[13] The number of surviving "baby boomers" in 1995 and 2005 was projected by the authors, using the demographic model underlying MLSP (1993) and applying, to those cohorts, average birth-year specific survival rates recorded in 1991 and projected through 2005.
[14] Using analogous methodology to project the participation of "baby-boomers" in the contributing workforce (see preceding footnote), it is estimated that system dependency in 2005 would be 11 points higher without them, i.e., 0.83 instead of the MLSP-projected 0.72.
[15] Feldstein and Samwick 1997, p. 18, advance this broad definition of labor supply.
[16] James 1997a, p. 40.
[17] James 1997a, pp. 23-4.
[18] Algebraically, if the gross wage paid by employers is denoted by w_g and the wage received by workers, net of tax, by w_n, the labor demand function illustrated in Chart 2 is given by $Dem = 20{,}000 - 100 \cdot w_g$ and the supply function by $Supp = 100 \cdot w_n$. Employment is given by $Dem = 20{,}000 - 100 \cdot 110 = Supp = 100 \cdot 90 = 9{,}000$.
[19] With $w_g = 120$ and $w_n = 80$, employment is given by $Dem = 20{,}000 - 100 \cdot 120 = Supp = 100 \cdot 8{,}000 = 8{,}000$.
[20] See Schwarz and Valdés-Prieto, 1998.
[21] Fox, Palmer and McIsaac, 1996, p. 7.
[22] Referring back to endnotes 18 and 19, imposition of a social insurance contribution of 33.3% establishes the relationship $w_n = 0.667 w_g$. However, workers now regard half of the contribution as a wage supplement, so labor supply reacts as though the coefficient were $0.667 + 1/2 \cdot 0.333 = 0.833$ instead of only 0.667. We now have $Supp = 100(0.833 \cdot w_g) = 83.3 w_g$. Solving the employment equation $Dem =$

20,000 - 100·w_g = *Supp* = 83.3· w_g, we obtain w_g = 109.1 and employment = 9,100 or 9.1 million.
[23] Figures for Chile in this section are taken from Torche and Wagner 1997.
[24] The 21.5% comprises 10% for old-age pensions, 0.7% for disability and survivorship, 2.3% for AFP commissions, 7.0% for health insurance, and 1.5% for work-related accidents and illness.
[25] Chand and Jaeger 1996, p. 27. This excludes projected liabilities associated with future generations of workers under the current system; including those raises the gross liability to 206% of 1995 GDP.
[26] *A Summary of the 1998 Annual Social Security and Medicare Trust Fund Reports*, Social Security Administration, 1998 (SSA website).
[27] Feldstein and Samwick (1998) assume that privatization and funding of social security would induce Congress and the executive branch to allocate the looming budget surplus, projected to last until 2015, to helping fund the transition from PAYGO. Conversely, in the absence of privatization and funding, they assume the surplus will be dissipated in tax cuts or incremental expenditure that does not augment U.S. national saving.
[28]The author witnessed this process at close hand as a consultant to the Kenya Treasury during the 1980s.
[29] With one minor exception the zero option generates maximum values of all three parameters.
[30] Oral presentation to HIID/Government of Bulgaria workshop, Cambridge, Mass., February 1997.
[31] Lüders 1999, p. 5.
[32] Cf. Chand and Jaeger, 1996; Mackenzie, Gerson and Cuevas, 1997; de Castello Branco, 1998; Hemming, 1998; Heller, 1998.
[33] Data on Egypt are taken from Gray (1999), p. 3.
[34] Bateman 1998, p. 24.
[35] Bateman, 1998, ibid. This does not mean that half the participants switched, since some switched twice in the year.
[36] The issue is not yet operational because the pension funds have been required initially to place most of their assets in treasury bonds, in order to finance the transition from PAYGO.
[37] Taking account of Bulgaria's reluctance to invest public pension contributions out of the country, Kotlikoff, in a proposal submitted to that country's government in January 1999, proposed that transition payments on account of existing pension liabilities be financed by selling bonds to the World Bank, IMF, and European Bank for Reconstruction and Development, thus generating a compensating inflow of foreign capital. See Kotlikoff 1999.

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APPENDIX A:

TABLES AND CHARTS

Table A-1

Asset Class Assumptions

Asset Class	Proxy	Return	Risk
Cash Equivalents	SOLB World Money $	8.21%	8.31%
Emerging Mkt Bonds	JPM Emrg Mkt Bond	17.86	17.26
Global Bonds	SOLB Curr-Hgd WrldBd	9.55	4.46
Emerging Mkt Equity	MSCI Emerg Free-$	14.94	26.88
Global Equity	MSCI World Index-$	11.37	14.98

Table A-2

Correlation between Asset Classes

Asset Class	(1)	(2)	(3)	(4)	(5)
(1) Cash Equivalents	1.00	0.02	0.20	-0.06	-0.03
(2) Emerging Mkt Bonds	0.02	1.00	0.30	0.17	0.34
(3) Global Bonds	0.20	0.30	1.00	0.05	0.27
(4) Emerging Mkt Equity	-0.06	0.17	0.05	1.00	0.31
(5) Global Equity	-0.03	0.34	0.27	0.31	1.00

Table A-3

Alternative Optimal Portfolios

Percent Allocation by Asset Class

Asset Class	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Cash Equivalents	20.00%	7.38%	2.00%	2.00%	2.00%
Emerging Mkt Bonds	9.71	22.49	25.00	25.00	25.00
Global Bonds	50.00	50.00	45.15	35.35	17.16
Emerging Mkt Equity	4.13	10.13	17.85	25.00	25.00
Global Equity	16.15	10.00	10.00	12.65	30.84
Return	10.61%	12.05%	12.75%	13.18%	13.51%
Std Deviation	5.41%	6.94%	8.46%	9.99%	11.52%
Sharpe Ratio	1.96	1.74	1.51	1.32	1.17

Chart A-1
Risk - Return Characteristics by Asset Class

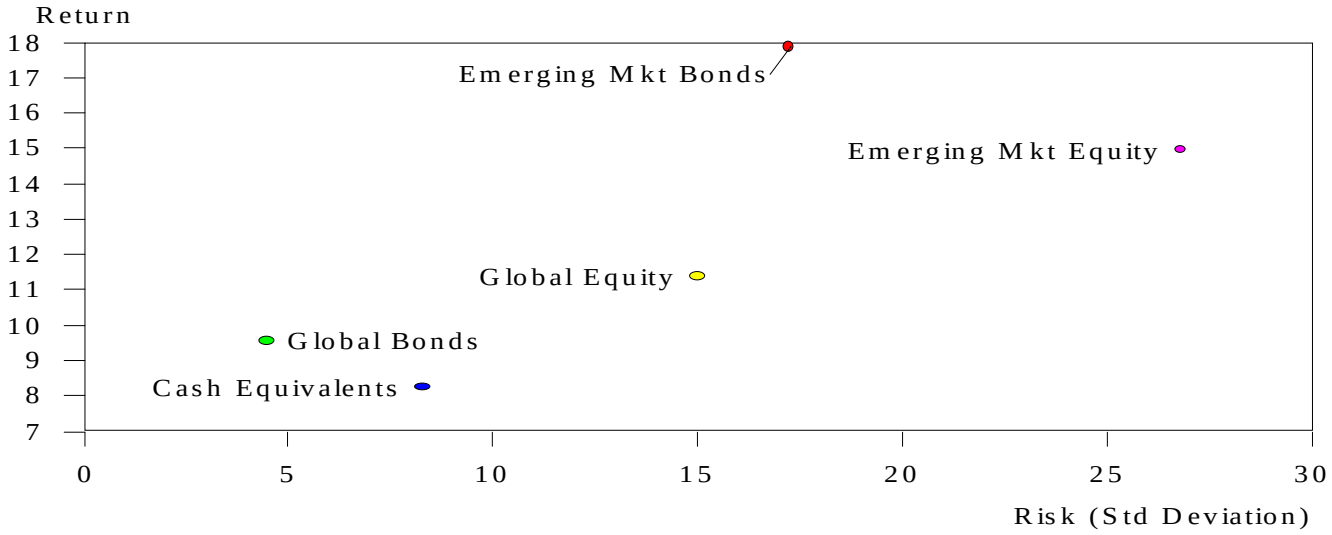

Chart A-2: Efficient Frontier

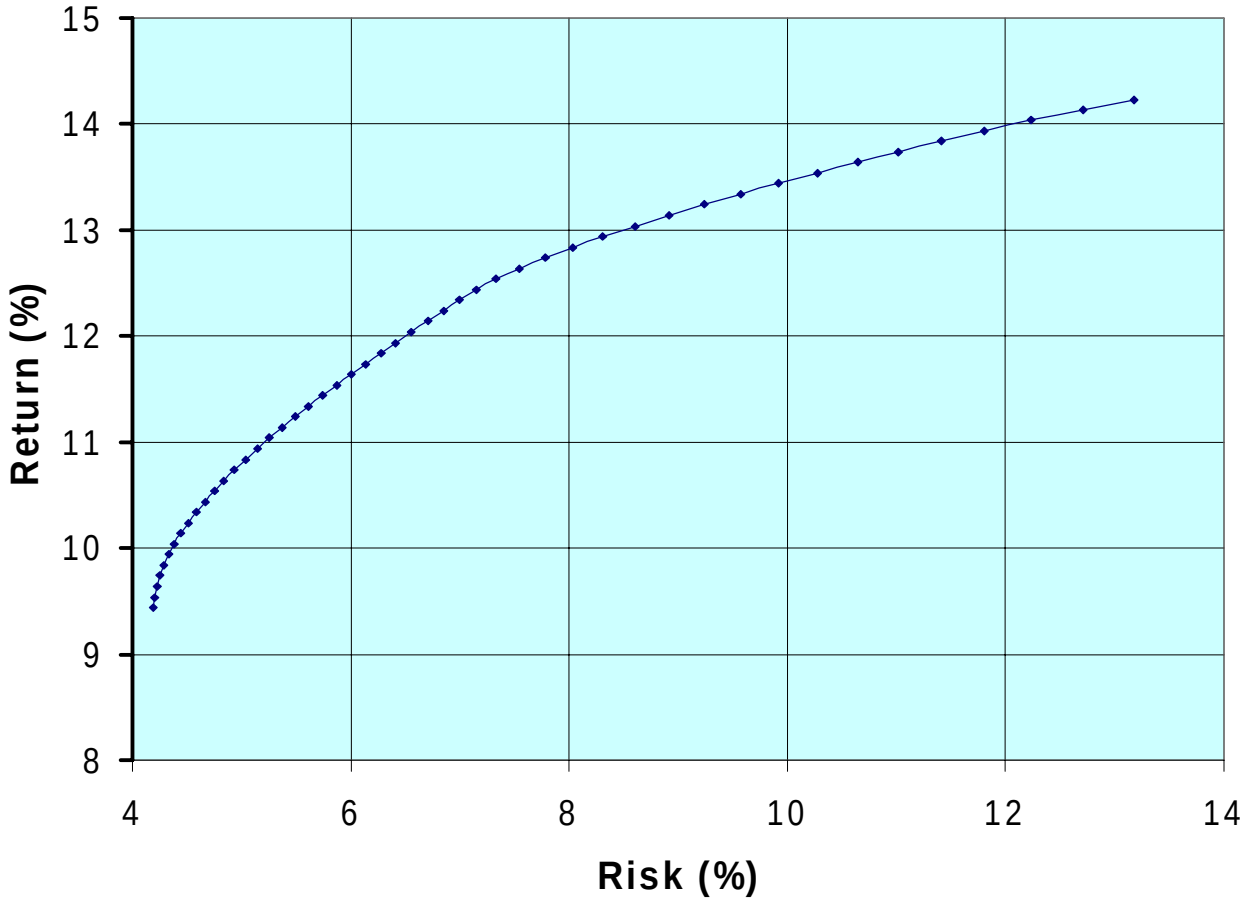

Chart A-3: Allocation vs. Risk

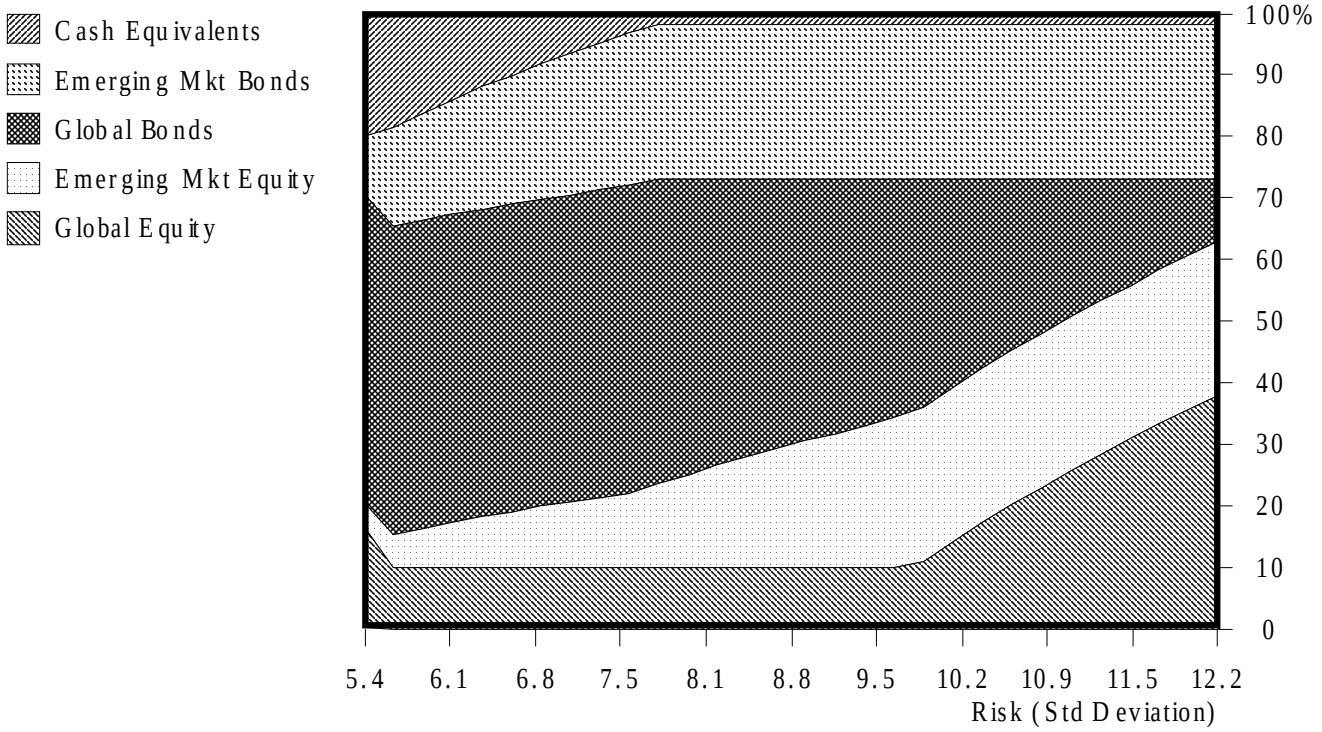

Chart A-4
Distribution of Annual Returns

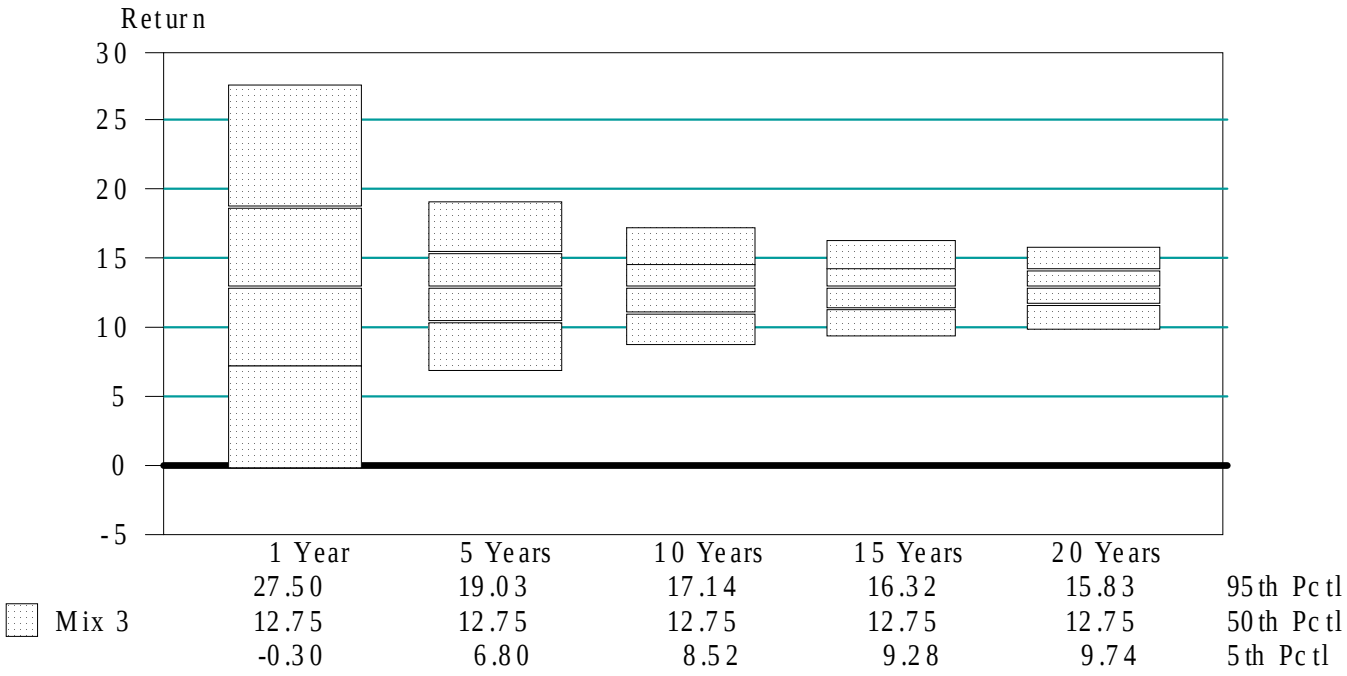

Chart A-5

Back Test - Cumulative Return

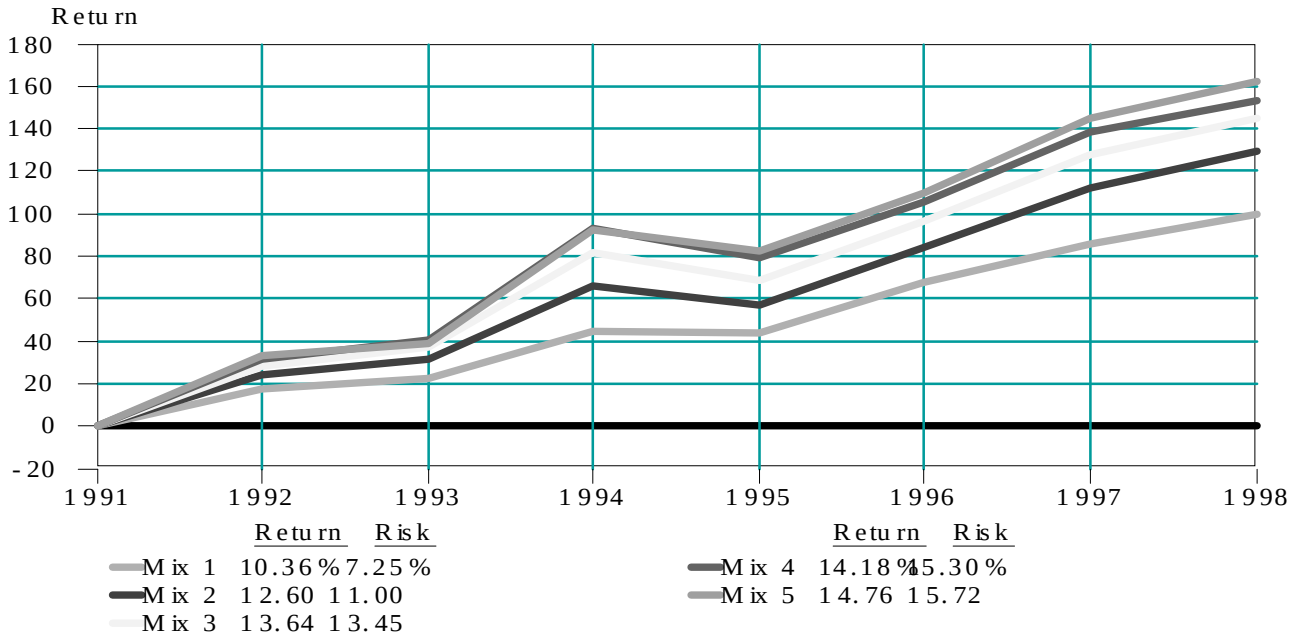

Chart A-6

Back Test of Alternative Allocations

Year by Year