

1. Introduction

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Over the past few decades there has been a global move towards private provision for retirement through individual defined contribution plans, at the expense of publicly provided and employer-sponsored defined benefit arrangements. As a consequence, workers and retirees are increasingly exposed to uncertainties in financial, economic and labour markets. These uncertainties have materialized in the form of extreme stock price volatility, discontinuous labour market participation, regulatory failure and macroeconomic instability. The broad aim of this book is to identify these potentially scary aspects of pre-funded private provision for retirement, relate specific country experiences and offer possible solutions. Overall, private funded retirement income arrangements are seen to be resilient to a wide range of scary market scenarios.

RETIREMENT INCOME TRENDS AROUND THE WORLD

In developed and less developed countries alike there is an ongoing trend towards greater emphasis on private retirement income arrangements. In the developed world, this has been largely due to financing shortfalls associated with generous, less than fully funded, public pensions in the face of population ageing (OECD 2005a; Commission to Strengthen Social Security 2001; Feldstein 2005; Takayama 1998). Also important has been the goal to increase living standards of the elderly (Bateman and Piggott 1997). In the developing world the trend has been driven by a slightly different set of factors, including rapid industrialization or a desire to increase economic growth, combined with inadequate, low coverage or corrupt formal retirement income arrangements (World Bank 1994; Holzmann and Hinz 2005).

Chile was the first country to make funded private arrangements the dominant form of retirement income provision when the pay-as-you-go (PAYG) public pension was 'privatized' in 1981. This marked the beginning of a trend which continues to this day. Switzerland and Australia followed in the mid-1980s, with the introduction of mandatory funded private arrangements to supplement their public pension schemes. Voluntary participation in private

pensions increased in the UK with the introduction of ‘contracting out’ in the mid-1980s, whereby many defined benefit public pensions were converted into private defined contribution arrangements; and in the USA and Canada, private pension coverage increased to around 50 per cent of the workforce following the introduction of tax preference for Individual Retirement Accounts (IRAs), 401(k)s (an employer sponsored defined contribution pension plan named after section 401k of the Internal Revenue Code subsection that regulates it) and Registered Retirement Savings Plans (RRSPs).

Over the past two decades, funded private retirement income arrangements have also gained prominence across most of Latin America, many OECD countries (including Sweden and Poland), a number of transition economies (including Hungary and Kazakhstan), Asia (including Hong Kong, South Korea and Japan) and many developing economies (see Holzmann and Hinz 2005; Bateman et al. 2001).¹ In the USA there has been an ongoing debate about the pros and cons of the ‘privatization of social security’. Despite numerous proposals and reports, legislative action is yet to be taken (see Diamond and Orszag 2004; Commission to Strengthen Social Security 2001; Feldstein 2005).

VULNERABILITY TO SCARY MARKETS

Under privately provided retirement incomes based on defined contributions, income in retirement is directly related to the size of the periodic contributions, the net rate of return on these contributions and the length of the contributory period. However, when translating this simple formula into practice, many more variables come into play. These include the length and continuity of labour force participation (which affects the ability to make contributions and the timing of these contributions), the amount of the periodic net contribution (which may be affected by statutory minimum requirements, the capacity to make voluntary contributions and the existence of incentives for voluntary contributions, taxes on contributions, wages growth and any contribution or entry fees), and net returns (influenced by asset allocation, asset returns, taxation of investment income and capital gains, investment fees, administrative expenses, market structure, governance and the regulatory framework).

As a result, private provision for retirement is particularly vulnerable to scary markets in the form of fluctuations in economic, financial and labour markets, long-term socioeconomic and demographic trends, market failures in the retirement saving industry, and the ability of governments to adequately regulate this industry.

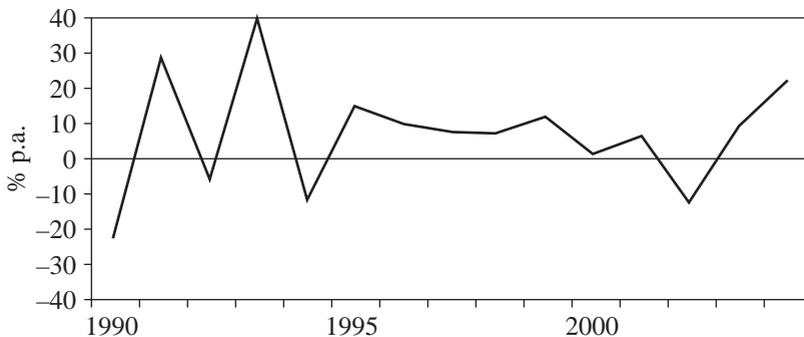
Recent economic, financial and labour market indicators, for five of the

countries examined in the following chapters, are summarized in Table 1.1. The indicators examined are GDP (gross domestic product) as a measure of macroeconomic performance and stability, CPI (consumer price index) as a measure of the purchasing power of retirement incomes, interest rates and share price index movements as indicators of asset returns, and the unemployment rate as an indicator of the state of the labour market.

Macroeconomic stability, as proxied by GDP growth rates, has been only moderately scary over the past 15 years for most of the countries examined. In Australia, real GDP growth ranged from a low of -0.6 per cent per annum in 1991 to a high of 5.3 per cent per annum in 1994, while in Brazil, the annual GDP growth rates have ranged from a low of 4.8 per cent in 1990 to a high of 5.9 per cent in 1994. However, movement in the CPI, the indicator responsible for determining the real value or purchasing power of retirement savings, appears scarier, ranging from a high of 2948 per cent per annum in Brazil in 1990, to a low of -1.0 per cent per annum in Japan in 2002. All countries considered here show some variation in rates of unemployment, moderate variation in interest rates, and extreme variation in share price indexes. The greatest variation has been experienced by Brazil for all three of these indicators.

To provide an indication of scary stock markets, annual share price index movements in Australia, Japan, the UK and the USA are summarized in Figures 1.1 to 1.4.

Another potentially scary phenomenon is the demographic trend of population ageing. Table 1.2 shows the increase in the old-age dependency ratios across all five exemplar countries. We know that an ageing population will lead to a smaller future labour force and raise questions about the ability of



Sources: ASX 200, Reserve Bank of Australia Bulletin, various issues.

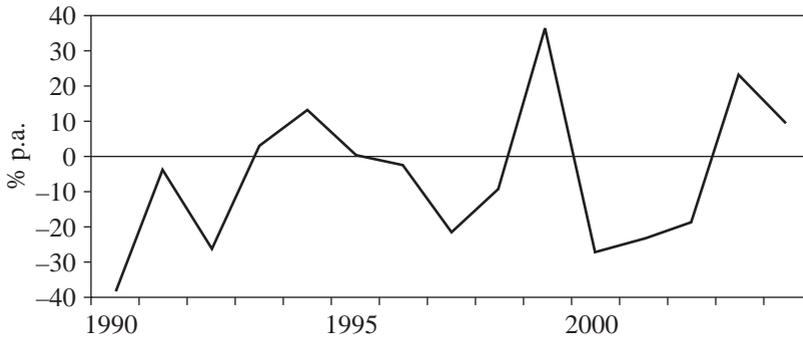
Table 1.1 Scary economic and financial conditions (1990–2004)

	Australia	Brazil	Japan	UK	USA
GDP% p.a.					
Highest (year)	5.3 (1998)	5.9 (1994)	5.3 (1990)	4.0 (2000)	4.5 (1997)
Lowest (year)	-0.6 (1991)	-4.2 (1990)	-0.3 (2002)	-1.4 (1991)	-0.2 (1991)
CPI % p.a.					
Highest (year)	7.3 (1990)	2948 (1990)	-3.2 (1991)	7.5 (1991)	5.4 (1990)
Lowest (year)	0.3 (1997)	3.2 (1998)	-1.0 (2002)	0.8 (2000)	1.5 (1998)
Unemployment %					
Highest (year)	10.5 (1992)	3.7 (1990)	5.4 (2002)	10.4 (1993)	7.5 (1992)
Lowst (year)	5.5 (2004)	12.3 (1993)	2.1 (1991)	4.8 (2004)	4.0 (2000)
Interest rates % p.a.*					
Highest (year)	14.2 (1990)	49.9 (1995)	7.4 (1990)	12.1 (1990)	7.7 (1990)
Lowest (year)	4.8 (2001)	17.1 (2004)	1.0 (2003)	4.2 (2003)	1.0 (2003)
Share price % yr on yr**					
Highest (year)	40.3 (1993)	3275 (1993)	34.8 (1999)	17.2 (1993)	33.5 (1995)
Lowest (year)	-22.4 (2003)	-17.6 (2002)	-38.7 (1990)	-24.5 (2002)	-23.4 (2002)

Notes:

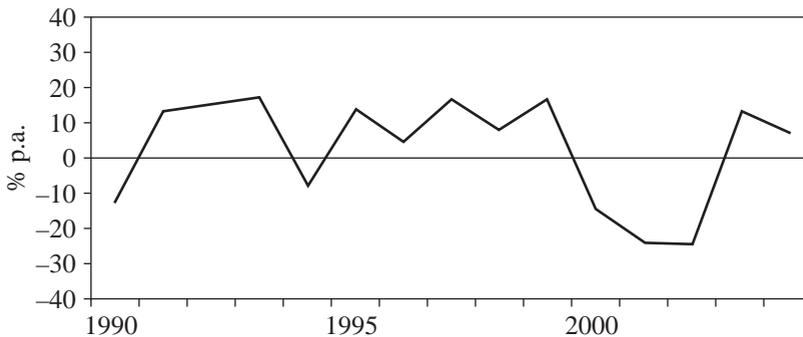
* Interest rates: Australia (Treasury Bills), Brazil (money market rate), Japan (government bond), UK (government bond, short term), US (Treasury Bill).
 ** Share price index: Australia (S&P/ASX 200), Brazil (industrial share price index), Japan (Nikkei-225, until 2001; thereafter TOPIX), UK (FT Industrial Ordinary until 2001; thereafter FTSE 100), USA (Dow Jones Industrial until 2001; thereafter S&P 500).

Source: International Monetary Fund, *International Financial Statistics* at <http://ifs.apdi.net/imf/about.asp> and International Monetary Fund, *World Economic Outlook* at <http://www.imf.org/external/pubs/ft/weo/weorepts.htm>.



Sources: Nikkei-225 (to 2001); thereafter TOPIX, *Reserve Bank of Australia Bulletin*, various issues.

Figure 1.2 Japan share price index, per cent per annum

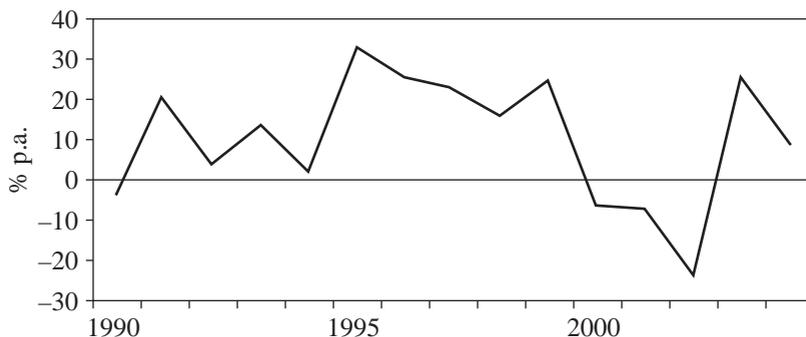


Sources: FT Industrial Ordinary (to 2001); thereafter FTSE 100, *Reserve Bank of Australia Bulletin*, various issues.

Figure 1.3 UK share price index, per cent per annum

governments to fund public pensions. However, we are less certain about the long-term implications for financial markets and asset returns (Disney 1996; Poterba 2001). Some empirical studies suggest that equity prices will weaken at the expense of bond prices once the baby boomers in the major OECD economies move from accumulation to decumulation. However, it is also argued that this will be offset by increased saving elsewhere in the world.

Other potentially scary aspects of a greater reliance on private provision for retirement include the increased importance of a sound regulatory structure. It is possible that too little or inappropriate regulation may increase the



Sources: US Dow Jones Industrial (to 2001); thereafter S&P 500, *Reserve Bank of Australia Bulletin*, various issues.

Figure 1.4 USA share price index, per cent per annum

Table 1.2 Scary population trends – old age dependency ratios

	Old-age dependency ratio			Very-old persons ratio		
	2000 %	2005 %	Increase	2000 %	2005 %	Increase
Australia	20.4	47.0	26.6	23.3	34.0	10.7
Japan	27.7	64.5	36.9	21.9	42.2	20.3
UK	26.6	45.3	18.7	25.0	37.3	12.3
USA	21.7	37.9	16.2	26.5	36.1	9.6

Source: OECD (2003), Table 1.

likelihood of institutional failure, while over-regulation may force down net rates of return.

Finally, an important implication of the trend towards private defined contribution pension plans is the shift in risk bearing from the government and employers to individuals. Therefore, to the extent that markets are scary, the impact is felt directly by workers and retirees.

STRUCTURE OF THE BOOK

The contributory chapters to this book address a broad range of scary and potentially scary scenarios. The first three substantive chapters focus on asset

allocation. The perceptions that equity markets are too volatile to be included in retirement portfolios and that fixed interest assets are low risk are challenged, and the role of index funds in lifecycle investment portfolios in an environment of heightened financial market uncertainty is explored. The next two chapters turn to labour markets. Two issues are considered – the impact of scary financial markets on labour supply, and the impact of scary labour markets on retirement income adequacy. Chapters 7 and 8 consider scary financial markets during decumulation. Two quite different solutions are offered to the problem of ensuring adequate, yet smooth, retirement income streams. Chapter 9 follows with a discussion of the impact of corporate collapse and regulatory failure on employer-sponsored pensions, while Chapter 10 tackles the issue of fundamental pension reform in a depressed economy with a rapidly ageing population. Finally, Chapter 11 discusses pension reform in the context of extreme macroeconomic and financial volatility. The author concludes with the observation that the proposed regulatory reforms are almost as scary as the underlying macroeconomic conditions.

Overall, the contributory chapters consider a broad range of scary scenarios for a number of representative countries, and offer many novel solutions.

Chapter 2, by Bewley, Ingram, Livera and Thompson, is motivated by the perception that current equity market returns are more volatile now than in the past and that this may be leading retirees and their advisers to steer clear of equities. The main question under investigation is whether the unusual and unprecedented events of the past few decades, such as the Asian financial crisis or the threats of terrorism, have caused a permanent increase in the volatility of equity markets. This leads the authors to question the right mix between risky and riskless investments in retirement.

Using statistical analysis and simulation methods, Bewley et al. find that, when considered over the long term, there has not been an upward shift in market volatility of Australian equities. In fact, Sydney residential property is found to have a much higher probability of suffering losses over the short term than Australian equities. However, the analysis does uncover increased volatility in individual stocks in the period since the 1997 Asian financial crisis, which suggests the need for effective diversification strategies. The authors argue that equities are an essential component of an investment portfolio for both retirement savers and retirees, and conclude that the scariest thing about investing for retirement is not the risk associated with equities, but the risk of not including equities in an investment portfolio.

The inclusion of fixed interest in a retirement savings portfolio is considered by Geoffrey Brianton in Chapter 3. Although fixed interest portfolios have been considered a ‘safe’ asset, the number of risks in a typical one has increased over the past decade, due to an increase in corporate debt relative to government borrowing. As a result, fixed interest has shifted from being

invested predominantly in domestic and government-issued securities to portfolios that have a global spread of investments and an increasing reliance on credit. This has occurred in the context of more integrated international capital markets, a move to a low-inflation global economy and a withdrawal from the debt markets by many government issuers. Consequently, the standard measures of duration and convexity are no longer sufficient to measure and control risk in portfolios that contain exposure to a number of yield curves, currency risk and credit risk.

In the light of these developments, Brianton argues that while the changes have meant that the number of investment risks in a typical bond portfolio has increased significantly, this does not axiomatically translate into riskier portfolios. Provided risks are understood and well managed, global bond portfolios do not carry greater risks. The chapter concludes by highlighting the uncertainty surrounding the retirement of the baby boomers and whether they will shift their wealth to bonds as they move from accumulation to consumption. The impact this may have on future asset prices has been keenly debated (see OECD 2005b).

A partial solution to actual or perceived increases in the risks associated with equities or fixed interest is the subject of Chapter 4. Here David Gallagher discusses the use of index funds as a low-cost alternative to direct investment in equities and fixed interest, particularly in times of heightened financial market uncertainty. He notes that this trend has arisen for a number of reasons, including the empirical research which has highlighted the overall underperformance of active managers – in both conventional and scary markets. As a result, pension funds and retirement savers alike are becoming increasingly sensitive to active managers being unable to generate at least the returns of the underlying indexes across asset classes. This chapter provides a background to the rationale for indexing, discusses the alternative approaches to indexing and evaluates the various challenges facing index portfolio managers.

The associated issue of scary labour markets is introduced in Chapters 5 and 6. In Chapter 5, Mitchell, Phillips, Au and McCarthy consider the effect of scary labour markets, in the form of earnings variability, on people's preparedness for retirement. The metric considered is accumulated wealth at retirement and the reference economy is the USA. The authors note that past research has demonstrated that the average US household on the verge of retirement would need to save substantially more in order to preserve consumption in old age. And, while several socioeconomic factors have been suggested that might explain the shortfalls, the prior studies have not assessed the role of earnings variability over the lifetime as a potential explanation for poor retirement prospects.

To address this issue, Mitchell et al. evaluate the effect of earnings variability on retirement wealth using information supplied by respondents to the

Health and Retirement Study (HRS). This is a rich and nationally representative dataset on Americans on the verge of retirement, and is matched with administrative records on lifetime earnings. Particular findings include that workers with higher lifetime earnings levels experience lower earnings variability, and that retirement wealth is more sensitive to earnings variability for non-married individuals than for married individuals. Overall, earnings variability is found to have interesting and powerful effects on retirement assets, being detrimental to both short-term retirement saving and wellbeing in retirement.

In Chapter 6, Gardner and Orszag investigate how older workers actually responded to the scary equity markets in the period 1999–2002. Over this period, the FTSE All-Share Index in the UK declined by 42 per cent, the S&P 500 in the USA declined by 38 per cent, and stock prices in Europe declined by around 40 per cent and in Hong Kong by over 40 per cent. While such declines in stock markets were not unprecedented, this time was a little different because, more than ever before, equity markets were being used to finance retirement.

Bodie et al. (1992) were the first to examine retirement decisions jointly with asset allocation. This initial work has been extended over the past decade and the main predictions of the academic literature include that: the proportion of assets invested in equities should increase with the ratio of human capital to financial capital; individuals with flexible retirement dates should hold more assets in equities; a decline in financial wealth should induce more work; and socioeconomic variables are also important drivers of retirement decisions.

Using a survey of 4500 individuals in the UK who were approaching retirement, or who were semi-retired or retired, Gardner and Orszag conducted a natural experiment to see how the changes in world equity markets affected their retirement plans and asset allocations.

Nearly 50 per cent of individuals reported that their savings had ‘declined a lot’ and around 20 per cent that they had ‘declined a little’. The study indicated that 25 per cent of older working individuals had pushed backward their retirement date, compared to their plans two years previously. This was somewhat surprising since, particularly among this cohort, defined contribution pension plans are not the dominant form of private pension provision.

On the other hand, for those individuals who had already retired, there was little correlation between the degree of loss and the likelihood of returning to work. This provides some support to the theories in which the retirement decision is modelled as irreversible.

However, Gardner and Orszag also found that individuals who have more control over their retirement date are no more likely to have been more exposed to the equity market, which is in contrast to predictions about asset allocation in Bodie et al. (1992) referred to earlier.

The next two chapters turn to the impact of scary markets in the retirement/decumulation phase. Two different approaches to protect retirement income streams against volatile asset returns are offered. In Chapter 7, Thorp, Kingston and Bateman use financial engineering in the form of a consumption floor to address the question of optimal decumulation and asset allocation of retirement savings. In Chapter 8 Anthony Asher develops a smoothing algorithm using a set of forward contracts of different durations in order to smooth benefit payments in retirement.

The analysis by Thorp et al. in Chapter 7 creates a crucial link between the policy-based analysis of retirement income streams which is frequently centred on a desired subsistence consumption path or replacement rate, and the theoretical analysis which depends on assumptions about agents' preferences for consumption and risk. The conventional treatment of these preferences is via the constant relative risk aversion (CRRA) model, which implicitly sets this consumption floor to zero. Thorp et al. take an alternative view that utility from consumption is better measured relative to some reference level, and consider risk management in terms of protecting a consumption floor using a HARA (hyperbolic absolute risk aversion) utility formulation. Maintaining a consumption floor, while allowing for exposure to volatile returns once that consumption floor is ensured, is a way of protecting retirement savings against volatile asset markets.

Using simulations and numerical experiments calibrated to the Australian retirement income arrangements, Thorp et al. demonstrate that to ensure a constant subsistence rate of consumption over a reasonably long retirement, annuitants need more conservative portfolio strategies than are commonly advised. On the basis of their results, Thorp et al. note that since protecting oneself from longevity and investment risk places such stringent restrictions on portfolio allocations and consumption paths, the simulations could be used to make a *prima facie* case for annuitization. They then investigate the optimum time between retirement and annuitization.

Chapter 8 continues the theme of incomes in retirement with a discussion of smoothing algorithms. The context here is that with the switch from defined benefit to defined contribution schemes, investment risk has been transferred from sponsor to member and benefits paid are not necessarily predictable or smooth. The risks are relevant both before and in retirement: before retirement, as asset price volatility affects the retirement accumulation; and after retirement, as asset price volatility directly transfers to retirement income volatility. A strategy favoured by most defined contribution plans and their members is to use asset diversification in order to provide an optimum mix of security, inflation protection and participation in the equity premium. This chapter discusses an algorithm which works by smoothing volatile investment returns using a set of forward contracts of different durations to produce a

more acceptable income flow. Under the proposed algorithm, the smoothed return is similar to that obtained by ‘lifestyle’ disinvesting from equities, and buying zero-coupon fixed interest assets as maturity approaches. However, the approach provides for gearing in the initial years (which would allow recapture of the equity premium) and is likely to result in lower costs, as the transactions would be internal to the fund.

The focus now moves from scary economic, financial and labour markets to the implications of corporate collapse and regulatory failure. In Chapter 9, Shauna Ferris discusses of collapse of Ansett, then Australia’s largest domestic airline, and the impact this had on the superannuation entitlements of Ansett employees.

Most Ansett employees had belonged to a defined benefit fund, the Ground Staff Superannuation Plan. Before the collapse of Ansett this plan had reported to members that it had assets of about \$580 million. However, only a few months later, when Ansett collapsed in September 2001, the trustees announced a shortfall of more than \$100 million. The trustees sought additional funds from the Ansett administrators to cover the benefit liabilities, but the administrators denied the liability and fought to avoid making any payment to the fund. Unfortunately, the law was not clear and the case spent two years in court, with legal costs in excess of \$6 million. In the end, a negotiated settlement was reached in which the fund received nothing and the members were left with a shortfall which had grown to almost \$150 million. On average, members would receive less than 80 per cent of their benefit entitlements.

The Ansett story highlights how superannuation funds based on both defined benefit and defined contributions are vulnerable not only to scary economic, financial and labour markets, but to corporate and regulatory deficiencies as well.

The two final chapters turn again to scary macroeconomic conditions and financial markets. However, the context here is not only the impact on the retirement benefits of members in existing schemes, but the problems policy-makers may face when trying to reform retirement income arrangements in difficult macroeconomic and financial circumstances.

Japan is considered first in Chapter 10. While the Japanese economy, along with the USA, UK and other developed economies, entered into recession in the early 1990s, the Japanese economy remained depressed for around a decade after the other economies recovered. At the same time, the rapid ageing of the Japanese population was becoming more prominent, with the labour force itself beginning to decline from the early 1990s. In addition, urgent public and private pension reform was becoming inevitable due to the underfundedness of both public and private pensions. In this chapter Masaharu Usuki discusses how companies have adjusted their pension plans, and how the government has

modified its policy stance to cope with this scary macroeconomic, financial, demographic and retirement benefits scenario. Responses included measures taken by pension plans, their sponsors and government: more sophisticated asset management by plan sponsors, changes in benefit design (through the reduction of benefits, conversion of defined benefit plans into cash balance plans, introduction of defined contribution plans and plan terminations), and changes in government regulations (including deregulation of asset management, changes to funding rules and the introduction of new types of funded pension plans). Overall, the responses have meant that the impacts of unanticipated declines in asset prices and economic activity have been shared across workers, profits and retirees.

The final chapter considers the case of pensions in Brazil. Brazilian pension reforms are quite similar to those taking place in the USA, UK and Australia. However, unlike these countries, the Brazilian pension reforms are taking place against a backdrop of extraordinary macroeconomic volatility and uncertainty. In this chapter, Flávio Rabelo introduces the current Brazilian pension system and discusses the proposed reforms, while highlighting the enormous difficulties associated with pension reform in a volatile, developing economy. Rabelo concludes with the observation that despite the extreme economic and financial market volatility in Brazil, almost as scary is the increasing trend towards more, and more complicated, private pension regulation.

CONCLUDING COMMENTS

Overall, the chapters in this volume address a myriad of scary scenarios, including volatile asset markets, problematic labour market trends, population ageing, corporate collapse, regulatory failure, and depressed and volatile macroeconomies, across a broad range of countries – Australia, Brazil, Japan, the UK and the USA. Partial solutions to scary markets are advanced, including the standard response of asset diversification, as well as financial engineering, smoothing algorithms and risk sharing. The issues raised, and solutions offered, have universal application.

NOTES

1. For a more complete list see Holzmann and Hinz (2005), ch. 7 and Bateman et al. (2001), Appendix 2.

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