



THE COMING PENSIONS CRISIS

Recommendations for Keeping the Global Pensions System Afloat

Citi GPS: Global Perspectives & Solutions

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**Farooq Hanif**

Head of European Insurance Research

+44-207-986-3975 | farooq.hanif@citi.com

**Charles Millard**

Head of Pension Relations

+1-212-723-4700 | charles.millard@citi.com

**Erik J. Bass, CFA**

US Life Insurance Analyst

+1-212-816-5257 | erik.bass@citi.com

**Elizabeth Curmi**

Thematic Analyst

+44-20-7986-6818 | elizabeth.curmi@citi.com

**Sarah Deans**

Head of EMEA Accounting & Valuation Research

+44-20-7986-4156 | sarah.deans@citi.com

**Darwin Lam, CFA**

Head of Asia Pacific Insurance Research

+852-2501-2482 | darwin.lam@citi.com

**Hiroyuki Maekawa**

Japanese Insurance Analyst

+81-3-6270-4849 | hiroyuki.maekawa@citi.com

**Nigel Pittaway**

Australian Insurance/Diversified Financial Analyst

+61-2-8225-4860 | nigel.pittaway@citi.com

*With thanks to:****Boston College Center for Retirement Research, Keith Crider (Citi), Swapnil Katkar (Citi), Martin Bernstein (Citi), William R Katz (Citi), and Haley Tam (Citi).***

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Kathleen Boyle, CFA
Managing Editor, Citi GPS

What's your dream for retirement? Is it living on the beach, traveling on cruise ships throughout Europe, spending time with kids and grandkids, finally getting the chance to perfect your golf game? For a lot of people, the retirement dream is to retire early enough so that they can enjoy the fruits of their long working career while they're still healthy and to live out their sunset years relaxing and enjoying the good life. However, the reality for many is that there isn't enough money in the piggy bank to last throughout their retired life.

Workers in the past trusted that the defined benefit pension plans provided by their employers would keep them and their spouse living comfortably through their retirement. And if anything happened with their corporate pension, they figured they had paid into government social security and it would be more than enough to cover things. Today's workers are a bit less worry-free. With the rise of defined contribution plans, employees are being asked to manage their own retirement account which puts the onus on them to ensure they not only put enough away money for retirement, but also invest that money properly to get the best return. Improvements in healthcare are increasing life expectancies meaning retirement money needs to last much longer. At the same time demographic shifts — an increase in the retirement age population accompanied by a decrease in the working age population — are starting to put a strain on pay-as-you-go government pension schemes such as social security.

How much of a problem is it? According to our estimates, the total value of unfunded or underfunded government pension liabilities for twenty OECD countries is a staggering \$78 trillion, or almost double the \$44 trillion published national debt number. Corporations have also not consistently met their pension obligation and most US and UK corporate pension plans remain underfunded with an aggregate fund status in the US of just 82%.

In the report that follows, the authors look at the scope of the pension problem both on the public and the private side. But instead of being all doom and gloom, they offer a set of recommendations to policymakers, corporate and public pension plan sponsors and managers, and product providers to deal with the crisis. These include: (1) publishing the amount of underfunded government pension obligations so that everyone can see them, (2) raising the retirement age, (3) creating a new system that utilizes Collective Defined Contribution plans which share both the risks and benefits of the plan between plan sponsors and individuals, (4) creating powerful 'soft compulsion' incentives to ensure that private pension savings increase, (5) encouraging pension plan sponsors to make their full pension contributions when they are due, and (6) encouraging corporates with frozen plans to get out of the insurance business.

Finally, the silver lining of the pensions crisis is for product providers such as insurers and asset managers. Private pension assets are forecast to grow \$5-\$11 trillion over the next 10-30 years and strong growth is forecast in insurance pension buy-outs, private pension schemes, and asset and guaranteed retirement income solutions.

With hope that we can still avoid a pension crisis, I'm not giving up on my Hawaiian shirt just yet.

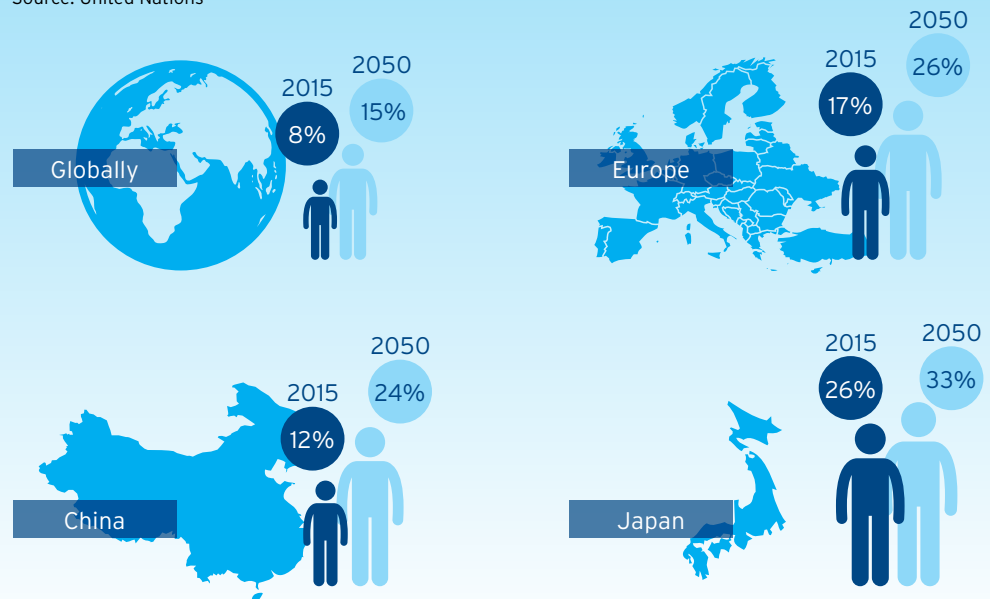
The scope of the problem

How to ensure we have enough money to retire

Demographics are changing

Big rise expected in the 65+ aged population

Source: United Nations

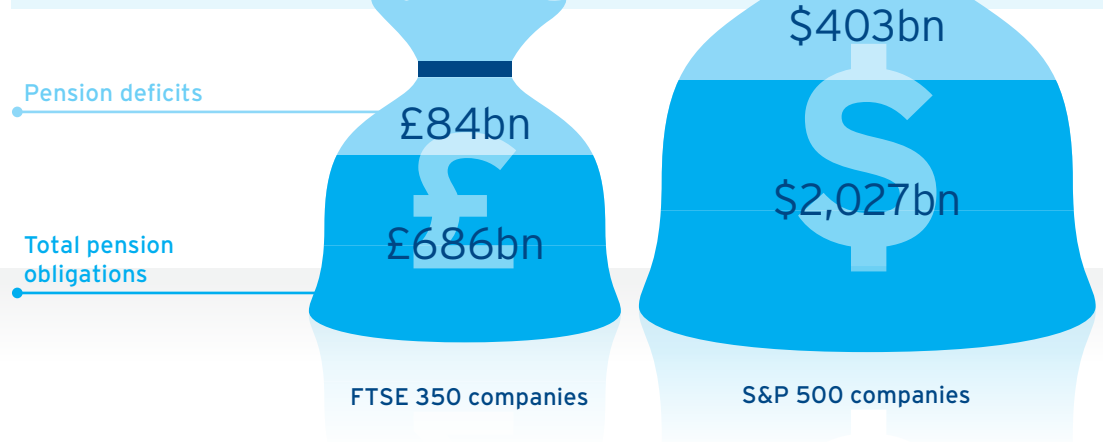


Private sector pension liabilities are big...

The global private pension savings pool has \$26 trillion in assets, 55% of which are in the US

Source: Hewitt

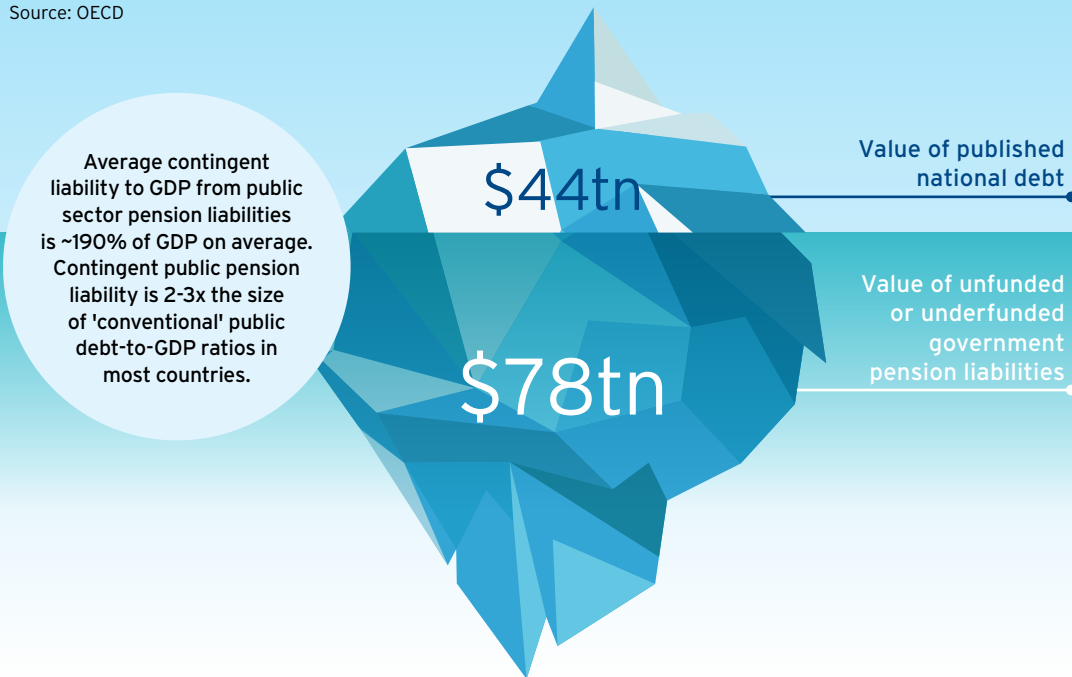
We forecast a \$5 trillion to \$11 trillion savings opportunity from the growth in private pension savings globally over the next 10-30 years – a shift away from government pension schemes – which should benefit insurers and asset managers.



...but Public Sector liabilities are potentially staggering

Average public sector pension cost-to-GDP is expected to rise from 9.5% in 2015 to 12% by 2050

Source: OECD



Recommendations to Keep the Pensions System Afloat

What policymakers, corporate and public plan sponsors and product providers can do

Source: Citigroup



Publish the amount of unfunded governmental pension obligations so everyone can see them



Raise the retirement age



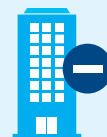
Introduce Collective Defined Contribution benefit systems globally to share risks and benefits



Create powerful 'soft compulsion' incentives to ensure that private pension savings increase



Pension plan sponsors should make full pension contributions when they are due



Corporations with frozen defined benefit plans, should get out of the insurance business



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Introduction

The world faces a retirement crisis.

We are living longer. And, while it is a mark of advancing civilization that nations, employers and local governments now make commitments to provide security and comfort in old age, these commitments are becoming more expensive. Since the first time that an actuary put people together to pool mortality risk and longevity risk and provide life insurance and annuities, the wonders of pooled risk have allowed millions of people to benefit from a degree of security in retirement that had been unknown before the twentieth century.

Unfortunately, longevity has been increasing, but nations, employers, local governments, and individuals have not put aside enough to meet their commitments and a crisis is coming. Indeed, it is arriving now.

Social security systems, national pension plans, private sector pensions, and individual retirement accounts are unfunded or underfunded across the globe. Government services, corporate profits, or retirement benefits themselves will have to be reduced to make any part of the system work. This poses an enormous challenge to employers, employees, and policymakers all over the world. In many ways, the math is simple. The solutions are not.

This publication will discuss changes in the concept, cost and length of retirement, the degree of underfunding in corporate and government-sponsored pension plans, the need for more individual retirement savings and potential policy responses to these challenges — some of which are being tried in certain individual countries and systems. We will also address the challenges faced by corporate finance officers, corporate boards and legislative budgets.

It is worth noting that the pension crisis shows itself in different ways across the globe. In Europe it is a government and public sector issue in unfunded and mainly social security schemes. In the US it is also about underfunding in public defined benefit schemes, but also a massive corporate defined benefit deficit problem. And in Asia there is little retirement provision for a rapidly aging population.

However, all is not doom and gloom. We highlight opportunities for insurers and asset managers and potential new business models to help the world address this challenge.

‘Retirement’

In 1889 when German Chancellor Otto von Bismarck initiated the first social security program, the idea of ‘retirement’ did not exist. And when Social Security began in the United States in 1935, President Roosevelt said it was intended to “give some measure of protection...against poverty-ridden old age.”¹

Developed world expectations for retirement have risen

Today, in much of the developed world, a comfortable and secure retirement is seen as a right. Early retirement is sought-after and proper retirement income is considered to be a half or more than half the level of final pay. Developed world expectations for retirement often include travel, comfort, and assistance to grandchildren.

¹ <http://www.ssa.gov/history/briefhistory3.html>

Rising expectations has increased the dollar amount of one year of retirement costs

In the less-developed world, promises and expectations for retirement are also changing. And while the economic retirement level may be lower in China or Brazil than in Denmark, it is no less challenging to meet.

Because the definition of retirement and the expectations of what retirement should involve has changed in the developed world, the dollar amount of one year of retirement costs is increasing. And that is before we even think about how much longer retirement lasts today compared to just a short time ago.

Longevity and Demographics

One hundred years ago, a person born in a city in what was then the developed world could expect to live to be 51 years old — the average life expectancy in the UK in 1915.

When Social Security was started in the 1940s it was expected to support a person for 12.7 years vs. nearly 20 years today

In the United States, when Social Security was started, a 65 year old man could expect to live 12.7 more years, and that was how long Social Security would have to help support him. The same man today can expect to live nearly 20 more years — about 50% longer than the system was intended to support.

So, retirement — an idea that barely existed for most people one hundred years ago — not only is more expensive for each year, it also lasts many years longer. This is made worse by low global bond yields that means the present value of retirement costs have ballooned.

The higher present value is putting a strain on public and private sector finances through unfunded (or underfunded) pension liabilities. A great area of dangers could be in government social security retirement provisions, where the potential unfunded liabilities are large and not well measured.

It is important to note that in many countries a modest social security payment will help keep most senior citizens from complete poverty. But this paper is more focused on the needs, desires, and expectations of individuals to live above that level, and the pressure on governments' and institutions' abilities to meet those needs. Avoiding abject poverty is a worthy goal, but if that is all that retirement delivers, then the repercussions for government spending and numerous sectors and the economy could be quite severe.

Unfunded Pension Liabilities

Governments and corporates have largely failed to put enough funds aside to meet future pension commitments

Employers — whether governments or private companies — have made commitments that stretch decades into the future, but have largely failed to put enough funds aside to meet those commitments. Individuals in defined contribution plans have also failed to set aside enough in retirement savings to support a secure retirement. However, the 'elephant in the room' is the large global unfunded pension promises that governments and corporate have made to their citizens and employees.

Unfunded pension liabilities and shortcomings by individuals in defined contribution plans in the US run in the tens of trillions of dollars

In the United States, current unfunded corporate defined benefit commitments total approximately \$425 billion. State and local government employee defined benefit pension plans have from \$1 trillion to \$3 trillion in unfunded commitments (depending on the discount rate used). And individuals in defined contribution plans (or without retirement savings) are \$7 trillion short of the ability to live in a secure retirement. The largest liability is in the US social security pension system where we estimate >\$10 trillion in unfunded liabilities.

In Europe, pension liabilities are more than twice as large as published national debt

Arguably, the Europeans have the largest problem when it comes to unfunded social security pensions. In most European countries, the cost of these pension liabilities is more than twice as large as the published national debt (which tends not to include the cost of public social security pensions to be paid in the future).

These obligations create pressures on corporations and on governments. As time passes, individuals will experience economic pressure, tremendously diminished lifestyles, and increased dependence upon already-strapped government programs. And governments will have to raise taxes or cut government expenditures elsewhere to make room for these cuts.

Corporations

An individual company that offers and supports a pension plan for their employees is referred to as a corporate plan sponsor. The support of pension plans by corporate plan sponsors is of course quite important to the beneficiaries of those pensions. However, that support also puts tremendous pressure on the corporation.

Current low interest rates has kept the value of pension liabilities and stated value of underfunding abnormally high, causing corporates to experience cash flow and corporate finance implications

The liabilities of a corporate pension plan are valued using discount rates that move with interest rates in general. The current low interest rate environment has kept the value of pension liabilities and the stated value of underfunding abnormally high. This has been exacerbated by rising longevity rates and underestimation of length of time over which pensions have to be paid. This creates cashflow and corporate finance implications that make it difficult and painful for corporates to keep their pensions in place. In addition, the relative size of a corporation's liability compared to its market capitalization can have an impact on how equity investors view a company's stock.

In recent years, legislation in the United States has made pension funding rules stricter but also more unpredictable, with many changes enacted in a period of just a few years. Accounting rules, both in the US and in Europe, have also intensified the impact pensions have on their corporate plan sponsors' cashflow and risk.

However, in the UK the separate class of pension trustees who have the primary fiduciary duty for a corporate pension plan have developed a dynamic of promoting less risky investments and higher levels of funding. There are also very strict funding rules in the Netherlands. This has led to many pension buy-outs by insurance companies in both the UK and the Netherlands — a trend that has begun to take hold in the US.

Government Sponsored Pension Plans

When the government is the employer, the issues are a bit different, but just as challenging.

Public pension plans in the US use a fixed interest rate which lowers stated assets and liabilities

In the US, most public pension plans do not use a variable interest rate to value their liabilities. So liabilities do not rise and fall with interest rates. Where corporations in the US use a variable rate currently around 4.0% to 4.5%, government plans use rates that are typically around 7.5%. Thus, a government plan with \$75 billion in stated assets and \$100 billion in stated liabilities would report that it is 75% funded. However, if it used the typical rate of a US corporate plan, that funded ratio would drop to approximately 52%.

Higher government pension liabilities can affect the issuance of municipal bonds

Looking at twenty OECD countries, the average level of unfunded government pension liabilities is ~190% of GDP vs. a reported level of 109%

In dollar terms, this equates to \$78 trillion of underfunding on government balance sheets vs. reported national debt of \$44 trillion

Defined benefit plans place the responsibility of financial planning and asset management with the corporate while giving certainty to employees over the level of benefits they will receive

The primary benefit of a defined benefit plan is that it can pool both longevity and generational risk

Government plans in the US are woefully underfunded because government plan sponsors — legislatures — have not made budget contributions to pension plans that are sufficient to match the generosity of the pension promises those officials have made. There is no law that can force states to make these contributions, though the Government Accounting Standards Board has adopted some reforms in recent years that are designed to encourage better pension funding.

Pressures on government pensions are different from those on corporations, as governments do not have earnings or stock prices. They do, however, have a cost of capital, and investors in US municipal bonds are increasingly considering the health of a government's pension when evaluating that government's municipal bonds.

In many other countries (e.g. in Europe), public sector workers have largely unfunded pay-as-you-go pension systems, so there is no ring-fenced valuation of these liabilities or prescribed 'contribution' requirements. These liabilities simply aggregate with unfunded pay-as-you-go social security pension systems that are particularly onerous in Europe.

If we focus on government pension liabilities for public sector workers and social security, our own analysis of twenty OECD countries (see Figure 15) indicates an average level of unfunded government pension liabilities of ~190% of GDP. For that same cohort of countries, the reported amount of all government debt totals only 109% of GDP. In US dollar terms, we estimate global retirement underfunding sitting on government balance sheets for these twenty countries to total \$78 trillion, compared to reported national debts totaling \$44 trillion. Therefore, if the liabilities of social security and public sector worker underfunding are added as a form of 'contingent debt', total global government debt may be three times as large as people currently think it is. Whatever the calculation used, the numbers are staggering.

Defined Contribution Challenges: For Plan Sponsors and for Individuals

In a classic defined benefit plan, burdens of investment allocation, diversification, risk management, and liquidity are borne by professionals who are hired by the plan or its sponsor to deal with those issues in a complex and holistic way. They use risk advisors to balance return-seeking versus risk-taking and they can hire asset managers at low fees to invest assets accordingly to a highly developed investment policy. Importantly, defined benefit plans give certainty to employees over the level of benefits they will ultimately receive, and the responsibility for the financial planning behind this promise lies ultimately with the corporates.

When an individual is responsible for his or her own defined contribution plan, that individual must develop a diversified investment plan, assess risk, and decide how much to contribute and when (and how) to take income. They may also face higher asset management charges depending on their own fund selection and the scale benefits of the pension plan they are in. In such schemes, all of the investment risk and choices over how much to contribute into the plan lie with the individuals.

Yet the most important benefit of defined benefit plans over defined contribution plans go even further. Above all the benefits of professional management are two kinds of pooling: pooling of longevity risk in retirement and pooling of generational risk.

Longevity risk is the risk you outlive your savings

Longevity risk is the 'risk' that you will live too long — that you will outlive your savings. In an individual defined contribution plan, you must assume that you live to 100. That means much lower annual payments to yourself, or a very real risk that you will run out of money.

Generational risk is the risk that markets crash or perform poorly ahead of when you need your savings

Generational risk is the 'risk' that, just when you need your savings, markets crash or perform poorly for many years. If you manage your own retirement savings and markets tank right around the time that you are retiring, you receive diminished benefits. For an individual to avoid that risk, he or she will have to go to a portfolio that is mostly bonds at around the age of 65. But he or she could live thirty years longer and by adjusting their portfolio in such a way will have to give up most of the benefits of return-seeking assets for the rest of their life.

Collective Defined Contribution plans can bring the positive pooling or risk to defined contribution plans

One solution to these risk problems — which forms part of our recommendations — is the use of a 'Collective Defined Contribution' (CDC) or 'Defined-Ambition' plan. These seek to achieve defined benefit outcomes but with the flexibility of not having to provide an absolute guarantee. Instead of allocating assets to individuals, assets and risks are managed on a pooled basis.

CDC plans smooth out mortality and longevity experience: those who die early in their retirements subsidize those who live longer. They also provide smoothing: those generations who are 'lucky' enough to retire when markets are rising may not get that benefit, however generations who are 'unlucky' enough to retire when markets are poor may not suffer that risk. In a CDC plan, the investment staff is investing for people who are 95-, 65- and 35-years old and taking into account the liability profile of employees. Hence, a CDC can remain a long-term investor and therefore can remain in an appropriate return-seeking allocation and avoid the risk of individuals' shifting their assets to low-risk allocations as they reach retirement.

Global Pension Systems: How They Deal With These Challenges

Many countries and jurisdictions have implemented systems and reforms that try to address some of these challenges. We describe some of these with in-depth chapters on regional case studies in the report that follows; however, we would highlight some emerging trends.

- Heightened awareness in governments of the rising costs of public sector and social security pension liabilities — leading to accelerated moves to cut down the costs of these schemes, e.g. through a reduction in benefits or increasing retirement ages.
- The continued demise of defined benefit schemes and government sponsored initiatives to encourage the growth in private sector defined contribution schemes. An important driver is the increased use of 'compulsion' to save.
- Increased awareness of the need to transfer defined benefit risks from corporates to insurers who are arguably better able to manage these risks and could benefit from the scale benefit of policy defined benefit liabilities.

The Pensions Risk Transfer Opportunity

Asked what they plan to do with their companies' insurance subsidiary, most CFOs and CEOs would assert that their company does not have an insurance subsidiary. But in fact, every company with a defined benefit pension plan does have an insurance subsidiary — the pension plan.

The defined pension plan on a corporate balance sheet is equivalent to an insurance subsidiary

The difference between these companies and actual insurance companies is that insurance companies face higher levels of regulation through national regulators (or state insurance commissioners in the US) and they usually invest more conservatively. The allocation of corporate plans' assets to risky investments creates a tremendous opportunity for insurance companies to underwrite and take risk from plan sponsors in the US and the UK and elsewhere. This can be achieved through pension risk transfer transactions, buy-outs or buy-ins.

For most corporates with defined benefit plans, we recommend transferring the risk to an insurer through a pension risk transfer

Some corporates may prefer to continue running their own defined benefit plans. However, for the majority — especially those that are facing a great deal of accounting volatility as a result of these plans — our advice is to transfer this risk to insurers. Even if there is a premium to be paid, transferring the risk eliminates unpredictable long-term liabilities and puts them in the hands of institutions whose mission is to deliver on those kinds of liabilities.

The pension risk transfer opportunity is potentially large for insurers and could exceed \$1 trillion over time

This is an area of opportunity for insurers who have the capital and expertise to take on this business, and we believe this could be quite a large opportunity. Over the next 5-10 years, we project potential transactions of \$200-\$350 billion in the US, £100-£200 billion in the UK, and €100-€150 billion in the Netherlands. Other potential growth markets include Canada, Australia, and the Nordic region. We expect such transactions to grow in popularity globally, especially if interest rates rise and plan funded status improves, and we believe the total liability transfer opportunity could exceed \$1 trillion over time.

Pension Savings Opportunities for Insurers and Asset Management

The US has \$26 trillion of pension assets in US pension plans

The largest private pensions savings pool globally is in the US, with ~55% of the global \$26 trillion of pension assets invested in US pension plans. Many other countries (such as the Netherlands, Iceland, Switzerland, Australia, the UK, and Canada) also have very significant private pension savings schemes.

We see a rapid shift to private pension savings, particularly in Europe...

However, most of the world still relies too heavily on government pensions through pay-as-you-go social security pensions or public sector schemes (e.g. for healthcare professionals, law enforcement, the armed forces, and other government employees). This is unsustainable and a rapid shift to private pension savings is inevitable in our opinion — particularly in Europe where some of the largest liabilities are looming.

...creating a \$5-\$11 trillion growth opportunity for global insurers and asset managers

We think this presents a substantial growth opportunity for global insurers and asset managers — particularly those that are already involved in this space and can exploit their existing capabilities and experience. In the next 10-30 years, we forecast a \$5 trillion to \$11 trillion savings opportunity from the growth in private pension savings globally — with a large proportion of this in Europe.

Insurers and asset managers will have to be prepared for this shift, making sure they have the right systems, the right level of scale, and an ability to generate adequate margins in what could be quite a highly regulated market.

Insurers and asset managers need to be prepared for this shift and recognize the huge 'decumulation opportunity' in more mature markets

Asset managers and insurers should also recognize the huge 'decumulation opportunity' in more mature markets where established private pension schemes and customers are coming to retirement. These individuals in defined contribution plans will need products to manage the risk of living too long: some downside investment protection, real returns to keep pace with inflation, and some protection against longevity risk. We think both insurers and asset managers could be well placed to design products to manage retirement income.

We think there is also a large opportunity for asset managers in continuing to help defined benefit schemes manage their liabilities, as well as recognizing the threat from insurers in the pensions risk transfer space. Strategies that suit 'aging' defined benefit schemes such as Liability-Driven Investment (LDI), absolute return, and alternative investment strategies, have already become a prominent part of the asset management landscape — and those that do not have good capabilities in this area need to boost them. However, asset managers also need to shift their mindset towards an 'outcome-based' approach that can appropriately package and tailor products to match the risk-reward needs of particular pension plans.

Conclusion

With trillions upon trillions of dollars of unfunded vested retirement obligations, the pensions system is under water — the piggy bank is drowning. Something needs to give; indeed many things.

At a minimum, we recommend:

- Publish the amount of underfunded governmental pension obligations so everyone can see them;
- Raise the retirement age;
- Create a new system that utilizes Collective Defined Contribution plans which share risks and benefits which is potentially better for everyone;
- Create powerful 'soft compulsion' incentives to ensure that private pension savings increase;
- For pension plan sponsors (corporate and public), make their full pension contributions when they are due; and
- For corporations with frozen plans, get out of the insurance business.

With compromise from all parties, we can make the system sustainable. Without these compromises, we are headed for disaster.



THE SCOPE OF THE PROBLEM

Demographics

Public and private pensions in many countries are facing acute challenges due to the pressure from the retiring of the baby boom generation, population aging, and prolonged life expectancy in retirement. The financial consequences of these trends could be more negative and abrupt than some expect. While some governments are taking action to address these rising costs, the apparent slow-burn nature of the problem means that there is little immediate political incentive to take radical steps. We think this is a mistake.

The age composition of the global population is expected to change due to lower fertility rates and increased life expectancy

Even though world population is expected to increase from 7.3 billion today to 9.5 billion in 2050 under a medium fertility scenario, the age composition of the population is expected to change, with a rise in the median age and a shift from younger to older people. Two main factors are contributing to this change: (1) a reduction in fertility rates and (2) an increase in life expectancy.

Fertility rates in developed countries have decreased over time, and as the 1960s baby boomers reach retirement age in the next few years, they will be replaced in the working population by a smaller number of people. This will cause the dependency ratio (the ratio of retired people to those of the working age) to rise considerably, putting extensive pressure on pension systems in developed countries. Substantially increased immigration may be a solution, but in practice may be politically unpalatable.

People are also living longer, and in some parts of the world, leading healthier lives. The increase in life expectancy is considered to be one of the greatest achievements of the last century; however it also poses a significant challenge to the health and pension systems in many countries. Life expectancy trends have outperformed expectations in the past two decades, and if there are further positive surprises (e.g. due to medical advances in the treatment of cancer), this could translate into severe solvency issues for public and private pension systems.

United Nations Population Scenarios

The UN calculates population figures for eight different scenarios taking into consideration future fertility rates, mortality rates, and international migration numbers. These scenarios were projected using sophisticated 'stochastic simulations', i.e. building in random fluctuations into mortality and fertility models and running multiple simulations to arrive at a distribution of outcomes. Their central scenario assumes that fertility rates fluctuate at around or below 2.1 children per women as a global average (higher in nearer years and falling over time); however this differs between individual countries. This scenario also assumes a normal mortality rate with the notion that life expectancy continues to increase and no limit is imposed in the near future.

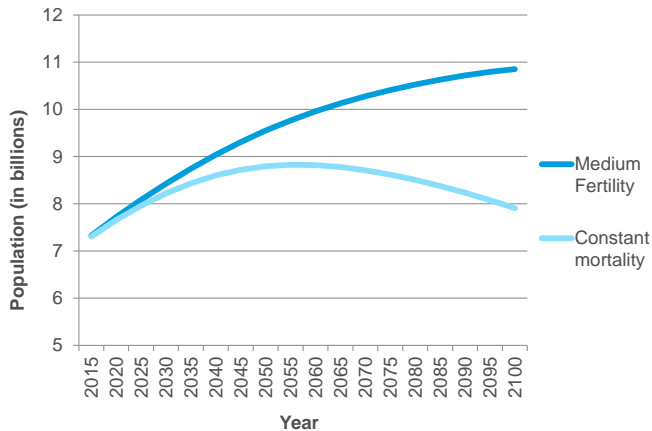
To understand the importance and uncertainty of future mortality rates, we compare this scenario of falling mortality rates to a constant mortality assumption in Figure 1. The latter assumes that mortality over the projection period is maintained constant for each country level estimated for 2005-2010.

Population Aging and the Coming Pensions Crisis

Under a central scenario, the global population will rise to 9.5 billion people in 2050 vs. 7.3 billion today

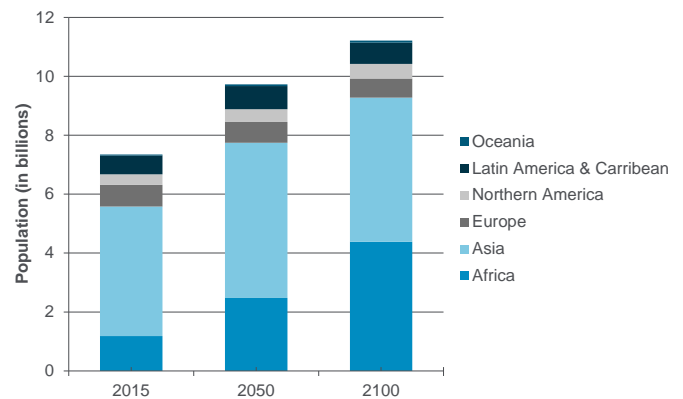
Under the central scenario, world population is expected to increase from 7.3 billion in 2015 to an estimated 9.5 billion people in 2050 as shown in Figure 1. The constant mortality scenario assumes a similar population growth pattern until 2035 but this decreases over time and reaches 7.9 billion in 2050. Hence a continuous improvement in life expectancy at older ages is likely to have a dramatic impact on future population growth.

Figure 1. Population Projections: Improving vs. Constant Mortality



Source: UN, Citi Research

Figure 2. Population Projections: Mix by Continent/Region



Source: UN, Citi Research

The majority of population growth is expected in Africa

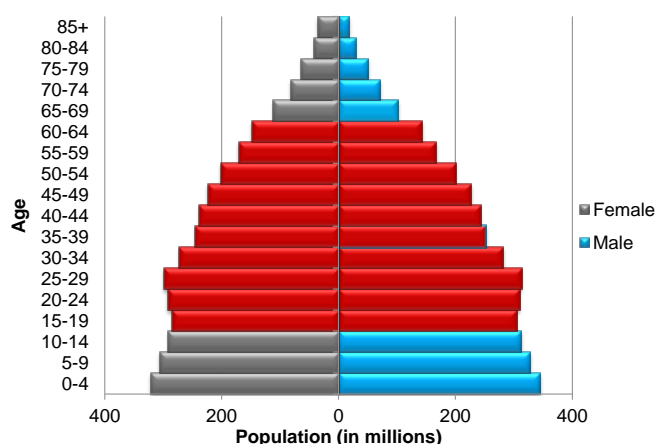
A surprising consequence of the UN's projections (assuming medium fertility, medium mortality improvements) is the likely dramatic shift in regional population mix (Figure 2). Most of the growth is likely to come from Africa with the population more than doubling by 2050. The UN's central estimates suggest that Africa could account for ~40% of the world's population by 2100, compared to 16% currently.

The age composition of the population is expected to change with people aged 65+ rising to 15% of the global population in 2050 vs. 8% today

Due to the unprecedented increase in the average life expectancy as well as a rapid decline in human fertility in many parts of the world, the age composition of the world's population will alter as median ages rise and the shift from younger to older people will continue over time.² Figure 2 and Figure 3 show the global population age structure in 2015 and 2050 respectively with the working population age (20-65 years) highlighted in red. In 2015, people aged 65+ will represent 8% of the global population (0.6 billion); this increases to over 15% of the global population (1.4 billion) in 2050. However, this probably underestimates more rapid aging in certain large markets and developed economies.

² Harper S (2014), Economic and social implications of aging societies, Science, Vol 346, Issue 6209.

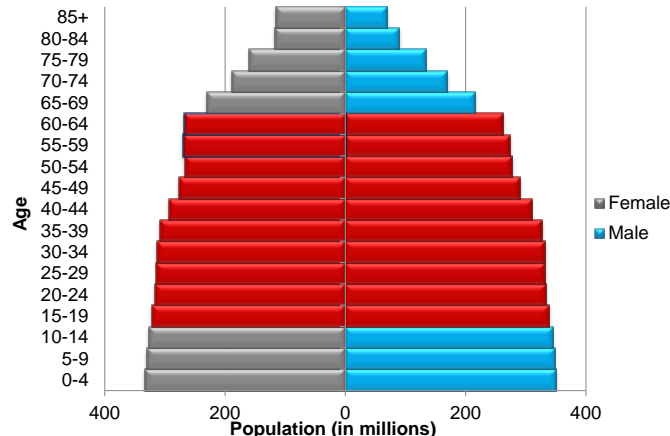
Figure 3. Global Population: Age Structure (Female & Male) in 2015



Note: Working age population is highlighted in red.

Source: UN, Citi Research

Figure 4. Global Population: Age Structure (Female & Male) in 2050



Note: Working age population is highlighted in red.

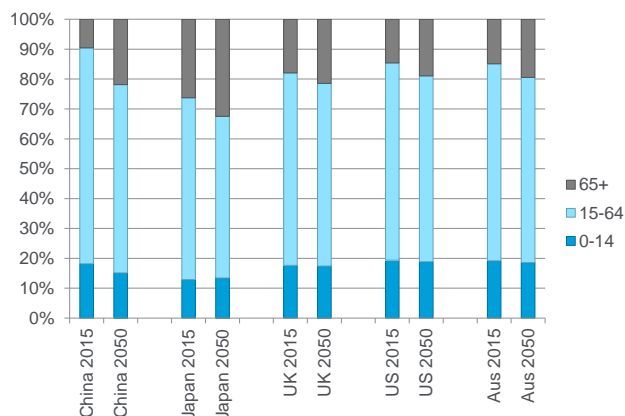
Source: UN, Citi Research

The change in population age structure will be extensive and pressure dependency ratios

In Figure 5 and Figure 6 we show the projected age distribution of populations in various regions by 2050 and express this as a 'dependency ratio' – a rough measure of the ratio of the working population (aged 20-64) to those in retirement (aged 65+). The potential shift in the age structure of future populations is likely to be extensive:

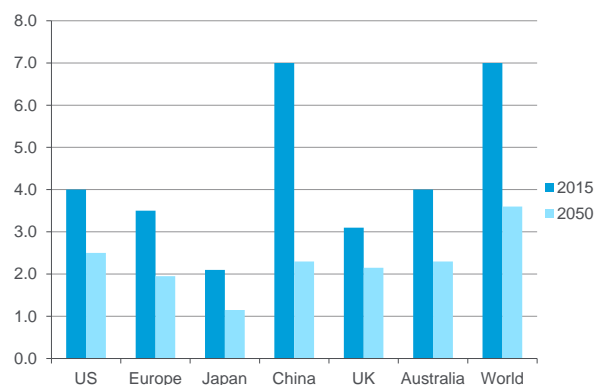
- There will likely be a far more dramatic aging of populations in some countries relative to the global average. This is particularly evident in China where by 2050 the proportion aged over 65 may more than double to 24%. Population aging is already a major issue in Japan where the current proportion aged 65 is 26%, but may be over a third of the population by 2050. In Europe the UN anticipates the proportion aged over 65 rising to 27% by 2050 from 17% currently.
- These trends will pressure dependency ratios. This is a crude measure of the ratio of the working population to those in retirement, with a lower ratio implying that there are fewer workers to support pensioners. In China, we may see dependency ratios collapse from 7 to 2 in the years to 2050. In Japan the dependency ratio could reach just over 1 by 2050. In the world as a whole, the UN data suggests a halving of the dependency ratio.

Figure 5. Distribution of Age Groups 2015 vs. 2050



Source: UN, Citi Research

Figure 6. Dependency Ratios of Workers (15-64) to Retired (65+)



Source: UN, Citi Research

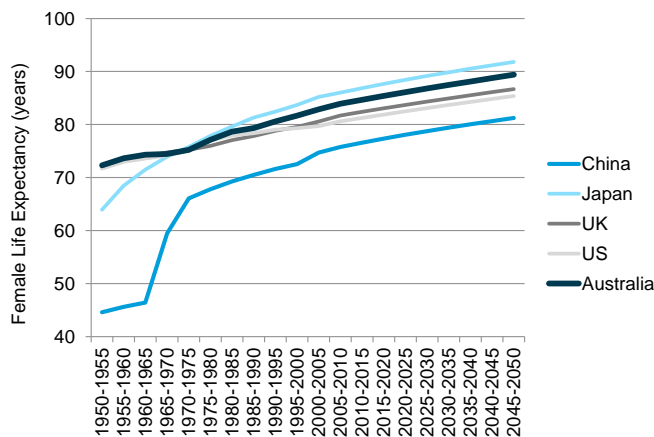
The aging of the population is driven by falling fertility and rising longevity

Drivers of Aging Population — A Focus on Fertility and Longevity

Population aging is driven by falling fertility and higher longevity. Two thirds of the world's countries now have fertility rates near or below the replacement rates.³ Such a decrease in fertility rates may be due to changes in the labor market, where more women are entering the workforce and due to the introduction of modern contraception. A healthier lifestyle and a better health system are also increasing the life expectancy of people. Figure 7 and Figure 8 show the median female and male life expectancy for a number of countries from 1950 until 2050 (estimated from 2015 onwards).

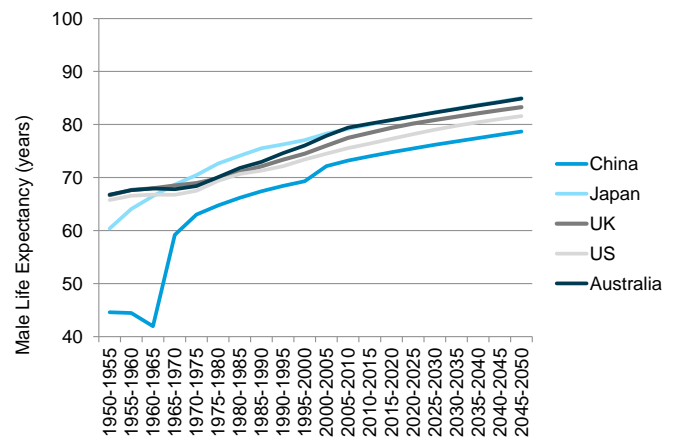
In countries such as the UK, the average life expectancy appears to have grown by approximately 10 years in the period between 1950 and 2000, suggesting 2 years added for every decade. This trend of increased lifespans is expected to continue with dramatic effects. Average female life expectancy in Japan is estimated to reach over 90 years old in 2050; this increases even further to 97 years old in 2100. The total number of people aged over 80 years old is estimated to increase by over 7 million in 2050 when compared to today. Life expectancy also increases in all other countries, with the lowest average rate found in China. The population aged 80+ is estimated to reach over 100 million people in China in 2050, an increase of over 77 million people when compared in 2015.

Figure 7. Female Life Expectancy from 1950-2050 (Median Range)



Source: UN, Citi Research

Figure 8. Male Life Expectancy from 1950-2050 (Median Range)



Source: UN, Citi Research

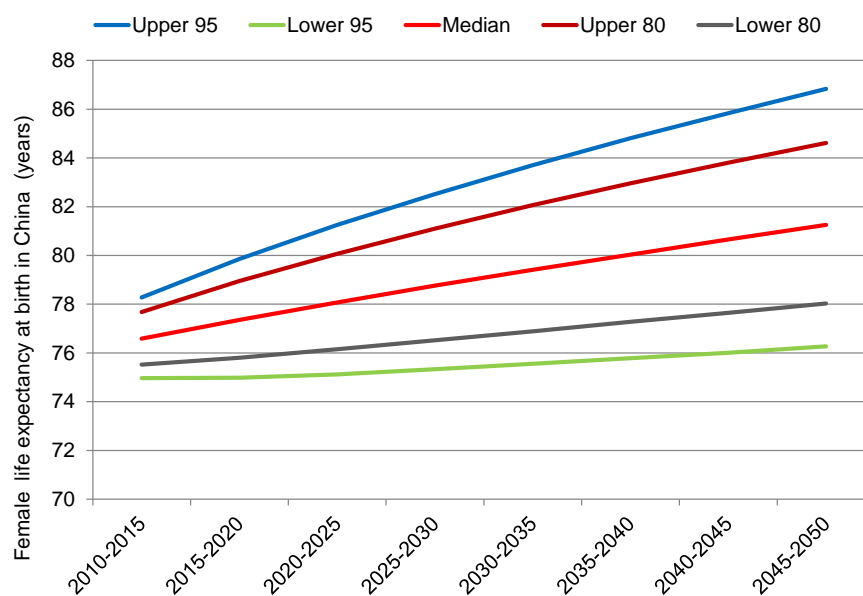
There is quite a lot of uncertainty surrounding life expectancy and mortality figures – these are typically modelled ‘stochastically’, allowing for volatility in the numbers, and uncertainty. Figure 9 below show the results of a stochastic analysis undertaken by the UN on life expectancy. The results are shown for females in China, however similar results are found for male life expectancy. According to this, the average female life expectancy in China in 2050 could be as high as 87 years old under the upper 95th percentile or as low as 76 under the lower 80th percentile. The uncertainty in these variables creates significant uncertainty on the costs of longevity in current defined benefit pension systems.

³ Harper S (2014), Economic and social implications of aging societies, Science, Vol 346, Issue 6209.

The problems of an aging population are already relatively advanced in Japan

The problems of aging are already relatively advanced in Japan. In fact the Japan Policy Council recently issued a report that encourages Tokyo to send 1 million elderly citizens to other Japanese regions due to the number of care facilities needed and because the fixed pension income that they are receiving would go much further in other regions⁴. However in the future, population aging will become the norm in many other countries and if not managed properly could have an effect on the economy, health, and pension systems.

Figure 9. Stochastic Analysis of Female Life Expectancy in China



Source: UN, Citi Research

The Coming Pensions Crisis

Future population and life expectancy trends will exert pressure on public and private pension systems

The key conclusion is that future population and life expectancy trends will exert considerable pressure on public and private sector pension systems in the developed and developing world. Unless addressed quickly, we believe this could overwhelm public and private sector balance sheets and act as a major drag on economic growth.

The increase in life expectancy rates is one of the most remarkable success stories in human history. However, coupled with the decrease in fertility rates, it raises significant concerns about the possible economic consequences of living longer lives. Population aging introduces difficulties for the fiscal integrity of public and private pensions, due to an ever lower share of people working in the system compared to longer periods over which pensions will need to be paid:

- In the public sector, large unfunded pension promises, relying on a pay-as-you-go model, will become unaffordable as dependency ratios fall and face either drastic cuts in benefits or terminal collapse. Importantly we do not believe these deficits are disclosed in a transparent way and they are commonly not added to public sector balance sheets. Therefore there are substantial fiscal liabilities that, if correctly reflected, would add a substantial burden to published debt ratios.

⁴ Financial Times, 'Tokyo told to send 1m elderly to provinces as 'care crisis' looms', published June 25th 2015.

- In funded private and public sector defined benefit plans, where there are ring-fenced assets backing future pension liabilities, the evidence suggests that there are sizeable deficits. To the extent that some of the actuarial assumptions in these plans understate mortality improvements, these deficits may widen with stronger than expected mortality improvements. This may be further exacerbated by optimistic discount rates used to value liabilities. As defined benefit plans are increasingly closed to new business, the problems of an aging population base, and funding spread over a smaller base of workers, will come to the fore.
- Uncertainty over future improvements in life expectancy poses a material risk. Most mortality models assume some form of smoothed improvement in human longevity in the future. However, the reality is that human mortality may be subject to positive and negative shocks due to epidemiological changes and medical advances. Examples include therapies that reduce the incidence of terminal diseases (e.g. old-age cancer) or materially improve lifespans for those contracting such illnesses. Conversely new diseases or global pandemics pose the opposite risk. This creates major uncertainty over planning and funding pensions. The OECD estimates that each additional year that life expectancy is not provisioned for can be expected to add an estimated 3 to 4% to current defined benefit liabilities⁵.

⁵ OECD (2014), OECD Pensions Outlook, 2014, OECD publishing-
<http://dx.doi.org/10.1787/9789264222687-en>.

Government Pension Liabilities

Without further and far more radical steps to address unfunded pension liabilities, the world could face a substantial increase in spending on pensions

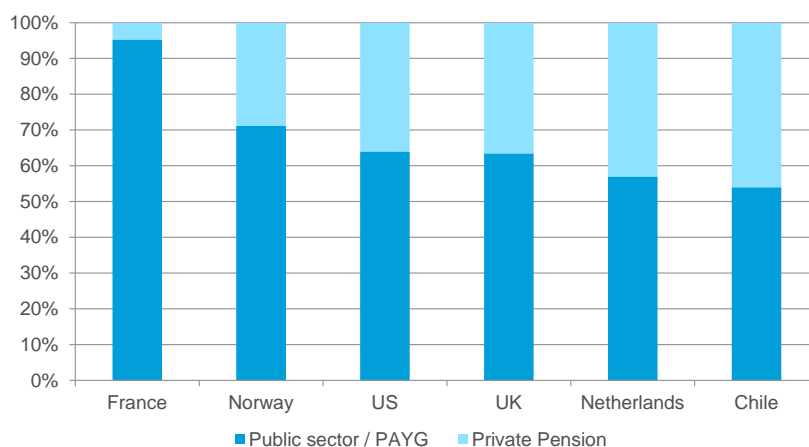
Public sector worker government pensions tend to be more generous than private sector schemes

Most major world economies carry substantial unfunded pension liabilities for public sector workers or for the general population through social security pension provisions. Although governments are starting to reform these commitments, without further and far more radical steps, developed and developing countries are likely to face a substantial increase in spending on pensions (as a proportion of GDP) in the next 30-50 years. If we express these 'contingent liabilities' as debt, in many countries the implied total debt to GDP ratios look unsustainably large.

Although these pension commitments are not strictly the same thing as government borrowing, they are still a long-term liability. These liabilities also result in large generational imbalances as a declining ratio of workers to retirees puts unsustainable pressure on future tax payers to fund a dramatically greater population of pensioners. Leaving apart the financial and demographic pressures created by this problem, the political consequence of such a landscape could also be stark.

Government pensions to public sector workers tend to be more generous than private sector schemes; especially given the shift to defined contribution schemes in the private sector which passes on investment and longevity risks to private individuals rather than companies or the government. Often a decent pension is an attractive 'perk' of working in the public sector that compensates for potentially lower take-home pay. This creates a further political dilemma as private sector pension schemes start to look far less lucrative than those in the public sector.

Figure 10. Government (Incl. Social Security) vs. Private Pension Share of Retirement Income
The government still dominates as a source of retirement income in most countries



Source: OECD, Citi Research

Better and more globally consistent disclosure of the size of unfunded government pension liabilities is necessary

We would argue for better (and more consistent) global disclosure of the size of unfunded pension liabilities faced by the government – and of the assumptions used to value these. We fear that current data on public sector scheme liabilities and pay-as-you-go schemes may understate the real cost due to optimistic economic or mortality assumptions. Making these contingent liabilities more clear or comparable is the first step towards further pension reform to address the increased risks from a rising dependency ratio and a rising cost burden of public pension systems. We have calculated for a basket of OECD countries an unstated liability for long-term pension promises that are currently earned but underfunded of \$78 trillion which are not on government balance sheets.

Government and Social Security Pension Dependency

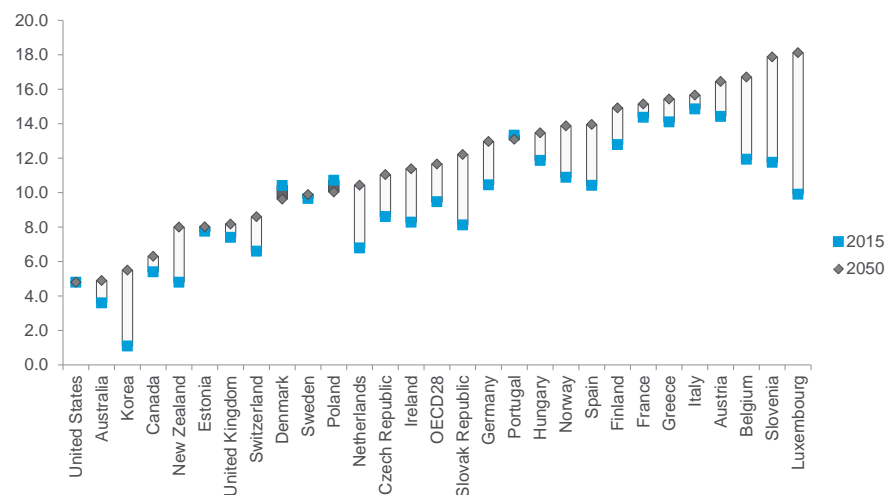
Government pension costs arise either from pension schemes for public sector workers (e.g. government employees, or employees of nationalized industries) as well as social security pension systems. To be more precise, a 'cost' arises from:

- Unfunded pension promises for public sector workers, where commitments are not backed by a segregated funds, but instead met out of general or local taxation;
- Funded public sector worker schemes (i.e. schemes with ring-fenced assets to meet pension liabilities, and where specific contributions are made to fund pensions), where there is a 'deficit' of assets vs. projected liabilities; and
- Pay-as-you-go social security pensions, offering pension benefits to the general public funded by general taxation. Depending on the country, these may be earnings related as well as providing a 'basic pension' safety net to all regardless of employment status.

Despite a rise in private pension funds in developed markets, the dependence on governments to fund pension payments remains very high

The costs arising from these commitments need to be met by government expenditure and can be a highly significant proportion of economic activity, although this varies by country. Figure 11 shows that despite a rise in private pension funds in developed markets in the past 30-40 years, the dependence on governments to fund pension payments remains very high.

Figure 11. Estimated Government Pension Payments 2015 to 2050 as a Proportion of GDP
Wide variations in public sector pension costs by country



Source: OECD, Citi Research

Costs to meet public sector deficits or unfunded social security commitments average 9.5% of GDP in OECD countries

The costs involved in meeting public sector deficits or unfunded social security commitments can also be a substantial proportion of GDP, with figures from the OECD suggesting that these vary globally between 1% and 15% of GDP annually, with an OECD average (of 34 countries) of 9.5% of GDP. An aging population and rising ratio of pensioners to workers will likely exacerbate this in the next 30-40 years. As we illustrate in Figure 11, the average pension cost to GDP rises from 9.5% in 2015 to a projected 12% of GDP by 2050 – according to OECD estimates. These figures take into account measures to limit pension costs in the future, which we discuss in more detail below.

Variations in cost to GDP ratios vary widely by country

Increasing the retirement age or reducing the level of pension liabilities can help improve the financial sustainability of social security pension schemes

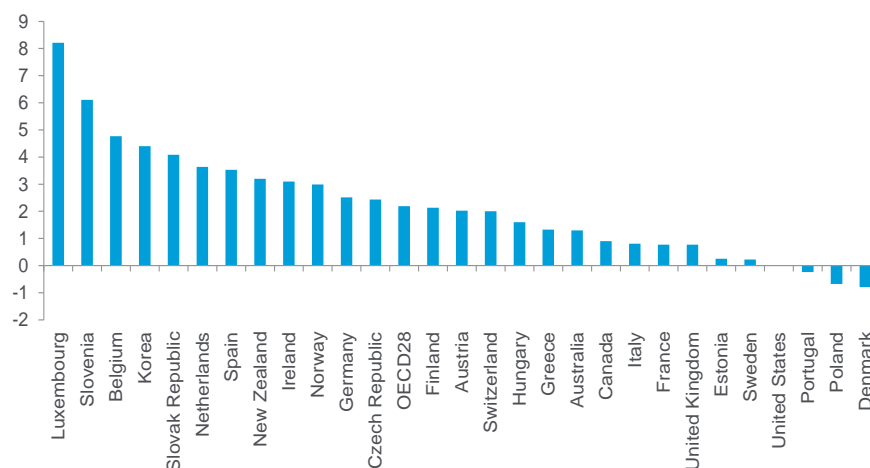
Note the wide variation in cost to GDP ratios by country and their expected development between now and 2050. Countries such as the US, the UK, Switzerland, Canada, and Australia have made earlier progress than others to develop successful private pension systems resulting in the build-up of a substantial level of private sector pension savings (either through institutional schemes or through retail products). These countries have also controlled government pension payments for the general public or have significantly limited the level of guaranteed retirement income provided by the government.

As we discuss a little later in this section, key initiatives to improve the financial sustainability of social security pension schemes include increases in retirement age – sometimes directly linked to or coordinated with mortality trends and life expectancy indices, or through equalising pension ages for males and females. In addition, there may be actions to reduce the actual level of pension liabilities, e.g. through limiting the impact of wage inflation (basing pension entitlements on career average salaries rather than ‘final’ salaries). The absolute level of expected pension spending as a proportion of economic activity is projected to remain relatively lower in countries taking action to limit pension costs than other countries by 2050. In spite of this, even countries taking early action are still likely to end up spending a substantial proportion of GDP on meeting pension expenditure – between 5% and 8% of GDP by 2050.

Contrast this with other countries at the higher end of the scale, where current pension expenditure is already at greater than 10% of GDP and where this is also expected to rise in the years to 2050. We would especially highlight the ‘developed’ economies of Germany, France, Spain, and Italy in Europe. In these countries, although pension costs are a high-profile political issue, pay-as-you-go social security pension systems are still a major part of the economic system, and private sector pension savings have not matured to the level of some other ‘lower risk’ countries. In these economies, there may also be a political expectation that the government will be there to pay citizens’ retirement income. It is also relevant, however, that most of these countries also benefit from large levels of savings in life insurance policies in the form of ‘medium-term savings’ that may not be intended to support retirement but could potentially be used to do so.

Figure 12. Estimated Increase in Government Pension Expenditure from 2015 to 2050 as a % of GDP

Some countries will be in a better position than others to control demographic pressures on costs



Source: OECD, Citi Research

We show the OECD's projections for the absolute increase in the level of pension expenditure in the next 30-40 years in Figure 12. Here we see countries such as the UK and the US again – as well as France and Italy – viewed as being able to control the rise of pension expenditure in proportion to their GDP, and some countries able to reduce it (e.g. Denmark).

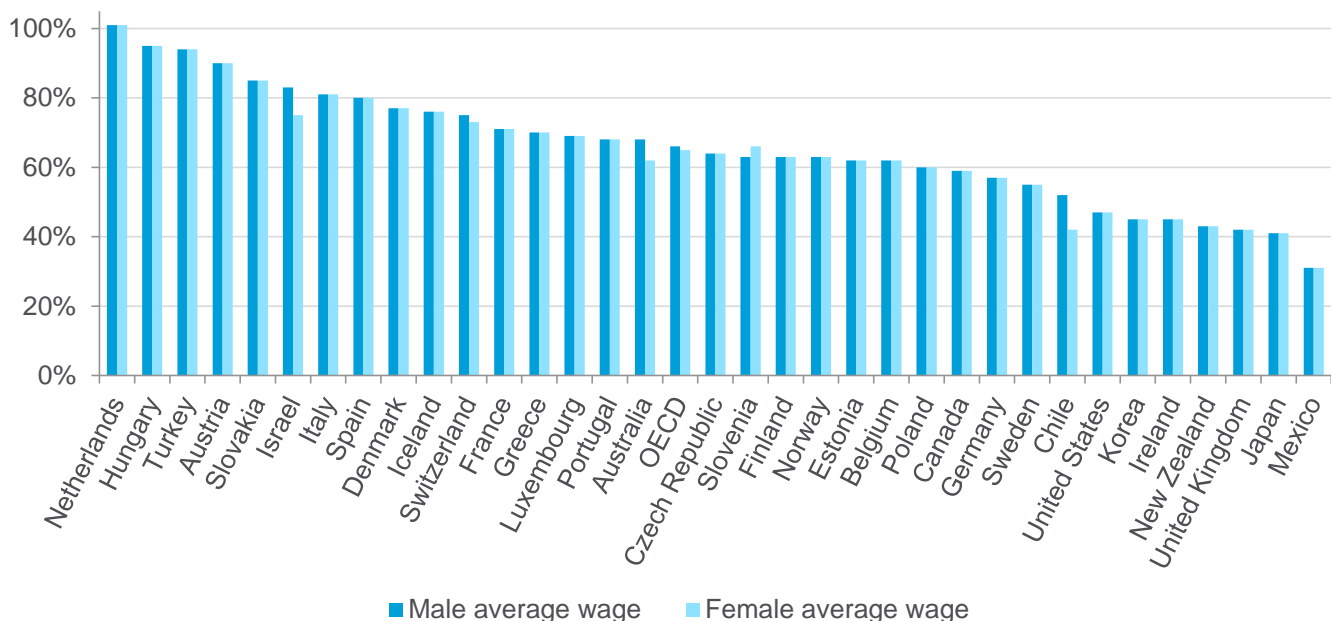
Pension Replacement Rates vs. Pension costs

Not all pension systems are equally generous. We can explore this through the concept of 'replacement rates' which measures the level of retirement income as a percentage of earnings before retirement. We chart this in Figure 13, which shows the replacement rate for males and females earning 'average wages' in each country. This data includes pensions from all sources including private defined benefit or defined contribution pensions in addition to government-supported schemes.

There is a wide variation in the level of pension adequacy across countries

This data shows a wide variety in the level of pension adequacy in each country. Countries such as the Netherlands have very high replacement rates through a mixture of public pensions, with a very well-developed and large defined benefit private pension system (pure non-guaranteed defined contribution pensions are a relatively new vehicle in the Netherlands). At the other end of the scale, countries such as the United Kingdom and United States, where there is a well-developed private pension sector, replacement rates are below 54%. This is an OECD 'reference rate' that refers to the average gross replacement rate for an average earner working a full career. Clearly, the combination of public sector and social security pensions and private pension savings in these countries is projected to provide a lower level of income than most other countries. Japan also looks relatively weak – and given the relatively high age demographic of this country (and the rapid rise in retirees to workers expected in the next few decades), this appears to be a major issue.

Figure 13. Male and Female Pension Replacement Rates, 2013



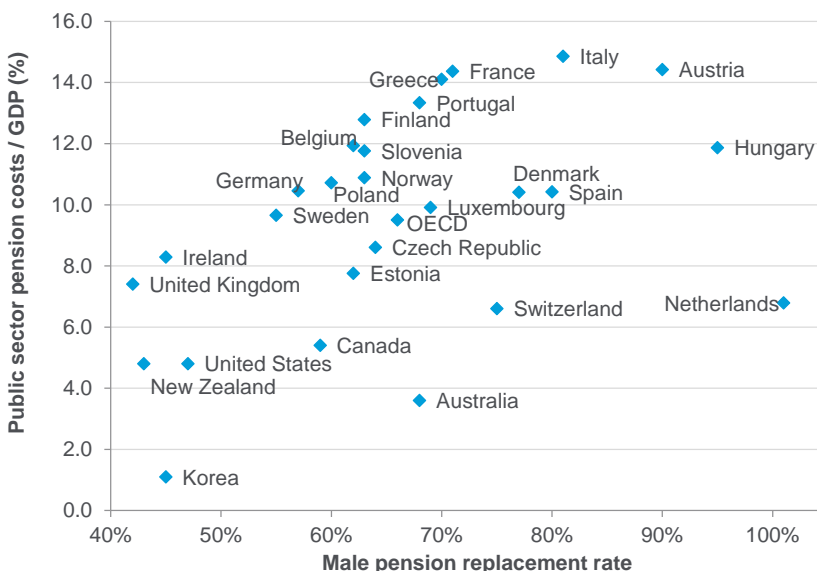
Source: OECD, Citi Research

The generosity of government pension schemes also varies by country

Comparing male to female replacement rates, it does not seem that there is a major difference on average across the countries shown. However, female replacement rates are slightly lower, and especially so, according to OECD data, in Israel, Australia and Chile. Female replacement rates are higher than males in Slovenia.

It is interesting to compare pension replacement rates with the data on government pension costs as a proportion of GDP, to compare relative generosity of pension systems with public expenditure on pensions. We show this analysis in Figure 14. Although it is difficult to read too much into this chart since there are different mixtures of private and public pensions in each country (and the cost to GDP ratio only considers *public* expenditure), this chart does at least highlight those countries that have very generous social security pension systems, but also high public sector pension costs. Good examples here are Italy, France, Greece, and Portugal, where pension replacement rates are well above the 54% OECD 'reference level', and public sector pension costs as a proportion of GDP are also relatively high.

Figure 14. Comparing Pension Replacement Rate with Government (Public Sector and Social Security) Pension Expenditure



Source: OECD, Citi Research

Contingent Pension Liability versus GDP

Although unfunded public sector pension commitments aren't technically government debt, because of the consequences of reneging on pension promises, it is similar to traditional government borrowing

Unfunded or underfunded public sector and social security pension commitments do not technically constitute government debt in the technical sense. These are long-term commitments that are not due immediately or indeed over a single date, but instead spread over many years. In addition, if governments essentially 'default' on these promises, this would not be considered in the same light as a government debt default. However, we believe the financial consequences of this debt are similar to more traditional government borrowing due to the high costs involved and the high proportion of government expenditure on public sector pension benefits. The political consequences of reneging on pension promises for the current generation of workers are also potentially complex and difficult. In addition, so long as governments do not default on these obligations, the actual economic cost experience will be the same as it is with public debt.

Quantifying these pension liabilities as 'contingent liabilities' is important and there is work on standardizing their treatment

Therefore, it is important to quantify these as 'contingent liabilities'. While there have been attempts, particularly in Europe, to standardize disclosure on contingent public sector pension liabilities, this has not been achieved as yet. According to European standards for government finance accounting, it is likely that the provision of pension liability data will become compulsory, but the first set of data may not arrive until 2017. In addition, where there has been work on estimating contingent pension liabilities, these are often based on assumptions that are not 'market-consistent' – e.g. in the choice of discount rates to value liabilities and future salary inflation, or are based on old data.

There are also various choices to the fundamental approach to value liabilities. Most use the concept of 'Accrued to Date Liabilities', or ADL. This only considers the level of benefits accrued to date based on workers' past employment history and takes no account of future benefits accrued as they continue in the system – which is a sensible approach mirroring the calculation of private sector defined benefit pension liabilities.

However, there can be differences in the allowance for future inflation. Do we assume that pension liabilities should incur future wage inflation (the PBO – or Projected Benefit Obligations approach), or do we simply assume zero wage inflation (the ABO – Accrued Benefits Obligation approach). The ABO should give substantially lower results than the PBO.

In the chart in Figure 15, we have put together estimates on a group of OECD countries of the implied contingent liability from public sector pension promises as a proportion of GDP. This data is open to interpretation since it is collated from different sources using sometimes different approaches, and often different assumptions. Most of the data in Figure 15 has been collated from various sources, although largely based on the application of a 'Freiburg University' model (Kaier and Muller), using a PBO approach and 2006 data.

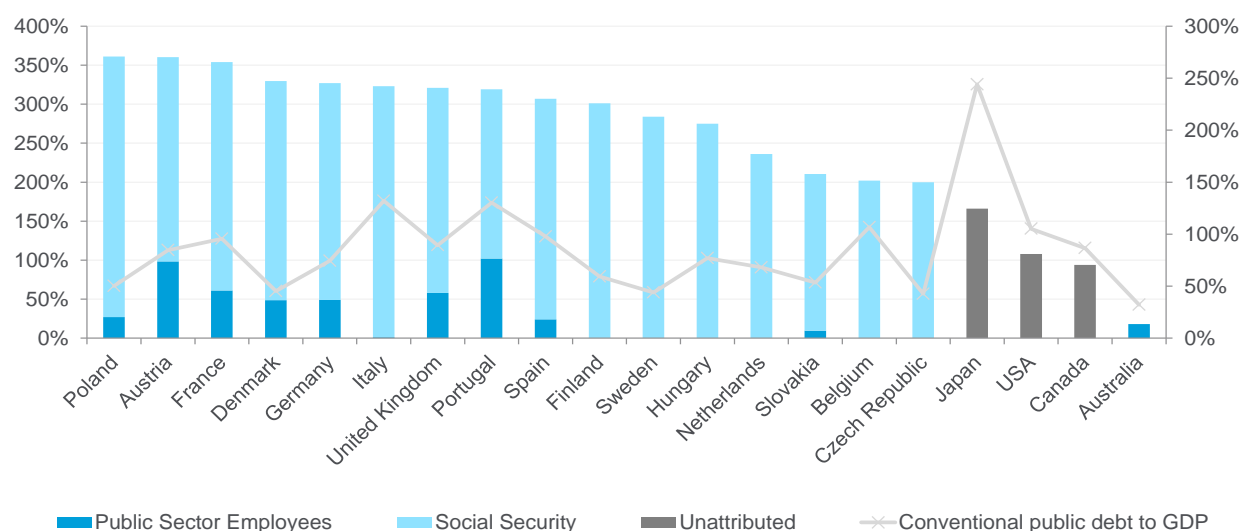
The average contingent liability to GDP from public sector pension liabilities is ~190% of GDP

The conclusion from this chart is stark. The average contingent liability to GDP from public sector pension liabilities is ~190% of GDP using a weighted average. This eclipses published conventional national debt, which for the countries in our chart is an estimated 109% of GDP. In dollar terms, the numbers are staggering. We estimate the value of unfunded or underfunded government pension liabilities for the twenty countries in Figure 15 to total \$78 trillion, compared to published national debt of \$44 trillion.

The unfunded or underfunded government pension liabilities for twenty OECD countries is \$78 trillion vs. published national debt of \$44 trillion

Unsurprisingly, countries with significant state pension systems in Europe appear to have the greatest issue here. Notably, France, Germany, Italy, the UK, Portugal and Spain have estimated public sector pension liabilities in excess of 300% of GDP according to these calculations. Also for most countries, with the exception of Japan, US, Canada, and Australia, the level of contingent public pension liability is 2-3x the size of 'conventional' public debt-to-GDP ratios.

Figure 15. Collated Estimates of Contingent Government Pension Liabilities as a % of GDP



Note: Most data based on 'Freiburg' model calculated on 2006 data; UK, Australia and Spain based on National calculations based on 2010 data; US, Japan and Canada based on 1996 data estimated by Chand and Jaeger.

Source: Kaier and Muller (Freiburg University), DNB, OECD, Citi Research

Assumptions Risk – Interest Rates and Mortality

The data in Figure 15 is highly sensitive to the assumptions used. The 'Freiburg Method' used to project liabilities that forms the basis of most of this data is based on aggregating data on age-sex specific data on existing pension entitlements and then projecting these based on demographic and mortality assumptions separately for each 'cohort'. There are also important economic assumptions in this projection, e.g. for wage inflation (to project current benefits to retirement age) and the choice of the discount rate used to value pension entitlements.

The valuation of pension liabilities is very sensitive to the assumptions used, i.e. interest rates

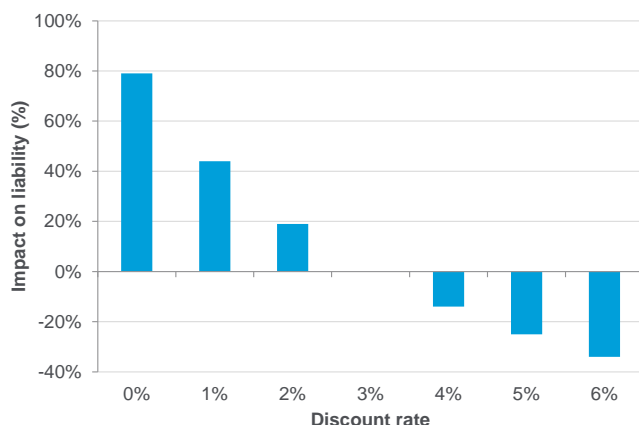
The long duration nature of pension liabilities means their valuations are highly sensitive to the assumptions used. Lower-than-anticipated future interest rates, coupled with higher-than-expected wage inflation and longer-than-expected life expectancy could impact pension debt to GDP ratios negatively. The majority of the calculations shown in Figure 15 are based on a standard 3% discount rate, 1.5% real wage inflation and a 'standard' mortality scenario that allows for future improvements in life expectancy over time. There are some major exceptions, e.g. the UK data is based on substantially higher discount rate of 5%.

In Portugal, a 100bps reduction in the discount rate would add ~15% to the value of contingent liabilities

Some of the studies on government pension liabilities provide sensitivity analysis to economic and mortality assumptions. A DNB working paper on the measurement of international pension obligations⁶ looked at sensitivities to Portuguese government pension liabilities. Figure 16 shows that a 100 basis point reduction in the discount rate would add ~15% to the value of contingent pension liabilities in Portugal. The pension liability calculations assume future improvements in life expectancy in-line with observed trends in each market. Figure 17 suggests that if this was removed (and we assumed constant life expectancy), this would reduce pension liability valuations by ~7%. However higher-than-expected life expectancy at 1.5x the central assumption could increase the pension liability by ~5%.

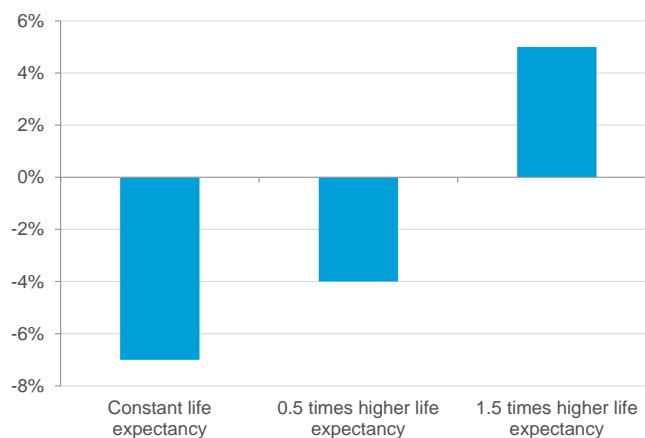
⁶ van der Wahl, D., (2014), 'The measurement of international pension obligations – Have we harmonised enough?', DNB Working Paper, No. 424, May 2014

Figure 16. Impact on Portuguese Government Pension Liability from Change in Discount Rate



Source: Kaier and Muller (Freiburg University), Citi Research

Figure 17. Impact on Portuguese Government Pension Liability from Change in Life Expectancy Assumption



Source: Kaier and Muller (Freiburg University), Citi Research

Some US states and municipalities have faced pressure on their pension plans while others will face tremendous budget pressure in the coming years due to expensive pension commitments

Spotlight on US States and Localities

Certain US states and localities have faced severe pressure on their budgets due in part to pressure from the pension plan including, most notably, Detroit. Some have passed legislation trying to limit future cost of living adjustment (COLA) increases or to decrease the rate at which current employees earn benefits. And some have put in place defined contribution systems for future employees, but it will be decades before those changes are felt.

In the meantime, budgetary pressures will be less on the actual pensions themselves (except in the most egregious situations) and more on state and local budgets, which will see pension contributions rise as a percentage of overall spending. This has resulted in anger and electoral efforts to change pension rules in for example some parts of California and in negotiated settlements where all parties could see that current math is unworkable, for example in Rhode Island.

In coming years, states like New Jersey and Illinois will face tremendous budget pressure due to expensive pension commitments. And many municipalities in California will face difficulty meeting their pension obligations to the state fund CalPERS (California Public Employees' Retirement System).

So long as local governments do not file for bankruptcy (states cannot do so, but municipalities can), retirees can expect their pensions to be paid. But many other government obligations will need to be cut back or taxes will need to be raised in order to fulfill these obligations. These pressures will gradually become quite large.

Pension Reforms: Mitigating Pension Costs

The estimates of future pension liabilities largely incorporate any pension reforms announced in each country at the time of calculation. Obviously, given most of the data is based on the 2006 base year, this may not include recent measures taken in many countries to curb pension costs as part of deficit reduction measures during the financial crisis.

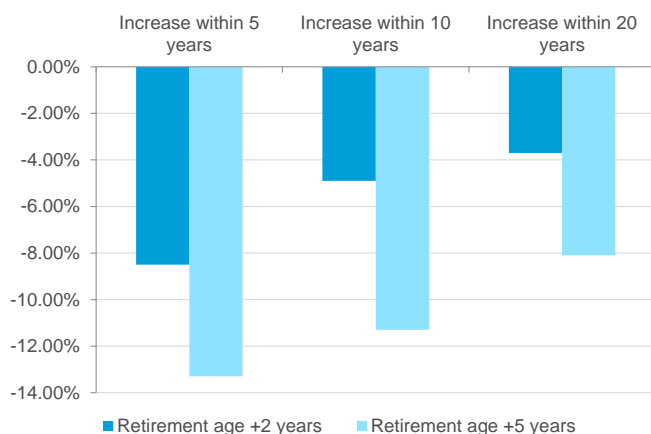
We give examples of the types of mitigating actions taken by some governments in Figure 20, at the end of this chapter. On the whole these include:

Pension reform is being enacted to start mitigating pension cost

Raising the retirement age by 2 years and enacting this within 10 years could reduce pension liabilities by ~5%

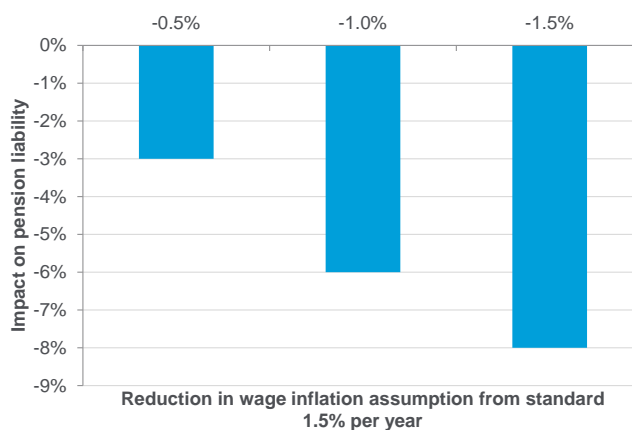
■ **Increasing retirement ages.** This is the simplest reform to enact, but politically highly charged. Governments making this change commonly announce increases to retirement age for those still far away from retirement to avoid affecting those already close to retirement who may be an important section of the population (and a high share of the voting population). Hence, increases to retirement ages are usually phased in over time. Figure 18 shows the sensitivity to increasing retirement ages on the level of public pension liability according to two factors: (1) the number of years increase to the retirement age; and (2) the 'phase-in' period over which the retirement age increase is enacted. This data is (again) based on calculations on the contingent pension liability in Portugal. What it shows is that the speed with which governments enact the change to public retirement ages is just as important as the level of the retirement age increase itself. For example, raising the retirement age by 2 years and enacting this within 10 years could reduce pension liabilities by ~5%. One of the key changes that some governments have put into place is an equalization of the retirement age between males and females, partly to reflect the fact that women benefit from longer life expectancy than men. Another potential change, that we believe is a highly sensible adjustment to national retirement ages, is to link retirement ages explicitly to publicly published life expectancy data. This reduces the longevity assumptions risk in the level of pensions liability (which as we have shown is considerable), and eventually removes the political dimension in deciding future increases to public retirement ages.

Figure 18. Impact of Raising Retirement Age on Portuguese Government Pension Liabilities According to Time Taken to Put Increase into Place



Source: Citi Research

Figure 19. Impact on Portuguese Government Pension Liability of Reducing Real Wage Inflation Assumptions



Source: Citi Research

Basing the retirement benefit on career average wages vs. targeting some proportion of a person's final salary is a cost saver

■ **Reducing level of retirement benefit.** The most common adjustment to control the level of retirement benefit is changing from a benefit structure targeting some proportion of a person's final salary to one that is based on *career average* wages. Again, this can be politically controversial, but is easier to put into place for new entrants to the workforce rather than existing employees who would otherwise see a sharp cut in their pension entitlement, as current wages or future expected final wages before retirement are likely to be significantly higher than career average wages. However, for younger parts of the population and newer employees, a change to the benefit entitlement will clearly take a far longer time to have an effect on pension payments, therefore the present value of this change could be relatively low.

We do not have analysis of the impact on social security and public pension liabilities of shifting to a career average wage accrual (clearly the financial impact will also depend on how quickly this was put into place and which parts of the pension system are affected). However, in Figure 19 we show the impact of wage inflation assumptions on pension liabilities for the Portuguese public pension system. This shows that if wage inflation was removed as a factor altogether (which we believe would be similar to shifting employees to a career average wage rather than final salary), then the impact could be up to an 8% reduction in liability (i.e. assuming 1.5% real wage inflation is reduced to 0%). Other types of pension benefit reductions that governments have considered or put into place include a lower level of annual accrual (i.e. each year buys you a lower proportion of your salary), or simple absolute cuts to the level of benefits. The latter has been used by many governments recently in a bid to reduce national deficits during the sovereign debt crisis – for example through pension benefit and ‘bonus allowance’ cuts in Greece and Portugal. Those countries with the highest replacement rates (see Figure 14) clearly have the best scope for reducing benefits without harming relative pension adequacy.

■ **Other measures.** Other measures to control the growth or level of public sector pension liabilities include:

- Increases in specific pension taxation or general taxation to help fund pension costs: For example, increases to social security contribution rates related to pensions, where this is relevant.
- Freezing pension benefits – this is similar to reducing future pension entitlements or removing wage inflation, which we discussed above.
- Measures to redirect private pension savings into the public pension system: This was put into place in some Central & Eastern European (CEE) countries in recent years (e.g. Poland and Hungary), with mandatory private pension contributions and assets in private schemes transferred back into the public sector. However, while the increased contributions into the public system (and increased assets) alleviate the short-term costs of paying current pensioners in the public system, the longer-term liabilities of the public pension system are actually *increased* by this measure. Countries using this approach have simply increased contingent future pension commitments and potentially acted to reduce future retirement income.
- Incentives to lengthen working lives: Rather than just increasing official retirement ages, incentives can be provided to encourage workers to defer their retirement (e.g. through higher pension entitlements). These have the benefit of keeping workers contributing into the existing system for longer, and the cost of providing higher entitlements may be offset by some extent by lower remaining life expectancy for those retiring a little later.
- Administrative efficiencies: Measures can be taken to reduce the non-benefit costs of a pension system, e.g. through centralising the administration and management of multiple schemes, or through central asset management of funded public pension schemes.

In Figure 20, at the end of this chapter, we list some of the measures that governments have already taken in some major economies to address future pension liabilities. Note that many of these reforms have already been taken into account in estimates of future pension costs as a percent of GDP or current pension liabilities.

Conclusion

Some basic measures could have a significant impact on public sector pension liabilities

It is clear from the published work and analysis that public sector pension liabilities could be a significant multiple of stated public sector debt to GDP figures, with average contingent pension liabilities to GDP of ~190%, compared to a 'conventional' public debt to GDP ratio of ~109% for most countries in our sample. Although these liabilities are not strictly the same as public borrowings (meeting them will be just as expensive as meeting debt obligations), the political and practical consequences of not paying these liabilities seem to be similar. In addition, there are significant downside risks from getting the assumptions wrong in planning for the future – as we have shown, an increase in life expectancy to 1.5x our current expectations could increase liabilities by 5%. There is also a substantial risk from lower-than-anticipated interest rates, given the sensitivity of long-term liability calculations to the discount rate assumption.

It is important to note that some basic measures could have substantial impact. For example, increasing retirement age could reduce liabilities by ~5%-10% and a shift to career average wage based pension schemes (rather than final salary) could also reduce liabilities by up to ~8%. These measures alone could reduce the level of implied contingent liability to GDP from public schemes below 200%.

Figure 20. Country-Specific Pension Reforms in Recent Years

Country	Coverage	Pension Benefits	Taxes	Pension ages	Other
Australia	Abolition of 70-yr limit on compulsory contributions to private pension schemes (2013)	Mandatory DC contributions to 9.5% from July 2014 - expected to increase further in future years. From 2017, Age Pension indexed to consumer price index.	Increased taxes for higher earners from 2012 in superannuation scheme.	Age Pension equalized for men and women to 65 and increasing to 67 by 2017-23. Retirement age gradually increased to 70 (and equalized for women and men) by 2035.	Introduction of standardized MySuper 'default' product to replace existing default superannuation products from 1 January 2014. Results in greater administrative efficiency and pressure on fees.
Canada	New retirement savings plan (Pooled Registered Pension Plan) voluntary except in Quebec and based on auto-enrollment.	Increase of general drop-out provision to exclude 17% (from 15%) of the contributory periods of low earnings from benefit calculation.		Old-Age-Security (OAS) and Guaranteed Income Supplement benefit (public retirement systems) retirement age to increase from 65 to 67 between 2023 and 2029.	Automatic enrollment regime for OAS benefits being phased in from 2013 to reduce administrative burden on seniors administrative costs.
Chile	Self-employed automatically enrolled into DC pension system with opt-out option.				Management fees reduced in public defined contribution pension system from 114bps to 47bps on account holder's monthly earnings. Fees reduced for disability and survivor insurance.
France	Minimum contribution period introduced, but contribution period used for public pension benefit will be more generous for maternity, training, unemployment, students and part-time work. Contribution period will be increased in-line with changing life expectancy.		10% pension bonus for having at least three children will now be subject to taxes. The contribution rate will increase by 0.3ppts for both employers and employees from 2017.	Increase in retirement age to 62, but a person contributing to a full pension can retire by 60 without penalty. Individual accounts established to take into account arduous work, possibly allowing shorter contribution period.	Targeted minimum income of 85% of minimum wage.
Germany		Reduction in benefits for retirement before age 65		Retirement age lowered from 65 to 63 for people with 45 years of contributions.	Introduction of voluntary defined contribution pensions product with tax advantages.
Italy	Pension age to 65 (from 60) for men and to 60 (from 55) for women. Pension age for women and men to be equalised and growing to 66 from 2018. Pension age linked to life expectancy thereafter.	Adjustments to early-retirement benefits based on notional annuity calculation - making this more 'economically' linked.			
Japan	Pension age increasing to 65 (from 60).	Public pension benefits adjusted to reflect change in dependency ratio - lowering replacement ratio. Earnings in pension calculation to include bonuses.			Accrual rate reduced.
United Kingdom	Pension age for women rises to 65 and equalizes with men by 2018. Pension age rising to 66 by 2010 and 67 by 2026. Further consultations on pension age underway. Employers are required to provide access to pension and system of auto-enrollment introduced for all employers and employees.	Contribution rates in auto-enrollment to be increased from 1% to 3% for employers and 1% to 5% for employees. New single state pension replacing existing basic pension and minimum income guarantee from 2016.			NEST scheme (national auto-enrollment scheme) introduced for employers who do not want to set up their own defined contribution pension arrangement. Expected to have large economies of scale.

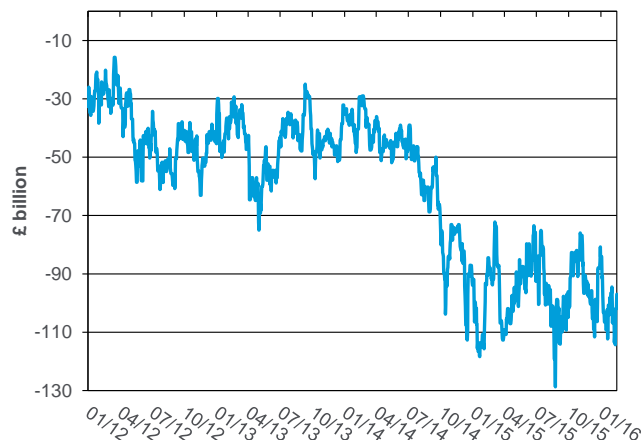
Source: Citi Research

Private Sector Pension Deficits Globally

Private companies also have pension deficits

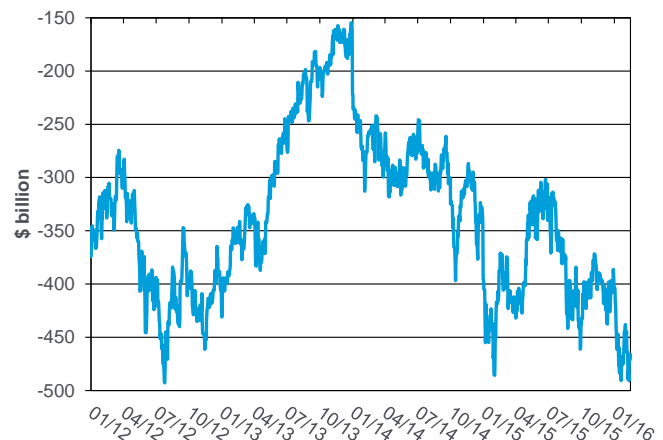
At the end of 2015 in the US, S&P 500 companies were estimated to have pension deficits totaling \$403 billion (while total pension obligations amounted to \$2,027 billion). In the UK, FTSE 350 companies were estimated to have deficits of £84 billion and gross liabilities of £686 billion, or £936 billion on a more conservative buy-out basis⁷ — by this we mean the financial assumptions used by insurers to price a defined benefit pension scheme buy-out. Obviously these figures are significant underestimates of total private sector deficits in those countries (as they do not include unlisted or smaller listed companies or other private sector exposure). It is not surprising that private sector pension deficits have been in focus with equity investors for some years now. Figure 21 and Figure 22 illustrate the development of these deficits (and pension liabilities and assets) over recent years.

Figure 21. FTSE 350 Pension Accounting Deficit, 2012-date (£bn)



Source: Aon (pensionrisktracker.aon.com)

Figure 22. S&P 500 Pension Accounting Deficit, 2012-date (\$bn)



Source: Aon

Private sector pension deficits are mostly a US and European problem as emerging market employees don't generally receive these pension benefits

Primarily, private sector deficits are a US and European problem, although pension deficits are also significant for some Japanese companies; employees in emerging markets generally do not receive these pension benefits. Even within Europe, corporate pension exposure varies significantly by country, and to some extent sector; only those companies which have significant defined benefit (DB) pension benefits (e.g. final salary based schemes) are affected. Most exposed companies are typically in the UK or Germany, often with historically very large workforces and/or public sector roots. In Germany, corporate pension schemes were historically unfunded, although DAX companies have tended to move towards a funded approach in recent years.

It is also, increasingly, a legacy issue: many companies have closed their defined benefit pension plans to new employees, and now some companies are freezing their pension schemes altogether, with existing pension rights protected but no further benefits granted. Nevertheless, the size of the existing liabilities continues to present significant challenges.

⁷ Aon pension risk tracker data as of 31 December 2015 (pensionrisktracker.aon.com).

Past accounting guidelines could be partly to blame for some of the private company pension issues

Some of the roots of companies' pension problems may be found, in our view, in the failings of pension accounting. (Many would argue that the failure to account properly for pension exposures has been an even bigger issue in the public sector.) Past pension accounting guidelines allowed pension deficits to be left off-balance sheet; this deficiency was only fully corrected in Europe in 2013. Even today, US pension accounting flatters earnings for companies with large, funded pension plans which invest in risky assets, and this may still be discouraging companies from reducing pension risk or exiting pension obligations. We outline below the current IFRS and US GAAP pension accounting rules, which we believe are fundamental to understanding corporate pension problems.

Pension Accounting

Bringing pension deficits on-balance sheet has increased company managements' focus on the need to manage pension risk

Under both IFRS and US GAAP⁸ accounting rules, pension deficits must now be reported on balance sheet. The pension deficit is the difference between the gross pension liabilities (the present value of all the pension benefits granted to date) and any pension assets which have been set aside into a separate vehicle to fund those obligations. Until 2006 in the US, and 2013 for Europe, it was possible for pension deficits of listed companies to remain off-balance sheet. We believe that bringing pension deficits on-balance sheet has increased company managements' focus on the need to manage pension risk.

The critical assumptions for calculation of the pension liabilities are:

- Discount rate;
- Inflation assumptions (e.g. if pension benefits are index-linked); and
- Mortality assumptions.

Three critical assumptions for the calculation of pension liabilities are discount rate, inflation assumptions, and mortality assumptions

The discount rate has been the most controversial of these factors. Under current accounting rules (both IFRS and US GAAP), the required discount rate is the market yield on high-quality (i.e. AA) corporate bonds of appropriate duration and currency. In the past, pension liabilities were frequently discounted using the expected return on the pension assets (typically a significantly higher rate). Many would argue that the theoretically right discount rate is the risk-free rate (which would be lower than the current AA discount rate).

Pension assets are measured at market value. Pension deficits must be marked-to-market at each reporting date, reflecting market discount rates and market asset values at the balance sheet date. We believe that the requirement to report current pension deficits on-balance sheet has been one of the factors driving increased pension risk management and asset-liability matching (together with other factors such as maturing pension schemes, reduced corporate risk appetite, increased regulation and tougher funding rules in some countries, and increased investor focus).

⁸ More than 90 countries require listed companies to use IFRS accounting rules, including all EU members. US GAAP accounting rules apply in the US.

Pension expense is made up of the pension service cost and a financial component.

Under IFRS, differences between the movement in the pension deficit on the balance sheet and the pension charge on the P&L do not have an impact on company earnings per share

Under US GAAP, earnings may be flattered if company management takes an optimistic view on long-term pension asset returns

P&L Treatment: International Financial Reporting Standards (IFRS)

Under IFRS, pension expense normally has two main components: an operating cost ('pension service cost') which equates to the value of the pension benefits granted in the year, and a financial component, which is calculated by multiplying the amount that the pension is underfunded (i.e. the pension deficit) by a discount rate (i.e. a notional interest charge on the pension underfunding). As pension schemes are increasingly frozen, the service cost may eventually reduce to zero (for defined benefit schemes; there will typically be a much lower expense for any replacement defined contribution scheme).

If the company undertakes a pension buy-out, in which the company passes the pension obligations to an insurance company, a loss corresponding to the difference between the pension deficit (as defined by IAS rule 19) and the buy-out measure of the deficit will be reported in the P&L.

Under IFRS, any difference between the movement in the pension deficit on the balance sheet and the pension charge on the P&L (i.e. 'actuarial gains and losses', such as movements in the pension liability arising from change in the discount rate) are reported in 'other comprehensive income' and crucially therefore do not have an impact on earnings per share (EPS).

P&L Treatment: US Generally Accepted Accounting Principles (GAAP)

In US GAAP, pension expense is the total of:

- Pension service cost (as in IFRS);
- Expected return on plan assets – this is an estimate by company management of the long-run expected return (%), multiplied by total pension plan assets;
- Interest on pension liabilities; and
- Other items, e.g. smoothing of past actuarial gains and losses.

These are generally reported as a combined pension expense within operating costs on the P&L.

Importantly, this means that under US GAAP, earnings may be flattered if company management takes a relatively optimistic view of the long-term pension asset returns (particularly if these are held in riskier assets). However, US GAAP also requires that all pension schemes gains or losses are (eventually) reported within earnings, unlike IFRS.

It is worth noting that in both the US and Europe, pension funding rules are separate from pension accounting rules. Pension funding requirements differ by country, with the Netherlands arguably the most strict (i.e. pension schemes are regulated similarly to insurance companies). Generally, Netherlands schemes are required to be fully funded within a year, whereas in the US deficits should be filled within 7 years, and typically up to 10 years in the UK – however, calculations of funding deficits also vary by country.

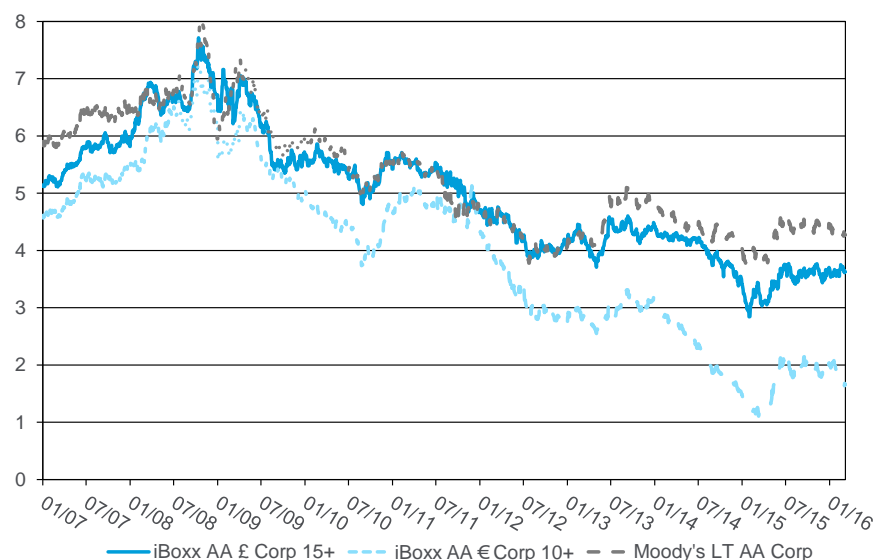
Drivers of Deficits

What are the key drivers of pension deficits in the private sector? Clearly for funded pension schemes, the valuation of pension assets is an important factor, driven by the performance of both equity and fixed income markets. Generally, equity allocations have fallen over recent years: in the UK, FTSE 350 companies' pension schemes now hold only an estimated 30% of assets in equities (compared to well over 60% in the early 2000s). In the US, the 250 largest corporate defined benefit plans hold an estimated 40% of assets in equities.

The single biggest factor driving pension deficits in recent years has been discount rates with lower interest rates resulting in higher pension deficits

However, the biggest single factor driving pension deficits in recent years has been discount rates, with much lower interest rates in recent years resulting in higher pension deficits. We show in Figure 23 the development of AA discount rates (£, Eurozone and US) over recent years. Typically, for a UK-listed company pension scheme, a 10 basis point reduction in discount rate increases the gross pension liability by about 1.7%.

Figure 23. UK, European and US Pension AA Discount Rates, 2007-date



Source: Datastream, Citi Research, UK index iBoxx £AA 15+ corporate bond yield, Euro index iBoxx €AA 10+ corporate bond yield, US Moody's long term AA corporate bond yield.

Longevity is also a driving factor leading some companies to adopt new mortality tables

A further factor has been a trend over some years of greater-than-expected improvements to longevity. For UK company pension schemes, 1 year of additional life expectancy increases gross liabilities about 3%. In fact in the United States, the Society of Actuaries recently adopted new mortality tables. Many companies have already adopted them, and all will soon be required by the IRS to use them. The new tables, on average, (depending on age and activity of workers and retirees) increase liabilities by 6-10%. There are a number of studies that estimate this however they all differ. See [Treasury & Risk article](#) and [Russell Investments article](#).

Looking Forward

Greater focus on corporate pension risk management will continue

We believe the greater focus on corporate pension risk management will continue. As we have seen, company pension deficits affect the balance sheet directly, and equity investors increasingly include pension deficits in company valuations. Therefore pension volatility has a direct share price implication for listed companies.

The increase in maturity of corporate pension schemes encourages a shift away from equity and towards greater asset-liability matching

While there is no significant change to pension accounting anticipated in the near term, the direction of travel has been greater disclosure and ultimately a more conservative measurement of defined benefit pension liabilities.

The pension buy-out and buy-in market has been growing, albeit from a relatively small base. Some companies have also bought longevity swaps or other hedging instruments. The increased maturity of corporate pension schemes (resulting from the closure of defined benefit schemes to new members and, in some cases, the closure of schemes altogether) encourages a shift away from equities, towards bonds and greater asset-liability matching.

If pension schemes move into surplus (i.e. as rates rise), we believe corporates will be far more willing to engage in buy-outs

Ultimately we think many companies will wish to exit pension exposure altogether through buy-outs. The critical factor is pricing: how big a loss a company would have to crystallize on a buy-out and how big a cash contribution would be required. This is partly driven by the insurers' appetite for buy-outs which may increase price competition. But for corporates, the biggest single factor is interest rates. If (long-term) interest rates increase significantly, deficits will fall (*ceteris paribus*). If pension schemes move into surplus, we believe CEOs will be far more willing to countenance a buy-out, even if there is a one-off P&L and balance sheet hit.

The average sensitivity is an approximately 1.7% increase in liabilities for a 10bps move in discount rates

It is relatively easy to quantify the approximate sensitivity of gross pension liabilities to discount rates. For example, as noted earlier, for UK-listed company pension liabilities, the average sensitivity is an approximately 1.7% increase in liabilities for a 10 basis point (bp) move in discount rates. While the relationship isn't entirely linear, we assume that a 100bp increase in discount rates would decrease FTSE 350 liabilities by over £100 billion (on an IFRS basis), close to the current entire deficit. However, deficits would clearly not fall by this much, due to large bond portfolios within pension assets, which would also fall in value. Nevertheless, a significant move up in interest rates would clearly reduce deficits. If we assume a 50% hedging of interest rate exposure, a 200bp increase in discount rates would eliminate the FTSE 350 deficit (ignoring any impact on the equity market or other factors).

Ultimately we anticipate most defined benefit pension liabilities will end up with insurers

Ultimately we anticipate most defined benefit pension liabilities will end up with insurers: in our view, it's just a matter of time. Eventually, in fact, we do not think there will be any corporate pension liabilities left. But it will be several decades before all the current defined benefit scheme members collect their last pension payment.



RECOMMENDATIONS

Addressing the Crisis

We address our recommendations to three constituencies: policymakers, corporate plan sponsors and product providers (namely asset managers and insurers).

Recommendations to Policymakers

We believe governments need to take action in two areas: (1) addressing large unsustainable public sector and social security pension liabilities and (2) creating a regulatory framework to encourage more sustainable pension systems for future savings and generations.

1. Measure your Pension Liabilities Consistently and Publish Them

Make data on the size of government and other retirement commitments public

If you don't measure it, you will never solve it. Governments must make data on the size of government and other public retirement commitments public. They must be clear about their assumptions, and clear about their size. This is the only way policymakers stand a chance of addressing the pension problem.

Governments and international bodies (e.g. the EU, IMF, and OECD) must agree on how to value these liabilities — with realistic discount rates and other assumptions — and introduce consistent reporting standards in published national accounts. Our calculations indicate for a basket of OECD countries there are \$78 trillion of unfunded or underfunded liabilities currently not being shown on government balance sheets.

2. Link Retirement Ages to Longevity

Reconsider linking retirement age with expected longevity

We believe all countries should reconsider their approach to retirement by explicitly linking retirement age with expected longevity. Many countries (e.g. the UK, France, and Italy) are already in the process of gradually raising retirement ages to reflect this, but there is no explicit link with mortality tables. Not only could this have a substantial positive impact on liabilities (e.g. raising the national retirement age by just 2 years could reduce liabilities by between 4% and 8%), but linking retirement to an independently monitored variable removes some of the politics from making this decision and also helps to 'future proof' the national retirement system.

As an anecdotal example to show the power of linking retirement age to longevity, if the retirement age were adjusted so that retirees received 12 years of retirement benefits (the retirement benefit that was originally forecast when instituting the US social security system), the new retirement age would be 73 and this would save ~\$4 trillion.

3. Redefine Social Security Pensions as a 'Safety Net'

Social security should be restored as a 'safety net' rather than a prime pension provider for an aging population

In some countries, government pensions paid to the general public go well beyond a level that we would describe as 'social security'. This is a particularly important issue in Europe where pension liabilities borne by governments are 2-3x the size of the economy. Unless this is addressed in the near future, we believe the rising annual cost of servicing these liabilities will reach crisis levels, with costs rising by 2%-3% of GDP by 2050 based on existing public pension plans. The idea that the government should guarantee incomes in retirement for pensioners that could live for a quarter of a century is simply not tenable, in our view.

Existing and vested commitments to individuals over the age of 50 should not, and politically speaking cannot, be cut. But the level of future pension promises for younger workers must be reduced. This can be done by restoring the function of social security to act as a 'safety net' that provides a basic minimum level of pension income for those that need it, rather than the prime pension provider for an aging population.

4. Adopt Legislation Allowing 'Collective Defined Contribution' or 'Defined Ambition' Plans

Look at alternative models such as Collective Defined Contribution plans to lower risk

Defined contribution plans leave all the risk on the employee. But there are alternative models, such as 'Collective Defined Contribution' (CDC), which are common in the Dutch pension market. These are based on a defined contribution principle but rather than allocating funds to individuals, the scheme targets a 'defined ambition' of salary-related benefits for employees and collectively manages funds to achieve this ambition. The guarantees are not concrete, but longevity can be pooled, asset management can be combined, and long-term time horizons can be maintained. Importantly, they benefit from professional risk and asset-liability management, rather than leaving individuals to make complex investment and actuarial decisions.

Policies to Encourage Private Sector Pension Saving

Countries that have set up private pension savings systems (e.g. the US, the Netherlands, and Australia to name a few) tend to have lower public pension costs (as a proportion of GDP) and are likely to face limited inflation in these costs over the next few decades.

5. Enact Strong Fiscal Incentives to Encourage Private Pension Savings

Governments need to promote private retirement savings with generous tax incentives

Individuals are unlikely to take actions to address their private pension savings needs without a strong fiscal incentive. Pensions are a long-term savings vehicle and many consumers are cautious about committing their capital into a product that will not provide a return until much later in life. It therefore makes sense that governments seeking to avoid high public expenditure on pensions should seek to promote private savings with generous tax incentives. We think this is better than the alternative of a rising government pension burden.

Most current successful private pension systems globally achieve this by allowing individuals to avoid income tax on retirement savings contributions (usually up to a limited level of contribution) and earn tax-free investment returns in pension funds. Tax is usually paid on retirement income taken later in life. Incentives should be powerful, but, to avoid favoring wealthier individuals, it may be necessary that tax benefits are at a 'flat rate' regardless of income (i.e. a flat tax benefit for all individuals regardless of their income or marginal tax rate, in particular for individual defined benefit contribution accounts).

Just as we advocate that a degree of means testing should be applied to social security systems, we advocate at the other end of the spectrum that tax incentives for pension savings go well into levels of higher earnings in the case of CDC plans. It is important to make sure that wealthier individuals do not rely on the government unnecessarily. At the same time, if CDC systems are to be implemented and thrive, it is important too that wide swathes of society feel invested and committed to the system and that the CDCs have sufficient scale to succeed.

Switch corporate pensions to 'opt-out' vs. 'opt-in' to encourage greater enrollment

6. Enable 'Soft Compulsion' to Encourage Saving in Corporate Pensions

Workplace pensions provide one of the best means to encourage increased retirement savings. These provide better scale than individual private schemes and possibly better investment choice.

To avoid the creation of a 'pension tax', we believe this compulsion should have an 'opt-out' function, rather than the full compulsion route used in Australia. The model of 'auto-enrollment' in the UK and other markets is an attractive compromise. Take-up rates in UK schemes under this approach have been high (despite the 'opt-out' option). Automatic contributions should rise in percentage and dollar amounts as time in employment and salary increase.

Protect individual investors from excessive charges and make appropriate allowances for the provision of advice

7. Protect Consumers with Cost Regulation and Advice

If there is to be an increasing level of compulsion to save, albeit in a 'soft-compulsion' approach, it will be necessary to ensure that individuals are protected from excessive charges or inappropriate investment choices. We believe some form of charge-capping is necessary to avoid high pension fund charges eating too much into customer investment returns in defined contribution schemes.

Consumers will also need access to advice in making appropriate investment decisions and to decide contribution rates. Hence, it is important that any regulation of costs provides an appropriate allowance for the provision of advice. This is a potential problem in some countries such as the Netherlands and the UK, where payment of commission to financial advisors is prohibited for investment products. Reasonable payment for providing advice, even if provided through automation or 'Fintech', will be necessary.

Ensure all workers have access to a retirement plan

8. Ensure That All Workers Have Access to a Retirement Plan

In the US, 45 million workers have no access to a workplace retirement plan. In many countries the numbers are even more stark. In the UK, that problem is partially addressed by the National Employment Savings Trust (NEST), a professionally managed pension system that allows employers to provide a pension structure without building their own pension infrastructure.

Other countries need systems similar to NEST. Employers should be required to offer access to such systems if they do not provide their own plan. And those systems could be run as CDC schemes, as described above.

A longer-term approach to closing pension deficits makes sense to help reduce the risk that benefits are cut

9. Adopt a Longer-term Approach to Dealing with Defined Benefit Deficits

Pension liabilities are a movie, not a snapshot. This should be reflected in policy.

There is a natural tension between addressing deficits immediately and managing for the longer term. Regulation plays an important role — pension funding regulation can sometimes require companies to close deficits very quickly (e.g. around 1 year in the Netherlands, compared to 7 years in the US). We think a longer-term approach to closing deficits makes sense: pension plan sponsors should be forced to make the necessary contributions to raise funding levels back to 100%, policymakers should ensure that financial and actuarial assumptions used to calculate contribution rates are 'realistic', and sponsors should be allowed enough time to get to full funding.

A longer-term approach to closing deficits should reduce the risk that benefits are cut (or that public pension protection funds are needed to bail out underfunded schemes). This would also allow corporates to have a more stable view of future funding requirements, potentially keeping more defined benefit pension plans intact.

Recommendations to Corporate and Public Pension Plan Sponsors and Managers

Managing pensions for employees will inevitably rise rapidly up the strategic agenda for corporates and other employers, as they face changes in the profile of their workforce. We believe corporates need to formulate a clear plan for managing these risks but also have clear goals for how they intend to help their employees manage retirement.

10. Make the Required Necessary Contributions — Now

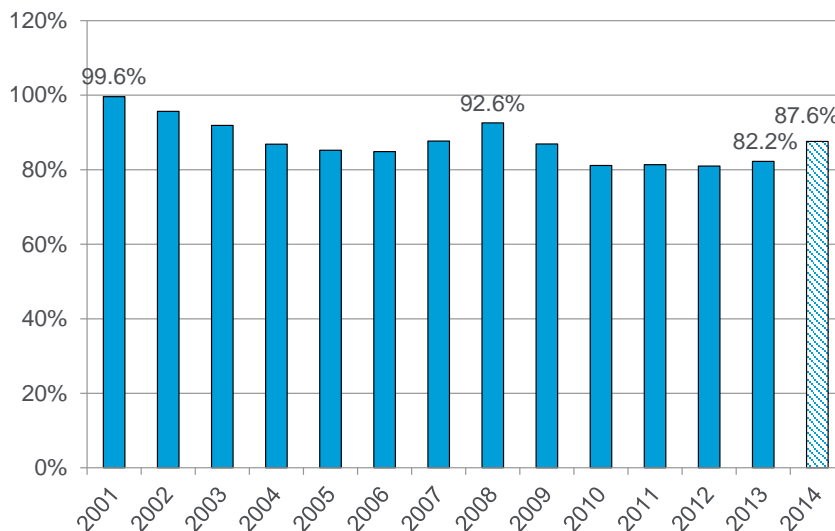
Failing to make the necessary contributions is the most significant component of underfunding — it should be a requirement that contributions are made when they are due

Pension plan sponsors must make their proper contributions at the time they are due. We believe having a generous funding plan that makes realistic assumptions for future investment returns, mortality, and benefits will avoid bigger problems down the line when pension plans start having to pay out retirement income.

One of the most significant components of global pension and retirement underfunding is their failure to do so. Unfortunately, while governments often impose genuine requirements for funding contributions on corporate sponsors, they rarely impose those standards on themselves.

For example in the US, public plans frequently increase benefits but fail to make the appropriate contribution. The Government Accounting Standards Board puts out the annual required contribution (ARC) but unfortunately, the word ‘required’ is just a word. US public plans have a median investment return of 8.3% over the last 25 years, according to the National Association of State Retirement Administrators. Investment returns are not their problem. The fact is that many public plan sponsors have simply not made the ARC.

Figure 24. Percentage of Required Contribution Paid, 2001-2014



Note: The measure for 2001-2013 is the annual required contribution (ARC) ; the measure for 2014 is the actuarially determined employer contribution (ADEC). The 2014 value is an estimate.
Source: Center for Retirement Research at Boston College, 2014 actuarial valuations and PPD (2001-2014)

11. Adopt a 'Recovery' or 'Exit' Strategy for Defined Benefit Fund Deficits

Managers of pension schemes should have a clear calculated strategy if they have a defined benefit fund deficit

Pension scheme managers dealing with defined benefit fund deficits need to make sure they have a clear, calculated strategy. It is no good to hope for 'good luck' and for markets to bail you out – bond yields might not rise as soon as you think and longevity extension remains a source of further downside risk. Where schemes are underfunded, corporates, plan sponsors or trustees managing these schemes need to decide between a 'recovery' or 'exit' strategy.

If your pension is well-funded, de-risk and move some or all of the liability to an insurer. Why be in the insurance business if it is not your actual business? We would argue that these liabilities are better aggregated on insurance company balance sheets — so plan sponsors (or trustees) should start planning for an insurance de-risking or buy-out exercise. This is particularly important for 'frozen' defined benefit pension plans that are no longer part of a company's future benefit package.

If your plan is underfunded, carry appropriate levels of return-seeking assets in your portfolio or consider issuing debt to fund some of the deficit

If your plan is underfunded:

1. Carry appropriate levels of return-seeking assets in your portfolio. Many plan sponsors have adopted 'glidepaths' to increase allocation to liability-driven investment (LDI) strategies as their funded status increases. But those with severe underfunding should have appropriate allocations to return-seeking assets.
2. Consider issuing debt to fund some of the deficit. Rating agencies view this underfunding as leverage anyway. On an after-tax basis, these contributions can be net present value (NPV) positive.

Alternatively, companies that want to continue to manage their schemes as a core part of their benefits package should consider locking-in returns through a major investment de-risking exercise involving cash flow matching of expected liability payments (i.e. LDI solution).

For severely underfunded schemes, a recovery strategy may simply not be feasible, in which case plan sponsors or trustees need to 'bite the bullet' and start planning for a possible inability to pay promised benefits. In countries where re-negotiation is permissible, this should be begin now, and insurance de-risking solutions here could also be a relevant tool.

12. Increase the Independent Governance of Schemes and Compensation of Managers

Increase the independence of public pensions and compensate their managers accordingly

Too frequently public pensions are governed by politicians. Independence, market nimbleness, and investment savvy are required for excellent management of the enormous sums of assets in pension plans. Those are characteristics that do not often go hand-in-hand with political governance. In Canada, a system of trustees or independent governance is in place to encourage sound and independent management schemes and to avoid conflicts of interest.

Moreover, if pensions are to have the human talent that is needed, managers must be compensated accordingly. The Canadian pension model has independent governance, market competition, and some of the best returns among global pensions. This is the good model to follow for large pensions.

Figure 25. Canadian Pension Plan Governance: A Culture, System and Practice of Independent Pension Governance

	Alberta Investment Management Corporation (AIMCo)	British Columbia Investment Management Corp (bcIMC)	Caisse de dépôt et placement du Québec	Canadian Pension Plan Investment Board (CPP Investment Board)	Healthcare of Ontario Pension Plan (HOOPP)	Ontario Municipal Employees Retirement System (OMERS) ¹	Ontario Teachers' Pension Plan	Public Sector Pension Investment Board (PSP Investments)
Board Appointment	11 members appointed by Lieutenant Governor in Council	Trustees of the 4 pension plans each appoint 1 member Minister of Finance appoints 3 members (1 will be Chair)	Members appointed by the Government excluding the <i>President & CEO</i> who is appointed by the Board	Board members are appointed by the Governor in Council on the Minister of Finance's recommendation	8 trustees appointed by the Ontario Hospital Association and 4 unions each appoint 2 trustees	<u>OSC Board:</u> 7 appointed by member reps + 7 appointed by employer reps <u>OAC Board:</u> Appointed by OSC (nominated by specific sponsors)	4 appointed by the Ontario Teachers' Federation, 4 appointed by Ontario government and 1 jointly appointed by both sponsors	Directors are appointed by the Governor in Council on the recommendation of the President of the Treasury Board
Board Composition	No specific composition mandated Currently 11 of 11 members are industry professionals	7 Members Current board is a mix between pension representatives, academics, industry professionals and Crown corporation executives	9-15 members, ≥ 2/3 of which must be independent (i.e. not a government/agency employee or have regulated ties to the government) Current board is a mix between industry professionals and those with a public service background	12 members Agents/employees of the Crown not permitted Current board is composed of industry professionals and academics	16 voting members (non-voting pension observers are permitted on the Board) Current board is a mix between union/hospital reps and industry professionals	<u>OSC Board:</u> 7 appointed by member reps + 7 appointed by employer reps <u>OAC Board:</u> 14 members nominated by employer & employee sponsors + independent chair	9 members Current board is a mix between industry professionals and education professionals	11 directors Agents/employees of the Crown are not permitted Current board is comprised of industry professionals

¹The OMERS Act, 2006, established an independent dual governance model for OMERS. The Provincial Government was replaced by the OSC which has responsibility for plan design, while the OAC is responsible for the day-to-day administration of the pension plan (including management of investments and pensions).

Source: Citi

Recommendations for Product Providers

As we set out later in this report, we believe the pension crisis and an aging population create significant opportunities for insurers and asset managers. Most notably, we project strong growth in: (1) insurance pension buy-outs, (2) private pension schemes and assets, and (3) guaranteed retirement income solutions. The following are our recommendations for insurers and asset managers to position themselves to benefit from these growth opportunities.

13. Invest for the Coming Growth in Pension Plans

We forecast private pension assets to grow \$5-11 trillion over the next 10-30 years (excluding market performance) as more countries adopt and emphasize defined contribution type schemes. This represents a massive opportunity for insurers and asset managers to manage these assets. Product providers in this space can choose either to be a full service provider (handling plan administration and investment management) or just focus on the investment management.

Companies that desire to be competitive in the full service space will need to make significant investments to establish distribution relationships and build efficient and scalable platforms. With much of the growth expected to come from emerging markets, having the right local market presence and partnerships will be critical. We also assume that margins will be quite thin for record-keeping and administration, due to either regulatory (fee cap restrictions) or competitive reasons. As such, scale and efficiency will be critical in order to earn attractive returns, requiring investments in initiatives such as digitalization. The most profitable companies will also need to offer superior investment capabilities and performance in order to manage as much of the assets in-house as possible (since investment management typically has much higher margins). For insurers, this likely means treating asset management as an independent profit center and investing in talent, capabilities and branding.

With a big move in private pension assets expected as more countries adopt defined contribution-type schemes, insurers and asset managers need to be ready for the inflow

Asset managers need to have the capabilities to help facilitate de-risking strategies or moves to higher alpha strategy from pension funds that are looking to reduce volatility in funding status or close current funding shortfalls

14. Asset Managers: Develop Outcome-Based Investment Solutions

We expect most pension funds to take one of two approaches over the next few years: 1) de-risk by adopting more of a liability-driven investing approach that reduces volatility in funded status, or 2) move to higher alpha strategies to help close current funding shortfalls. Asset managers need to have the capabilities to help facilitate either strategy, which we believe means shifting away from a focus on providing traditional asset class/style box-driven products and focusing more on an 'outcome-oriented' approach. Rather than presenting pension funds with a selection of different investment strategies to choose from, we believe asset managers should focus on the investment outcomes that individual pension funds are looking for and 'package' their products in a way that is tailored to this outcome. This may mean an LDI approach with currency overlays to help manage risk, or it could mean greater use of high alpha unconstrained strategies. In this sense, asset managers will have to shift away from being pure investment product providers towards more of an 'advisory' role.

Insurers need to introduce new products to help retirees create a guaranteed income stream from their defined contribution plans

15. Insurers: Create New Products for the 'Decumulation' Phase

Decumulation refers to the part of the pension life-cycle when individuals start to withdraw from their savings. One of the drawbacks of the shift away from defined benefit pension plans is that retirees will no longer have a guaranteed income stream – they will have to create one from their defined contribution plan (and other savings). This creates significant risk that retirees will outlive their savings, especially if longevity continues to increase. Insurers are uniquely positioned to address this need, and we see guaranteed income solutions as a significant growth opportunity given the aging global population. However, in order to fully realize the opportunity, we believe there will need to be changes made to annuities to simplify products and make them more attractive to consumers.

Solvency II, an EU directive that looks at the amount of capital EU insurance companies must hold to reduce the risk of insolvency, makes it difficult to offer annuities in Europe

Traditional payout annuities that guarantee an income as long as an individual lives are expensive in the current low interest rate environment, and most consumers do not like to forfeit control of their assets. Hybrid accumulation/income products such as variable and indexed annuities, which have had success in the US, provide a more consumer-friendly solution. However, these products tend to be expensive and complicated, and the income guarantees are capital-intensive for insurers to offer and create potential balance sheet risk. Solvency II's economic capital requirements also make these products difficult to offer in Europe. While we are unsure what the right product solution will be, it is critical that consumers continue to innovate given the immense need for income solutions. In addition to traditional annuities, we see opportunity for lifetime income products that can be purchased within a defined contribution plan. If structured appropriately, these could improve asset retention at the time of retirement (a key goal for plan administrators) and potentially benefit from risk pooling to improve pricing for consumers.

Insurers need to capitalize on the trend for corporate pension funds to de-risk through pension risk transfers

16. Insurers: Capitalize on the Significant Risk Transfer Potential

We see the secular trend of corporate pension fund de-risking providing a growth opportunity for insurers. Pension closeout annuities allow plan sponsors to transfer their pension liabilities to insurance companies, and we expect activity to accelerate over the next few years, especially if plans' funded status improves. Over the next 5-10 years, we project potential transactions of \$200-\$350 billion in the US, £100-£200 billion in the UK, and €100-€150 billion in the Netherlands. Other potential growth markets include Canada, Australia, and the Nordic region. We see pension closeouts as an opportunity for insurers to deploy meaningful capital at attractive returns (12-14%).

Activity is higher in the smaller end of the market, leading to higher competition and lower prices; barriers to entry in the jumbo transactions are relatively high and there is less competitive pricing

In order to effectively compete in this market, insurers need a strong rating and balance sheet, established mortality/longevity underwriting capabilities, and the ability to source attractive investments and appropriately asset/liability match. When thinking about opportunity and competition, we divide the market into 2 segments: 1) <\$1 billion liabilities and 2) >\$1 billion in liabilities. The smaller end of the market is currently seeing more activity, but it is also more competitive. In our view, having an existing relationship with a plan sponsor (such as by being the record keeper on a defined contribution plan or an employee benefits provider) can provide an advantage, but pricing is also a key factor in winning business, and barriers to entry are relatively low. By contrast, there are only a handful of competitors that have the expertise and balance sheet capacity to handle jumbo transactions. As a result, we see relatively high barriers to entry and expect less competitive pricing in this segment of the market. Transactions take significant time to complete, and a company's track record around execution and innovation can help it win deals even if it is not the lowest bidder. Therefore, investing in building a superior team can provide a significant competitive advantage.

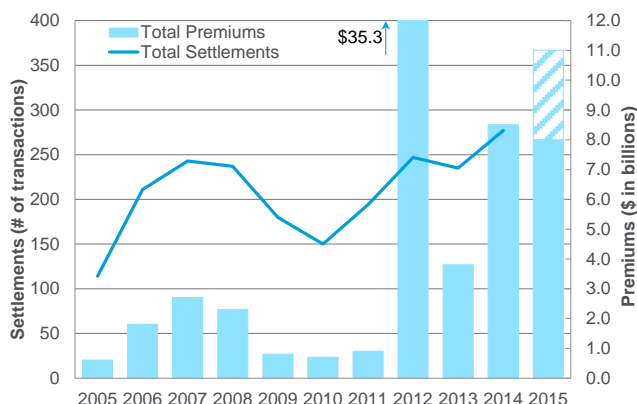


OPPORTUNITIES FOR CORPORATE PLAN SPONSORS, LIFE INSURERS AND ASSET MANAGERS

Corporate Plan Sponsors: De-Risking to Relieve Pension Volatility

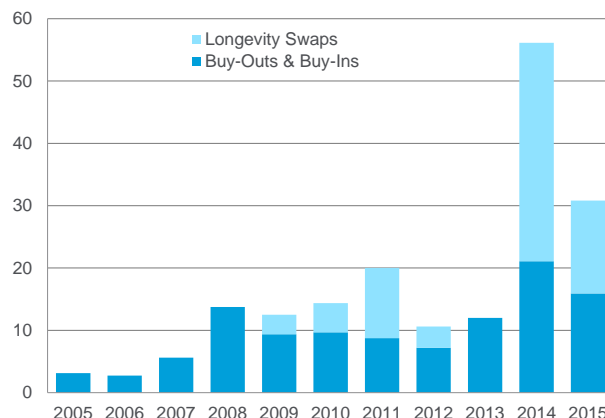
Corporations that are purposeful and focused in how they manage their pension liabilities stand to gain advantages over their competitors. These advantages can include increased leverage capacity on the corporate balance sheet, improved predictability of cashflows, a lower equity beta and cost of capital, potentially higher corporate valuations, and more attractiveness in M&A scenarios.

Figure 26. Growth of the US Pension Closeout Market



Source: Hewitt EnnisKnupp, LIMRA Secure Retirement, Citi Research estimates

Figure 27. Growth of the UK Pension Closeout Market



Source: Lane Clark and Peacock LLP, Citi Research estimates

Low interest rates and underfunding driving focus on pension risk and spurring solutions to help mitigate pension volatility and cash flow risk

Several Factors Spurring Companies to De-Risk Pensions

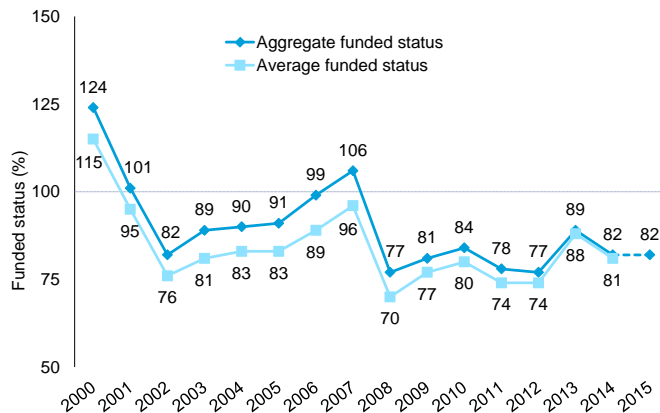
We have seen a notable shift in plan sponsors' tolerance for pension risk over the past five years and expect the pace of de-risking actions to accelerate. Given volatile equity market returns over the past decade and historically low interest rates, the majority of US pension plans are considerably underfunded. For corporate plans, Citi estimates at the time of this writing that 250 private sector plans in the US have an aggregate funded status 82%. Both companies and governments are now facing the prospect of having to make significant cash contributions to satisfy regulatory guidelines and meet future obligations. As a result, we are seeing an increased focus from management teams, boards, ratings agencies and investors on pension risk. We expect this to spur plan sponsors to pursue both internal and external solutions to help mitigate pension volatility and cash flow risk.

Volatility in US corporate pension plans has increased significantly over past decade leading to increased interest in risk mitigation

Volatility of Plan Funded Status Generating Increased Concern

US corporate pension plans have experienced significant volatility in their funded status over the past decade given swings in the equity market and interest rates. Plans went from being significantly overfunded in 1999 to only ~80% funded in 2002 following the bursting of the dot-com bubble. After recovering by 2007, funded status plummeted again during the financial crisis as plans were hit with the perfect storm of a collapsing equity market and historically low interest rates. This second downturn was especially painful because companies had contributed \$170 billion of capital to their plans from 2002-2007 to help close the shortfall. In our view, this volatility is causing plans to reevaluate their investment strategies and/or contemplate other de-risking alternatives. Many CFOs/CIOs now view 2007 as a missed opportunity. As a result, if plan funding levels improve, we expect a flurry of activity as companies seek to mitigate the risk of large gaps recurring in the future.

Figure 28. Most US Corporate Pension Plans Remain Underfunded



Source: Towers Watson, Citi Research

Figure 29. UK Corporate Pension Funds



Source: Citi Research

The Moving Ahead for Progress in the 21st Century Act (MAP-21) allows plans to calculate the discount rate for determining minimum contributions using a 25-year average. The Act also raised PBGC premiums

Legislative Changes Make Funding Requirements More Stringent

In our view, two specific factors have made the pension funding issue in the UK more acute and spurred companies to take action sooner: (1) plan cost of living adjustments have magnified the benefits costs and (2) passage of legislation that imposed stricter funding requirements. Historically, corporations in the UK offered generous pension benefits that included cost of living adjustments. Life expectancies have steadily increased and market returns have failed to keep pace with plan assumptions, creating significant funding challenges. Solvency concerns helped spur the 2004 Pension Act, which created The Pensions Regulator, a body that has the power to require companies to make contributions to ensure funding objectives are met. Unlike in the US, funding requirements were not relaxed during the financial crisis. In our view, this has forced UK firms to address pension risk more quickly. Buy-in and buy-out transactions started to gain real traction in 2007, while longevity swaps and other insurance solutions began being launched in 2009.

US companies now also face tougher requirements, and we believe the market could develop similarly. The Pension Protection Act of 2006 (PPA) requires companies to amortize defined benefit plan shortfalls based on an actuarial formula that approximates 7 years. However, subsequent legislation provided short-term funding relief due to the financial crisis and the decline in interest rates. The Pension Relief Act relaxed funding requirements for 2009-2011, and in 2012 MAP-21 gave plans the option of using an alternate approach for calculating discount rates that reduced required contributions. Eventually, though, companies will be forced to close the gap. The potential for cash calls makes having an underfunded plan more punitive than in the past, which is another factor pushing plans toward de-risking.

Pension Underfunding Also has Other Economic Costs

In addition to potential required cash contributions, we note several other economic costs of underfunded pensions:

- **Higher borrowing costs:** The ratings agencies view underfunded pension liabilities similar to debt, so large funding gaps make a company appear more highly levered. This may lead to lower credit ratings and a higher cost of capital.
- **Reduced financial flexibility:** In our view, there is an opportunity cost to the leverage capacity being absorbed by an underfunded pension, particularly in a

Underfunded pensions can mean higher borrowing costs, reduced financial flexibility, and lower equity market valuations for corporates

low interest rate environment. Limited borrowing capacity could also make it harder for a corporate to pursue strategic growth opportunities, such as M&A.

- **Lower equity market valuations:** Research compiled by Citi's Pension Solutions team shows that companies with moderate or severe underfunding materially underperform the equity market. In addition, they tend to have a higher beta, suggesting a higher cost of equity. Survey data from equity investors suggests that an unfunded pension liability starts to become a concern when it approaches 10% of a company's market cap.

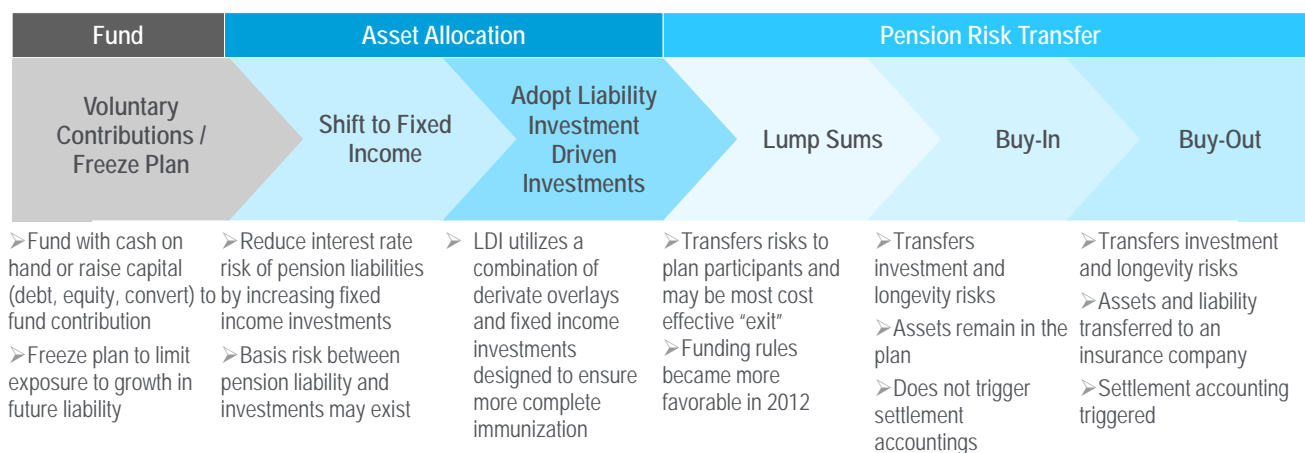
Several Potential De-Risking Options

Before pension plans can pursue meaningful de-risking, companies need to make voluntary contributions to close current funding gaps. This can be done either using cash on the balance sheet or by issuing debt. Given current low interest rates, borrowing to fund pension contributions can be an attractive strategy (especially considering tax benefits for interest expense and pension contributions).

Once a plan is fully funded, risk mitigation strategies include better aligning plan assets and liabilities to reduce volatility or permanently transferring pension risk to a third party

Once a plan is fully funded, plan sponsors have a number of options to dampen volatility or reduce the size of pension obligations. The first category is risk-mitigating strategies that do not shrink the size of pension obligations but focus on better aligning plan assets and liabilities to make the funded status less volatile. A second category is permanent solutions that transfer pension risk to a third party. Which strategy a plan chooses to pursue depends on a number of factors, including risk-tolerance and the sponsors' financial flexibility (given the higher initial expense of third party solutions). Figure 30 highlights some of the different options.

Figure 30. Spectrum of Pension De-Risking Strategies Available to Corporate Plans



Source: Citi Research

Risk Mitigation Strategies

Risk mitigation strategies include freezing the plan, issuing debt, changing investment strategy, and longevity reinsurance

These actions help plans reduce the risk of significant swings in funded status. However, they do not permanently eliminate the risks associated with pension benefit obligations.

- **Freezing the plan:** Many companies have elected to close their plans to new participants and/or cease contributions to current employees. While this does not address benefits already accrued, it limits future growth in the pension obligation. In 2012, about one-third of the plans backed by the Pension Benefit Guaranty Corp (PBGC) were frozen.

- **Issue debt to fill underfunding gap:** Rating agencies view pension underfunding as leverage, so issuing debt to contribute proceeds to an underfunded pension is essentially revenue neutral. Depending on a corporation's tax status, credit rating, and other issues, this action can sometimes be net present value (NPV) positive for the corporation while providing greater security for pension recipients and less volatility for the corporation going forward. It can also be step towards pension risk transfer.
- **Investment strategy changes:** Historically, most pension plan assets were managed to maximize returns, so the asset mix tended to favor equities. While equities have generated higher returns than bonds over time, they have limited correlation with plan liabilities (which are driven by interest rates). It has become clear that this can be problematic in a low rate environment when the value of long duration liabilities increases significantly. To counter this, companies can boost their holdings in fixed income products, which will more closely track liabilities. Some companies have chosen to adopt a comprehensive liability-driven investment (LDI) program whereby the portfolio of assets is constructed based on the plan's liability profile rather than a return target. Asset allocation is then actively managed over time as rates change and the liability evolves.
- **Longevity reinsurance:** While an LDI strategy should reduce investment risk and result in less volatility in a plan's funded status, it does not contemplate unexpected changes in the liability duration. The plan could still face losses if people live longer than anticipated, causing payouts to exceed forecasts. Longevity reinsurance transfers this risk to an insurance company by converting the uncertain future liability into fixed payments. As a result, plans that are either utilizing an LDI approach or plan to adopt one can complement that with longevity reinsurance.

Pension Risk Transfer Solutions

Pension risk transfer solutions include lump sum payouts, buy-ins, and buy-outs

Pension risk transfer strategies move a step beyond risk mitigation strategies and fully eliminate ALL risks associated with a pension benefit obligation. These solutions can either be utilized for the entire plan or for a specific subset of the liabilities (such as current retirees or salaried workers). Depending on the strategy used, accounting rules may dictate the immediate recognition of a profit or loss on the 'closeout' of the obligation (known as settlement accounting).

- **Lump sum payouts:** A number of plan sponsors have begun offering retirees the option to take a lump sum payment equal to the present value of their expected future pension benefits. While this has an initial upfront cost, it eliminates the uncertain long-term obligation. The Pension Protection Act in the US changed the calculation for minimum lump sum payouts by updating mortality tables and mandating that the discount rate be set using corporate bond (rather than Treasury) yields. These changes were phased in from 2008-2012, and the higher discount rate made lump sums more attractive beginning in 2012. There continues to be some resistance to lump sum payments by unions and advocacy groups as there are no restrictions on what the participant can use the money for.
- **Buy-ins:** In a buy-in transaction, a plan purchases a group annuity designed to make payments that mirror the benefit obligations of the plan. The annuity becomes an asset within the plan, and the insurer bears the risk of satisfying future benefit obligations. However, the plan stays on the company's balance sheet and the liability would revert back to the plan sponsor of the insurance company were to become insolvent. Therefore, buy-ins have counterparty risk that does not exist with buy-outs.

When de-risking, plans need to consider their funding status and capacity for additional contributions, the size of pension liabilities and underfunding vs. market cap, current leverage and credit ratings, capital needs of the company, settlement accounting, and outlook

- **Buy-outs:** A buy-out is similar to a buy-in, but rather than purchasing a group annuity, the plan transfers the pension benefit obligation and plan assets (plus an initial premium and additional funds if the pension liability is underfunded) to the insurance company. The insurer then takes responsibility for paying future benefits, and the pension benefit obligation (PBO) is removed from the ceding company's balance sheet. Unlike with a 'buy-in', settlement accounting is triggered.

Considerations for Plan Sponsors Contemplating De-Risking

Before deciding whether to engage in de-risking or pension risk transfer, corporate plan sponsors should consider the following issues:

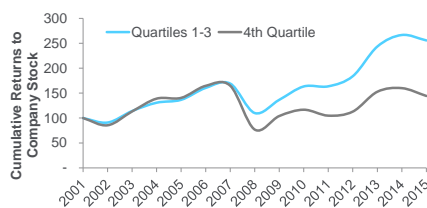
- **The plan's current funded status and capacity for additional contributions:**

Shifting to an LDI strategy or reducing a plan's investment risk could reduce capacity to close any current funding gap (since the assets and liabilities will move roughly in-sync). Therefore, a company with an underfunded plan would need to assume future cash contributions to close the gap. In addition, plans need to be fully funded to execute an insurance risk transfer solution.

- **Size of pension liabilities & current underfunding relative to market cap:**

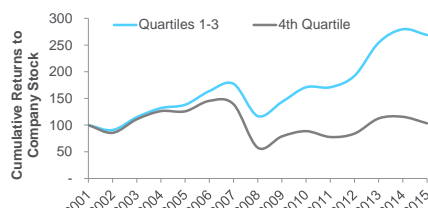
Research shows that corporations with severely underfunded plans, a large pension liability relative to market cap, or above-average equity allocations within the plan tend to underperform peers. From 2002 to 2015, Figure 31, Figure 32, and Figure 33 show that firms with seriously underfunded plans underperformed their peers with better funded plans by 111%. And firms with a higher percentage of fixed income in their plan assets performed 74% better than firms whose pensions had higher equity allocations. But these differences in performance are dwarfed by the difference in the overall size of the liabilities. There, the difference in performance was 165% since 2001.

Figure 31. Cumulative Equity Returns by Deficit: Market Cap Quartile



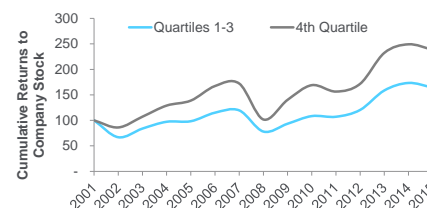
Source: Citi

Figure 32. Cumulative Equity Returns by Liabilities: Market Cap Quartile



Source: Citi

Figure 33. Cumulative Equity Returns by % Debt Quartile



Source: Citi

- **Current leverage and impact of pension plan on credit ratings:** Ratings agencies treat underfunded pension liabilities similarly to debt, so a large pension deficit can absorb leverage capacity or hinder credit ratings. As a result, companies may consider issuing debt to close a pension deficit and execute a PRT transaction, especially in a low interest rate environment. For companies looking to improve their ratings, reducing pension risk is a key lever to consider.
- **Other strategic needs for capital within the company:** Assuming a plan is underfunded, executing a PRT transaction would require an infusion of cash. Depending on a company's balance sheet or other investment priorities, this may not be feasible.

The positive effects of pension risk transfer include favorable balance sheet and cash flow impact, a potential reduction in equity beta and cost of capital, and a potential boost to the corporate's valuation

■ **Potential settlement accounting loss (if considering an insurance buy-out):**

If a company decides to execute a pension buy-out, it has to take a settlement accounting charge, which could negatively affect reported earnings and book value. While some companies do not view this as an impediment, others may.

- **The sponsor's outlook for interest rates and equity returns:** If a sponsor has a strong view that either interest rates will rise or that the equity market will produce returns above the level assumed in plan assumptions, it would probably want to hold off on significant pension de-risking. Conversely, if a company expects rates to remain low, it may want to act now despite the cost.

Once a plan sponsor has concluded its analysis of the foregoing considerations, it will need to weigh those against the potential positives of a PRT transaction. These are the principal reasons a plan sponsor would decide to engage in a (very complex) insurance transaction:

- **Favorable balance sheet and cash flow impact:** Corporate pension plans can create significant cash flow uncertainty as required contributions fluctuate depending on funded status. If low interest rates or poor investment performance cause funded status to fall, companies will need to make larger contributions. In a scenario where rates are falling and market returns are poor, cash flow and balance sheets can be hit very hard. This can be especially painful because it is likely coincide with a period of depressed earnings/EBITDA. Engaging in a PRT transaction can significantly reduce this risk.
- **Potential reduction in the sponsor's equity beta and cost of capital:** Recent studies show that equity beta and cost of capital can be reduced when pension assets and liabilities are transferred. Nobel Prize winner Robert Merton worked with Li Jin and Zvi Bodie on a methodology for looking at the risks faced by corporations with large pension liabilities relative to the size of the corporation. First, in the case of a 'typical' S&P 500 firm, complete transfer of pension risk can reduce the cost of capital. If a typical S&P 500 firm had a pension plan that was nearly fully funded and engaged in a complete PRT transaction, that hypothetical firm's cost of capital would decline by approximately 60 basis points (or ~7%). Secondly, that same hypothetical corporation would experience an ~11% reduction in its equity beta.
- **Potential boost to the corporate valuation and/or credit ratings:** Citi conducted a survey of large institutional investors, asking their views on pension liabilities and underfunding on their investment decisions. Two good rules of thumb that emerged from these discussions were that red flags tend to arise for institutional investors when 1) total pension liabilities are greater than 20-50% of market capitalization or 2) pensions are below 80% funded. Depending on the corporate plan sponsor's other strengths and weaknesses as well as its comparison to its peers, pension liabilities can bear a greater or lesser importance to investors.

For Most Companies, the Question Is Not If, but When, to De-Risk

Pension risk transfer is really a question of when vs. if

In our view, expansion of the US pension risk transfer market is really a question of 'when' and not 'if'. The biggest current challenge is that buy-outs require pensions to be fully funded and pay a premium to the insurance company (~3-7% currently), which makes them an expensive option for significantly underfunded plans. As a result, while a number of companies would like to undertake transactions, they may be struggling with whether to act now or wait in hopes that a rising equity market and/or higher interest rates reduce their funding gap first. The table below highlights some of the key arguments for acting now or waiting.

Figure 34. Plans Must Weigh Pros/Cons of Acting Now Versus Waiting

Reasons to Act Now	Reasons to Wait
<ul style="list-style-type: none"> ↑ Funded status could erode ↑ Pension liabilities create cash flow risk and balance sheet volatility ↑ Underfunding has opportunity cost and can hurt market perception ↑ Rising cost of managing pension plans, including higher PBGC fees ↑ Potential insurance capacity constraints ↑ Limited supply of long duration fixed income 	<ul style="list-style-type: none"> ↓ Favorable markets could alleviate need for cash contribution to fully fund plan ↓ Closeout pricing could improve due to higher competition among insurers ↓ Company has other pressing cash flow or investment priorities

Source: Citi Research

The true economic cost of a transaction is less than the amount of the premium paid to the insurer

While the cost of executing a closeout is an important factor in the decision, we note that the true economic cost of a transaction is less than the amount of the premium paid to the insurer. As a company cuts the size of its pension obligation, it will reduce (or eliminate) the costs associated with managing/administering the pension plan as well as the annual fees it pays to the Pension Benefit Guaranty Corp (PBGC). These costs are becoming more significant as PBGC fees were raised by MAP-21. Also, because there are differences between the accounting assumptions for mortality, discount rate, and investment return and the true economic cost, the actual premium may be less than it appears from an accounting standpoint.





Insurers: A \$750bn+ Opportunity Globally in Pension Closeouts

We see a \$750 billion+ opportunity in pension risk transfer

In the last 10 years there have been >\$250 billion of pension risk transfer transactions globally, and we expect further acceleration in growth going forward. Over the next 5-10 years we see PRT as \$750 billion-plus opportunity, driven primarily by the US, the UK, and the Netherlands. In addition, we see increased activity in Canada, Australia, and other markets over time.

Corporations that are purposeful and focused in how they manage their pension liabilities stand to gain advantages over their competitors. These advantages can include increased leverage capacity on the corporate balance sheet, improved predictability of cashflows, a lower equity beta and cost of capital, potentially higher corporate valuations and more attractiveness in M&A scenarios.

Figure 35. Pension Closeouts Represent a Significant Opportunity

	U.K.	U.S.	Canada	World
				
Pension Liabilities	\$1.9 trillion ⁽¹⁾	\$3.2 trillion ⁽²⁾	\$1.5 trillion ⁽³⁾	>\$6.6 trillion
Number of Transactions Over \$1 billion	33	5	1	39
PRT Transactions Since 2007	\$186 billion	\$50 billion	\$4 billion	\$240 billion

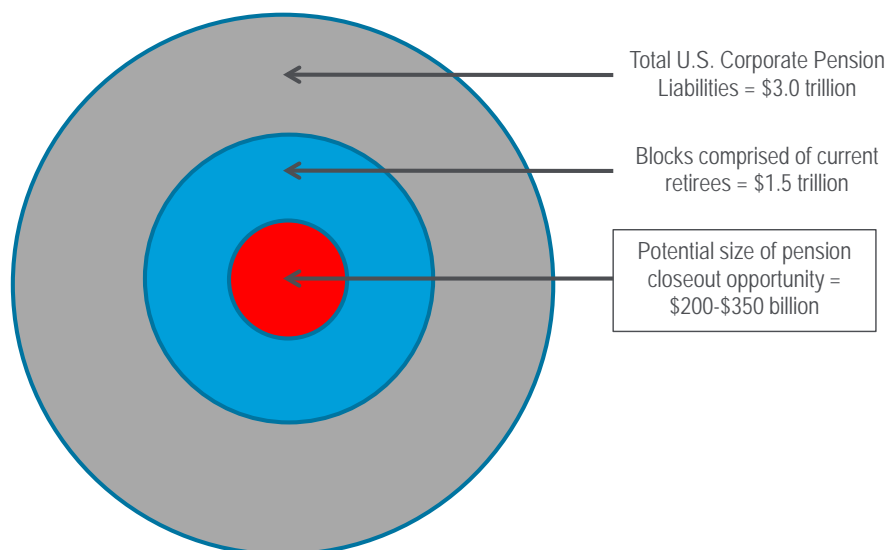
Source: Prudential Financial, Investment Company Institute, Towers Watson, and Citi Research

US Market Opportunity

In the US, pension risk transfer is a \$200-\$350 billion market opportunity over time

We see significant growth potential for pension risk transfer in the US and estimate a \$200-\$350 billion market opportunity over time. US corporate pension plans currently have ~\$3 trillion of liabilities. The portion of these liabilities best suited for pension closeouts is current retirees, which represent about half of the total. Prudential and Aon suggest that 15-25% of large company pension plans could ultimately decide to do a closeout transaction. To date, almost 10% of pension liabilities in the UK have been part of a PRT transaction, suggesting this is not an unreasonable target in the US. This suggests more than \$200 billion in eligible liabilities. If the longevity reinsurance market also develops in the US, the percentage of plans opting for an insurance solution could increase further. Over time, there may also be potential for transactions involving current employees or public sector plans (which have ~\$4.0 trillion in plan liabilities), although this appears unlikely near term.

Figure 36. We Estimate the US Pension Closeout Opportunity Could be \$200-\$350 Billion



Source: Citi Research

UK Market Opportunity

In the UK, the market opportunity is an additional \$140-\$280 billion of potential buy-outs over the next 5-10 years

The UK has been at the forefront of pension de-risking and has had nearly \$200 billion of transactions since 2007 (including longevity swaps). We estimate there will be another £100-£200 billion (\$140-\$280bn) of potential buy-outs over the next 5-10 years. As shown in the table below, there are about £430 billion (\$685bn) of pension liabilities in plans that are at least 75% funded (which we consider the cut-off to potentially consider a buy-out). We assume that 25-50% of these plans ultimately elect an insurance solution. This is a higher rate than in the US, driven by more stringent funding rules and a greater focus on longevity risk due to the impact of cost of living adjustments. Also, in the UK insurers normally take on all pension liabilities, not just retirees. Note that our estimate does not include longevity swaps, which have also been prominent in the UK (£9.3bn in 2015, £21.9bn in 2014) and likely remain robust as pension schemes look for innovative ways to control their liabilities.

Figure 37. UK Corporate Pension Plans that are at Least 75% Funded (as of March 2014)

	Small Plans	Medium Plans	Large Plans	Jumbo Plans	Total
Size (# members)	100-999	1000-4999	5000-9999	10000+	
Approx. average liability (£m)	60	330	1,100	5,110	NM
Estimated number of Plans (#)	643	168	52	55	918
Estimated total liability (£B)	38.6	55.4	57.2	281.1	432.3

Source: Lane Clark and Peacock LLP and Citi Research

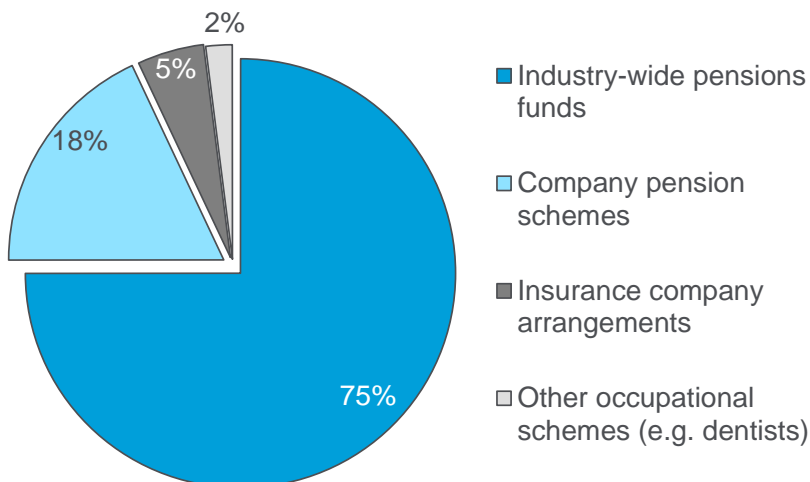
Dutch pension funds could see a \$110-\$165 billion pension risk transfer opportunity

Netherlands Opportunity

Dutch pension funds have to mark-to-market their liabilities using a similar yield curve to insurers. This can cause significant balance sheet volatility for plan sponsors. Current low interest rates are pressuring funding levels, leading to markedly higher premiums and contribution rates in order to meet targeted benefits. Dutch pension schemes are required to maintain asset levels above liabilities, with a minimum coverage ratio of 105% and a buffer on top leading to an average 'required' coverage ratio of 125%. If they fall below these levels, plans have 5 years to recover back to the 105% level and 15 years to get back to 125%. Therefore, the burden of running corporate or industry defined benefit pension schemes is high and has been rising given market conditions. This has helped to drive the insurance pension buy-out market (also known as the group life market) in recent years. There has been a significant flow of 'liquidations', where corporates shut down their defined benefit plans and pass the liabilities (as well as responsibility for future pension accruals for existing employees) to an insurer. We expect this to continue, although volatile markets and low interest rates have pressured funding levels, making it more expensive to execute a transaction near term.

The total Dutch pension market is slightly over €1 trillion (\$1.1 billion), with corporate plans accounting for about 20% of the total. Of these, we estimate that 50-75% could be eventually transferred to insurance companies, a market opportunity of €100-150 billion (\$110-\$165bn). The high percentage is driven by the onerous funding requirements (and relatively healthy current funded status) for Dutch plans. Overall, we expect Dutch life insurers to grow closeout/group life premiums at a high single digit rate.

Figure 38. Dutch Pension Schemes by Type (€1.1trn of total AUM, as of 2015)



Source: Dutch National Bank, Dutch Insurance Association, Citi Research

Other Market Opportunities

In the rest of the world, Canada, Australia and the Nordic countries have potential pension risk transfer opportunities

Canada also represents an emerging pension risk transfer market, with ~C\$2.5 billion (\$1.82bn) of transactions in 2014 and C\$7-C\$8 billion (\$5.1-\$5.8bn) in 2015 (including a C\$5 billion longevity swap for Bell Canada, the first longevity transaction for a North American pension plan). We expect a steady flow of small and medium-sized deals, with sporadic large transactions mixed in. Other markets that insurers have cited as potential growth opportunities are Australia and the Nordic countries. In total we believe emerging markets, including Canada, are a \$50 billion+ opportunity over the next 5-10 years.

Pension risk transfer is one of the few near-term potential growth markets for life insurers

Pension risk transfer gives insurers longevity risk as a natural hedge vs. mortality risk, is an efficient way to use insurance subsidiary capital, and limited expenses allow blocks to reach target ROE quickly

We believe returns on pension risk transfer deals should be 13%+ over time

PRT Represents Attractive Business for Life Insurers

We consider pension risk transfer (PRT) to be an attractive opportunity for life insurers to put considerable capital to work at attractive returns. In addition, it represents one of the few near-term potential growth markets for life insurers. The following are the key reasons why we believe the business makes sense for life insurers.

- **Longevity risk a natural hedge vs. mortality risk:** In our view, insurers are primarily taking on longevity risk in pension closeout transactions at least for blocks constituted exclusively of current retirees. While this is a risk, especially as medical care improves and people are living longer, most insurers have significantly more mortality risk on their balance sheet. As a result, if life expectancy improves more rapidly than insurers forecast, higher payouts on group annuity contracts should be offset by better life insurance returns. Under Solvency II in Europe, there is a quantifiable 'diversification benefit' from putting mortality risk together with longevity risk.
- **Efficient way to use insurance subsidiary capital:** Pension closeout transactions are written out of a company's insurance subsidiaries rather than the holding company. This can allow an insurer to use 'excess' capital in its subsidiaries (such as deferred tax assets or other non-admitted assets) that it is not able to divided to the holding company. An example was Prudential's ability to use excess capital in its Prudential Insurance Company of America (PICA) subsidiary for the General Motors/Verizon transactions. As a result, we do not view pension closeouts as necessarily consuming capital that would otherwise be immediately available to shareholders for buybacks or dividends. To the extent insurers can utilize 'trapped' capital earning low returns, this can result in a significant boost in returns.
- **Limited integration expenses allow blocks to reach target return on equity (ROE) quickly:** Outside of modest onboarding costs (mailings to plan participants, transition support) there are no major one-time expenses for a pension risk transfer case. As a result, unlike typical M&A transactions, returns should quickly get to targets levels and be immediately accretive to earnings.

We Project Pension Risk Transfer Deals to Generate 12-14% ROEs

Most competitors have indicated that they are pricing pension closeout transactions to generate 13%+ return on equity over time. While there is limited disclosure on the actual performance of PRT blocks and transactions, we believe these returns are achievable. Based on management commentary, we estimate that required capital for a pension closeout is about 5-6% of liabilities on a statutory basis (depending in part on the mix of assets), although economic capital may be modestly higher. MetLife has also commented that every \$1 billion of closeout sales yields \$10 million of annual earnings, which we believe is a reasonable rule-of-thumb. The following table provides estimated returns on a hypothetical \$1 billion transaction under different scenarios and suggests that an expectation of 12-14% ROEs is reasonable.

Figure 39. Pension Closeout ROE Matrix Suggests Double-Digit Returns
Projected after-tax ROE for a \$1 billion pension closeout, \$ in millions

		Required Equity (as % of Liabilities)						
		5.0%	5.5%	6.0%	6.5%	7.0%	7.5%	8.0%
Earnings (after-tax)	\$ 7	14.0%	12.7%	11.7%	10.8%	10.0%	9.3%	8.8%
	\$ 8	16.0%	14.5%	13.3%	12.3%	11.4%	10.7%	10.0%
	\$ 9	18.0%	16.4%	15.0%	13.8%	12.9%	12.0%	11.3%
	\$10	20.0%	18.2%	16.7%	15.4%	14.3%	13.3%	12.5%
	\$11	22.0%	20.0%	18.3%	16.9%	15.7%	14.7%	13.8%
	\$12	24.0%	21.8%	20.0%	18.5%	17.1%	16.0%	15.0%

Source: Company Reports, Citi Research estimates

Primary risks to insurers from pension risk transfer are increased longevity risk, interest rate risk, credit and investment performance plus, uncertain no-bank capital standards for large insurers in the US

Uncertain Capital Requirements, Longevity, Interest Rates Key Risks

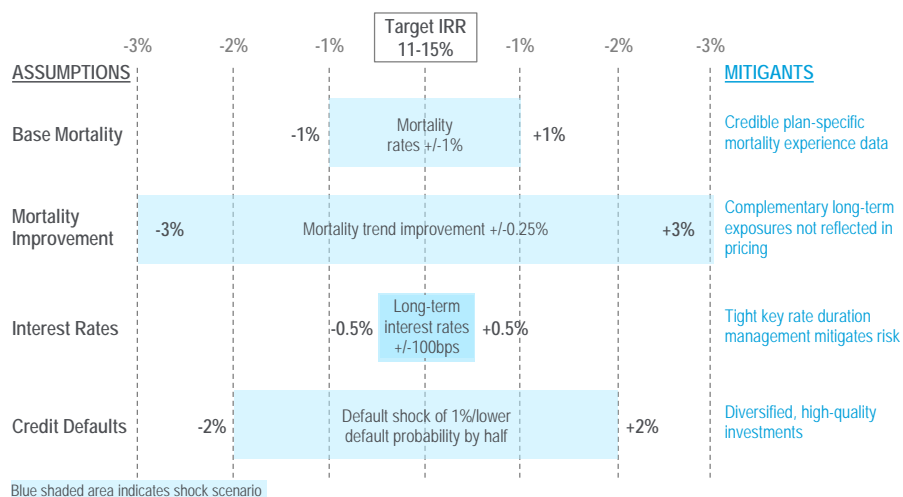
We believe pension risk transfer deals have a manageable risk profile, with the potential for increased longevity being the biggest concern. The primary risk factors are discussed below:

- **Increased longevity the primary risk:** Plan participants living longer than expected is the key risk for pensions as this would increase required payouts. Prudential (and we suspect most insurance companies) assumes gradual improvement in mortality trends in its pricing assumptions. In a stress scenario – such as an immediate cure of all cancers – Prudential indicated that PRT returns would be substantially below pricing assumptions but the business would still be profitable. In addition, there would be an offset at the company level as lower mortality would result in higher returns for life insurance risk. While having balanced longevity/mortality exposure helps mitigate risk, Prudential prices its PRT business independent of any assumed mortality benefit at the enterprise level.
- **Several factors mitigate interest rate risk:** Insurers in the US have primarily done transactions involving retired lives, limiting the liability duration. For example, Prudential's average age within a buy-out block is 72, and the typical duration is 9-10 years. This can be matched with comparable duration assets, so interest rates and reinvestment risk are not big concerns. In addition, deals typically have a true-up mechanism to adjust for changes in asset/liability values between announcement and closing. Insurers may also elect to take assets-in-kind, which eliminates some of the risk around investing cash flows. In European markets, Solvency II enforces a need for strict asset-liability management to make sure the duration gap between liabilities and bond assets held to match them is small — the use of interest rate hedging can help here. Therefore, we do not view PRT transactions as a 'call on rates'.
- **Credit and investment performance also a key factor:** The typical PRT portfolio looks a lot like insurers' general investment portfolios in the US, so it tends to be dominated by investment grade corporate debt and mortgage loans/bonds. Also, given the relatively long duration, alternative investments tend to be a good fit, so hedge fund and private equity allocations are often higher. As shown in Figure 40, credit risk represents a bigger risk to PRT returns than interest rates. This is also the case in the UK and the Netherlands given a similar need to buy long-term credit assets and mortgages to match liabilities

- **Uncertain non-bank SIFI capital standards in the US:** The Federal Reserve has yet to publish capital standards for the non-bank systemically important financial institution (SIFI) insurers (i.e. AIG, MetLife and Prudential), each of which participates in the PRT market. Recent commentary from the Fed acknowledges that insurance liabilities are different from bank liabilities and should be subject to different capital requirements. We expect a system similar to the current risk-based capital framework and without Basel III-type capital charges, so there should not be material impact on required capital for PRT deals. Prudential does not view the uncertain rules as a constraint on writing new business. MetLife has been more vocal about SIFI constraining its appetite for jumbo deals, although industry commentary suggests that it has still been actively bidding on transactions.

Figure 40. Sizing the Key Risk Factors for Pension Closeout Transactions

From Prudential's 2015 investor day slides



Source: Prudential Financial, Citi Research

Who is Best Positioned to Benefit?

Having an existing relationship with a plan sponsor can provide an advantage in the smaller end of the PRT market

When thinking about opportunity and competition, we divide the market into 2 segments: 1) <\$1 billion liabilities and 2) >\$1 billion in liabilities. The smaller end of the market is currently seeing more activity, but it is also more competitive. Among the companies participating in the US include American General (AIG), Legal & General, Mass Mutual, MetLife, Pacific Life, and Principal Financial. In our view, having an existing relationship with a plan sponsor (such as by being the record keeper on a defined contribution plan or an employee benefits provider) can provide an advantage, but pricing is also a key factor in winning business, and barriers to entry are relatively low.

High barriers to entry on the jumbo transaction side create a large opportunity for insurers

By contrast, there are very few competitors that have the expertise and balance sheet capacity to handle jumbo transactions. As a result, we see relatively high barriers to entry and expect less competitive pricing in this segment of the market. While transactions take significant time to complete and are lumpy, we see this as the biggest opportunity to move the needle in terms of earnings. In the US, the most notable competitors to this point have been Prudential, MetLife, and Mass Mutual. Prudential established itself as the leader in the jumbo market following the GM and Verizon deals, and it has been involved in every announced jumbo transaction. We believe the company's track record of execution and innovation have helped position it to win additional business, even if it is not the lowest bidder.

In Europe, there is a relatively concentrated market for PRT business — including Legal & General and Prudential (UK) in the UK, plus some unlisted players such as PIC and Rothesay Life. In the Netherlands many companies participate, but the top-3 dominant companies in the group life market are Aegon, Delta Lloyd and NN. In this market, we believe Solvency II (and the particularly high capital requirements for interest rate, credit and longevity risk in this capital regime) creates a fairly substantial barrier to entry.

Figure 41. Listing of Notable Recent Pension Risk Transfer Transactions

Includes publicly disclosed transactions over \$100 million of assets

	Date	Type of transaction	Assets involved	Employees covered	Country of plan	Insurer
US & Canada Transactions						
JCPenney	10/2/2015	Buy-out	\$0.5-1.5B	43,000	US	Prudential Financial
Royal Philips U.S.	10/1/2015	Buy-out	\$1,100	17,000	US	Prudential and Legal & General
West Pharmaceutical Svs.	9/10/2015	Buy-out	\$140	1,750	US	MettLife
Lincoln Electric	8/19/2015	Buy-out	\$425	1,900	US	Principal Financial
BCE	3/3/2015	Longevity swap	\$4,000	n/a	Canada	Sun Life Financial
Kimberly-Clark	2/23/2015	Buy-out	\$2,500	21,000	US	MassMutual and Prudential
Tinken	1/22/2015	Buy-out	\$600	5,000	US	Prudential
TRW Automotive Holdings	12/16/2014	Buy-out	\$440	7,045	US	MettLife Inc.
Bristol-Myers Squibb	9/30/2014	Buy-out	\$1,400	8,000	US	Prudential
Motorola Solutions	9/25/2014	Buy-out	\$3,100	30,000	US	Prudential
Visteon	7/16/2014	Buy-out	\$350	n/a	US	Prudential
SPX	11/14/2013	Buy-out	\$625	16,000	US	Mass Mutual
Canadian Wheat Board	6/18/2013	Buy-in	\$147	n/a	US	Sun Life Assurance Co. of Canada
Verizon Communications	10/17/2012	Buy-out	\$7,500	41,000	US	Prudential
General Motors	6/11/2012	Buy-out	\$29,000	118,000	US	Prudential
UK Transactions						
Philips	Nov-15	Buy-out	\$2,400	26,000	UK	Pension Insurance Corp.
Heineken	Sep-15	Longevity swap	\$2,400	19,000	UK	Friends Life (Aviva)
Civil Aviation Authority	Jul-15	Buy-in	\$1,600	n/a	UK	Rothesay Life
Scottish Power	Feb-15	Longevity swap	\$2,000	9,000	UK	Abbey Life (Deutsche Bank)
TRW	Nov-14	Buy-out	\$2,500	22,000	UK	Legal & General
BT	Jul-14	Longevity swap	\$16,000	n/a	UK	BTPS Captive Insurer
Total	Jun-14	Buy-in	\$1,600	n/a	UK	Pension Insurance Corporation
ICI	Mar-14	Buy-in	\$3,000	n/a	UK	Legal & General
AstraZeneca	Dec-13	Longevity swap	\$2,500	10,000	UK	Abbey Life (Deutsche Bank)
BAE Systems	Dec-13	Longevity swap	\$1,700	17,000	UK	Legal & General
Carillion	Dec-13	Longevity swap	\$1,000	9,000	UK	Abbey Life (Deutsche Bank)
BAE Systems	Feb-13	Longevity swap	\$3,200	31,000	UK	Legal & General
Tate & Lyle	Dec-12	Buy-in	\$350	n/a	UK	Legal & General
Merchant Navy Officers Pension Fund	Dec-12	Buy-out	\$680	34,000	UK	Rothesay Life
Uniq	Dec-11	Buy-in	\$830	21,000	UK	Rothesay Life
Pilkington Group	Dec-11	Longevity swap	\$1,000	11,500	UK	Legal & General
Turner and Newall	Oct-11	Buy-out	\$1,100	30,000	UK	Legal & General
ITV	Aug-11	Longevity swap	\$1,700	12,000	UK	Credit Suisse
GlaxoSmithKline	Nov-10	Buy-in	\$900	n/a	UK	Prudential
British Airways	Jul-10	Buy-in	\$1,300	n/a	UK	Rothesay Life
Alliance Boots	Jun-10	Buy-out	\$300	3,000	UK	Pension Insurance Corporation
BMW	Feb-10	Longevity swap	\$3,000	60,000	UK	Abbey Life (Deutsche Bank)
Babcock International	Dec-09	Longevity swap	\$300	n/a	UK	Credit Suisse
CDC	Nov-09	Buy-in	\$370	n/a	UK	Rothesay Life
RSA Insurance	Jul-08	Longevity swap	\$1,900	n/a	UK	Rothesay Life
Babcock International	Jun-09	Longevity swap	\$500	14,000	UK	Credit Suisse
Thorn	Dec-08	Buy-out	\$1,100	15,000	UK	Pension Insurance Corporation
Cable & Wireless	Sep-08	Buy-in	\$1,100	5,000	UK	Prudential
Delta	Jun-08	Buy-out	\$450	10,000	UK	Pension Insurance Corporation
Powell Duffrey	Mar-08	Buy-out	\$400	7,000	UK	Palernoster (now Rothesay Life)
Rank	Feb-08	Buy-out	\$700	19,000	UK	Rothesay Life

Source: Citi

Asset Managers and Insurers: Private Pension Savings Opportunity

Shifting more retirement savings responsibility to workers is critical for countries to have a sustainable pension scheme

As discussed in our recommendations to policymakers, we believe expanding the private pension savings market and shifting more retirement savings responsibility to workers is critical in order for countries to have a sustainable pension scheme. With governments acting to address public sector pension liabilities, we anticipate a rapid expansion in private pension savings over the next 10-20 years, largely into fund-based workplace defined contribution schemes. As we set out in previous chapters, this may be supported by a combination of 'push' and 'pull' policies, with some form of increased 'compulsion' to save together with generous tax benefits and investment freedoms.

We see substantial opportunity for insurers and asset managers as countries with under-developed private pension systems enter into radical pension reforms to address the retirement needs of an aging population. We estimate this could be a \$5 trillion asset opportunity in more developed markets, rising to \$11 trillion in the longer term as emerging markets also reform their pension systems.

Europe represents a significant growth opportunity in private pension savings

In our view, Europe represents a significant near-term growth opportunity given the current private sector pension 'gap' and the already unsustainably high burden of funding state pension systems. Another strong opportunity is in Asian markets — particularly China — although it is not clear to what extent global insurers and pension providers will be able to access this market in the medium term.

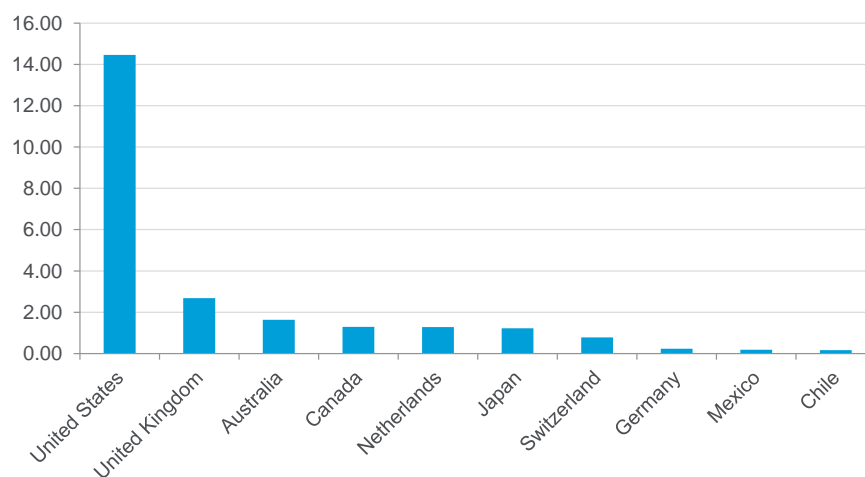
Scoping the Private Pension Savings Opportunity

92% of global private pension assets are in the top 10 countries — 55% are in the US alone

The current private pension savings landscape is dominated by the US. Out of a total \$26 trillion invested in private pension funds globally, approximately 55% is in the US pension market. In total, 92% of global private pension assets are in the top-10 countries — as illustrated in Figure 42.

Figure 42. Top 10 Private Pension Systems by AUM (US\$ trillion) – 2014

The US accounts for >50% of global private pension assets, and the top-10 countries >90%



Source: OECD, Citi Research

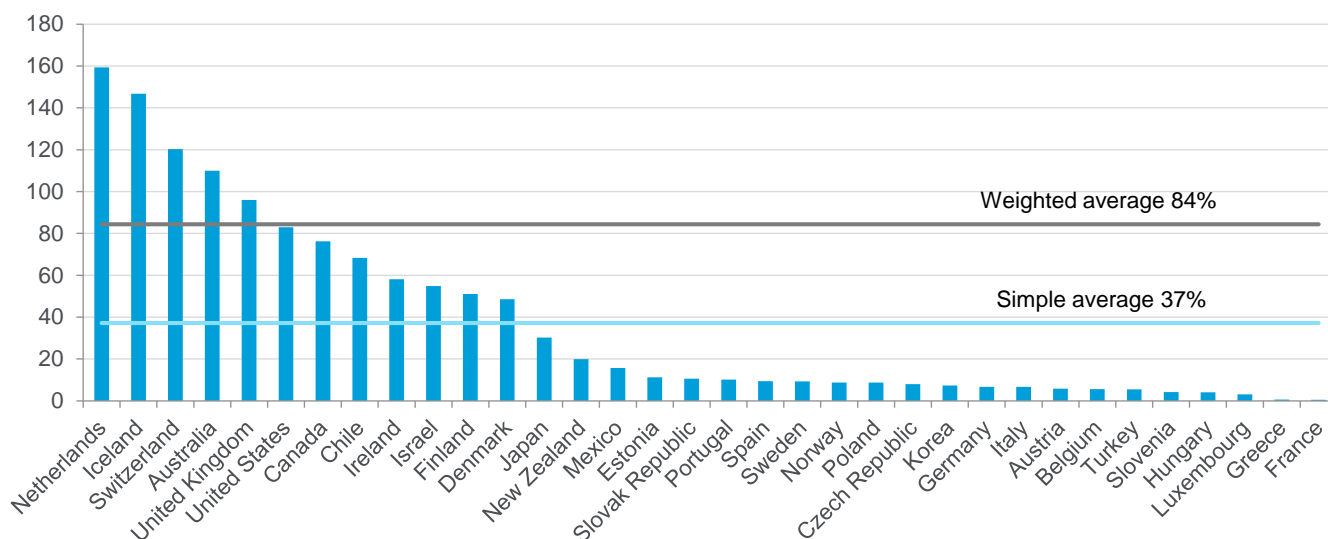
As we noted earlier, public sector pension liabilities are approximately 190% of GDP on average for major OECD economies. There is a particularly alarming liability-to-GDP ratio in some major European economies including France, Germany, Italy, the UK, and Spain among others (with public sector pension liabilities of >300% of GDP). In contrast, private sector pension savings assets are less than a fifth of public sector liabilities on average.

The level of dedicated pension funds savings appears very low in Europe with the exception of a few select markets

Figure 43 shows estimated private sector pension fund assets as a proportion of GDP across OECD countries. This data is slightly selective since it does not include substantial levels of life insurance and other 'non-pension' medium-term savings (e.g. mutual fund assets) that can also be put towards retirement. This could be particularly significant in markets such as Germany, Italy, and France where life insurance savings are a dominant medium-term savings product. Nevertheless, the level of dedicated pension fund savings appears very low in Europe generally, with the exception of select markets with well-established private pension systems such as the Netherlands, Switzerland, and the UK.

Figure 43. Private Pension Fund Assets by OECD Country as a Percentage of GDP (2014)

The average pension fund asset to GDP ratio of 37% is <15% of public sector contingent liabilities — many major countries such as Italy, France and Germany have insignificant funded private pensions, although they do have significant assets in life insurance savings vehicles



Source: OECD, Citi Research

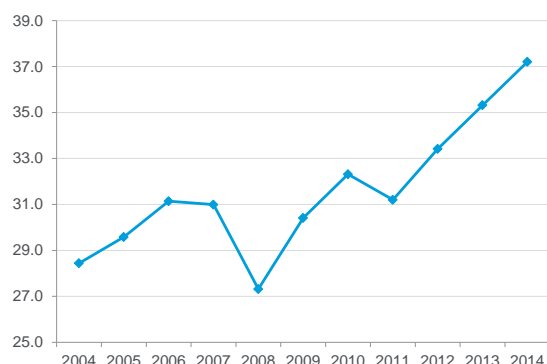
Over the next two decades, high public sector commitments in Europe will put unsustainable pressure on governments

We believe this picture will change in the next two decades, particularly in Europe, as high levels of public sector pension commitments will put unsustainable fiscal pressure on governments. We are already seeing key pension reforms being put into place to control these costs, including delays to government retirement ages, reductions in benefits, and curbs to future pension promises. As part of this, it is inevitable that governments will also aim to reform private pension savings and rapidly encourage growth in private sector pension funding. This may be through structures such as auto-enrollment, the form of 'soft compulsion' used in the UK, US, and New Zealand markets. We also anticipate that many of the new flows in private pension money will be into defined contribution schemes organized around the workplace, much like the US 401(k) market.

40% of the growth in pension assets can be attributed to asset inflows and contributions that have been supported by pension reforms

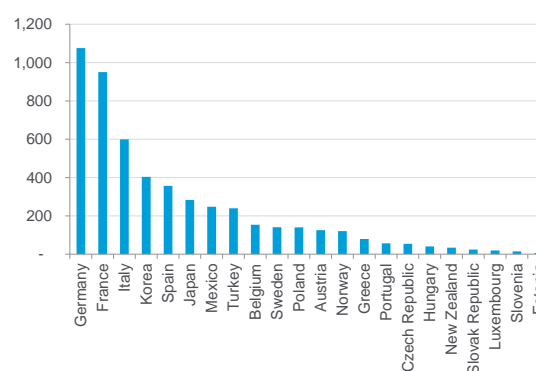
Therefore, we believe those countries that are currently 'underweight' private pension funds can close the gap in the next 10-20 years. We believe this is a realistic assumption given historical growth in private pension savings. As we show in Figure 44, the proportion of pension assets to GDP has grown by ~10 percentage points in the past decade, due partly to strong investment returns relative to GDP, but also due to pension reform measures. Of the 5% compound annual growth rate in pension assets over the past decade, we estimate that approximately 40% can be attributed to asset inflows and contributions that have been supported by pension reforms. These include the introduction of measures such as auto-enrollment and compulsory pension saving (e.g. in the Australian market).

Figure 44. Average OECD Country Private Pension AUM to GDP
~10ppts growth in private pension assets to GDP ratio in past decade



Source: OECD, Citi Research

Figure 45. Private Pensions gap in Selected OECD Countries (\$ trn)
We estimate ~\$5 trillion of total 'private pensions gap' in OECD countries,



Source: Citi Research

The 'private pensions gap' in OECD countries is ~\$5 trillion, or 20% of the current global private pensions market

We estimate the size of the 'private pensions gap' in developed OECD countries as ~\$5 trillion, approximately equivalent to 20% of the current global private pensions market. We calculate this very simply as the increase in assets among OECD countries necessary to raise all to a minimum private pensions-to-GDP ratio of 37%, i.e. the current OECD average level. This gap doubles if we also include non-OECD countries — although in some emerging markets it may take longer for this gap to close. Using a similar approach, assuming that all countries raise private pension savings assets to 37% of GDP, we estimate an additional \$6 trillion pensions gap in non-OECD countries.

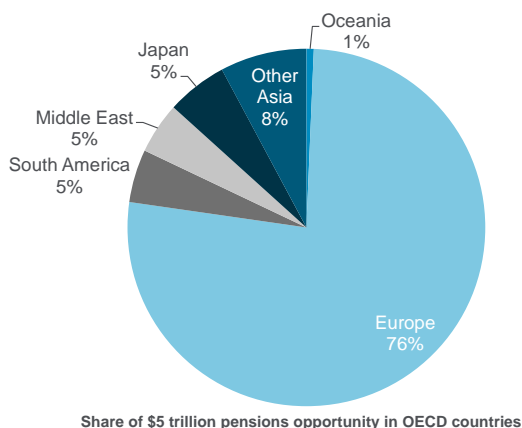
Global growth in pension savings assets could be \$5-\$11 trillion over the next 10-30 years

Therefore, in total we see potential global growth in private pension savings assets of \$5 trillion to \$11 trillion. We believe this gap could conceivably be addressed in the next 10-30 years. This provides a massive opportunity for private pension providers, with global insurers and asset managers being best-positioned to take advantage. This opportunity comes in addition to the natural growth in pension assets in countries with existing, well-developed pension systems, such as those illustrated in Figure 42. The current average contribution rate into private pensions in OECD countries is ~2% of GDP, which is equivalent to ~\$1 trillion per year. Over time, there will also be a significant decumulation (retirement income) opportunity as populations age and begin to retire.

Geographically, the largest near-term growth opportunity appears to be in Europe. Breaking down the \$5 trillion of pensions gap by region — as we show in Figure 46 — shows that ~75% of the global private pensions gap in developed economies comes from Europe, with the largest opportunities in Germany, France, and Italy. In non-OECD countries the largest opportunity, perhaps unsurprisingly, is China, followed by India and South America.

Figure 46. Share of 'Private Pensions Gap' by Region in OECD Countries

Europe has the greatest potential for private pensions growth

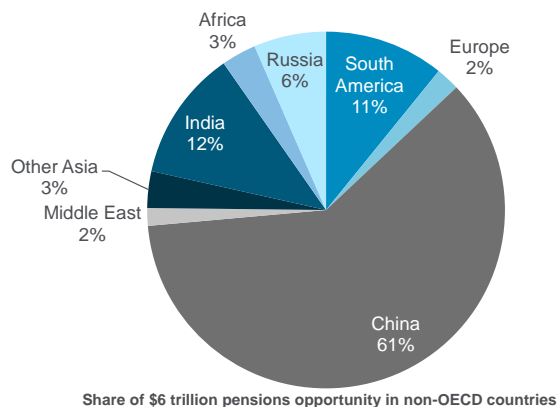


Share of \$5 trillion pensions opportunity in OECD countries

Source: Citi Research

Figure 47. Share of 'Private Pensions Gap' by Region in Non-OECD Countries

China, India and South America are major longer-term pensions markets



Share of \$6 trillion pensions opportunity in non-OECD countries

Source: Citi Research

Insurers & Asset Managers Well Placed to Capture a Large Slice of Private Pensions Market

Insurers are particularly well placed to benefit from private pension growth opportunity in markets such as Germany, France, and Italy

In our view, insurers and asset managers are the two industries best-positioned to capture the private pension growth opportunity given their capabilities in plan administration and investments. Insurers are particularly well placed to benefit from the growth opportunity in key European markets such as Germany, France, and Italy. In these countries, insurers are already established as leading providers in existing private pension schemes and are also major participants in medium-term savings through life insurance savings vehicles. In addition, they have well-developed asset management capabilities, experience in pension administration (and record keeping), strong distribution access, and well-established consumer brands in the long-term savings market.

There are also strong opportunities for asset managers and banks in this market

In markets where insurers have less well-established asset management capabilities, or less-strong relationships with corporates (which are likely to be the main source of growth through workplace defined contribution schemes), the market opportunity may be shared more widely. Certainly, there is a strong opportunity for asset managers with global investment capabilities (and local market expertise). Banks also serve as the primary distribution source for financial products (including private pensions) in many emerging markets, particularly in Asia and Latin America. In our view, the key in these markets is for product providers (insurers, asset managers) to partner with strong distributors.

Key success factors to capturing future growth in private pension savings include establishing key corporate relationships and distribution partnerships, adequate scale to achieve key earnings target returns, embracing digital and technology, and making asset management a key competence and profit center

Critical Success Factors in the Private Pension Market

We believe there are several critical success factors for companies to be able to capitalize on future growth in private pension savings – particularly in Europe and developed markets. We highlight some key areas below.

Establish Key Corporate Relationships & Distribution Partnerships

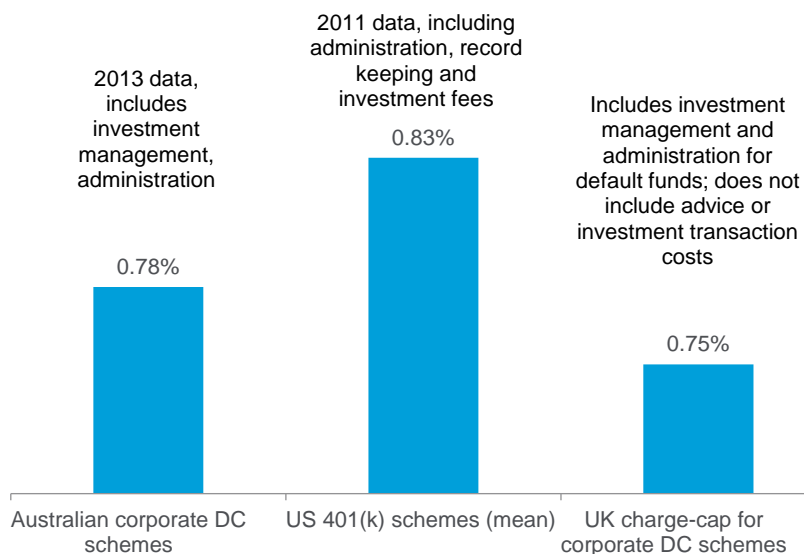
If we look at global models for private pension savings, the most successful tend to be centered around ‘workplace’ savings. The vast majority of defined private pension savings in developed markets – such as the US 401(k) system, Dutch pensions, UK auto-enrollment or Australian superannuation – are organized around companies or collective employer-groups where contributions are collected through payroll. While private pension schemes can take many different forms, in most countries the employer selects the plan provider. Therefore, in our view, the most successful providers will be those that have developed strong corporate relationships and a great reputation for service.

Distribution partnerships are also critical. Typically, there is some form of intermediary – often a broker or consultant – between a corporation and a plan sponsor. Banks can play an important role in client acquisition and servicing too, particularly in emerging markets (where banks function as most consumers’ primary financial touch point and distribute private retirement plans). As a result, plan providers need to have strong wholesaling capabilities to secure ‘shelf space’ with the biggest distributors. Customer service is also critical in terms of both providing support to distribution partners and retaining plan participants.

Scale Key to Earning Target Returns in Corporate DC Market

Earning an attractive return requires adequate scale (i.e. a high level of assets under management) as competition and regulation typically drive relatively thin margins. If governments create private pension systems and put into place forms of ‘compulsion’ or ‘soft-compulsion’ to drive asset flows, it is inevitable that regulators will also consider capping charges to avoid the risk that pension providers are viewed as exploiting savers. We have already seen this in markets such as the UK where the total cost to customers is capped at 75bps for default funds, including administration and asset management costs. Many new defined contribution pension propositions offer fund packages for 50bps including investment management and administration. Profit margins for even the largest providers in the corporate defined contribution market in the UK may only be ~20-30bps. In Australia, most of the ‘prepackaged’ diversified superannuation funds available in the market charge an ‘all-in’ fee of ~80bps. We would expect fee caps close to these levels to be gradually applied in all major defined contribution pension markets as regulators scrutinize providers’ returns and seek to avoid harming policyholder interests. Therefore, plan providers will need to build substantial economies of scale to generate adequate returns.

Figure 48. Changing Structures in Australian, US and UK Corporate DC Plans



Source: Deloitte, RiceWarner, FSC, Citi Research

Insurers: Embrace Digitalization and Technology

Efficiency is important competitively and can be helped by embracing technology

Charge-capping will require insurers and pension providers to operate as efficiently as possible, which involves cutting out unnecessary processes and expenses (e.g. paper forms and statements). Insurers will also need to be able to deal with sometimes vast inflows of assets as they build customers. The administration side of the pension management business will become increasingly commoditized as digitalization of record-keeping takes hold – i.e. the collection of contributions, sending statements to policyholders, dealing with fund changes and withdrawals, paying pensions, and dealing with changes to customer records. As we already witness in the US 401(k) market – the largest corporate defined contribution pension market in the world – margins for record-keeping are thin. Insurers have historically not been great at technological delivery, particularly given their history of dealing with the end customer through intermediaries (e.g. financial advisers or brokers) that managed a lot of the record-keeping and administration.

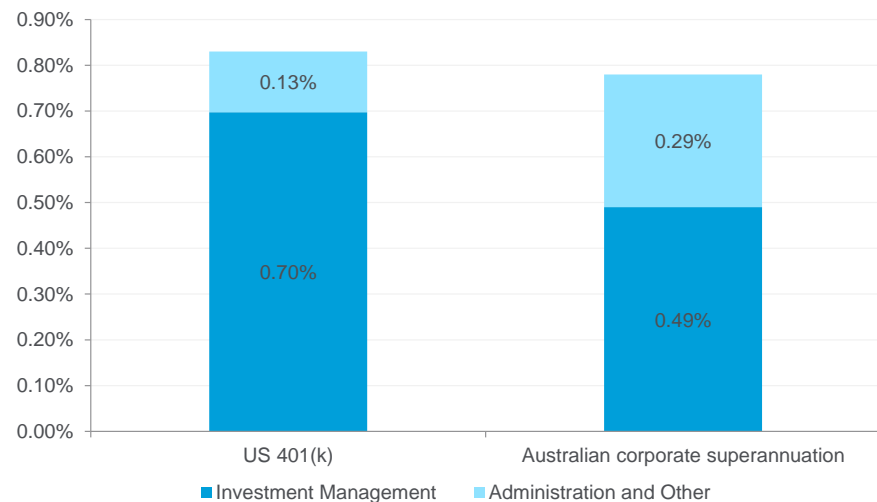
However, as banking, investment services, and other financial services become increasingly digitalized, employees and employers will likely choose to work with pension providers they can easily connect with through digital channels. In addition, given caps on fees for pension products, the ability to provide 'robo-advice' and digitally-driven investment guidance for individuals will become increasingly important. Companies with scalable and lean platforms that can still provide a great digital experience for end users will likely be winners in this market. Building such platforms will take time and involve a lot of upfront investment and risk (like most IT projects). Plan providers will need to invest in these platforms now so that they can benefit from an early competitive advantage over less well prepared peers.

Strong asset management capabilities are important as investment management fees account for the bulk of total fees charged

Make Asset Management a Key Competence and Profit Center

Given the commoditization and digitalization of record-keeping and the potential for regulatory pressure on fees, plan providers need to capture as much of the value chain as possible in defined contribution schemes. This means having strong asset management capabilities, as investment management fees account for the bulk of the total fees charged.

Figure 49. Estimated Split Between Record-Keeping and Investment Management
For corporate defined contribution plans



Source: ICI, RiceWarner, Citi Research

Defined contribution platforms typically provide a large degree of investment choice by allowing customers to select from a menu of fund managers and fund options across asset classes. Given the need to meet regulatory standards for providing adequate choice and avoiding conflicts of interest, most plans are open architecture (meaning they offer fund choices from asset managers other than just the plan sponsor). Therefore, most pension plan providers have less than half of their pension assets in proprietary funds. That being said, providers should strive to manage as much of the asset pool as possible in-house as these assets are much more profitable.

This will require insurers to build a strong asset management brand, attract/retain top talent, demonstrate a strong performance culture over time, and maintain competitive pricing. We believe this can only be achieved by separating asset management functions from their traditional role in insurance companies (managing insurance-related in-house assets) and moving to a greater focus on managing third-party assets. This will require asset managers to be run as separate profit centers, with arms-length relationships with their insurance businesses and separate P&L reporting. In many cases, insurers' long experience of managing assets to meet liabilities, pay insurance guarantees, and generate income over the longer-term could be a competitive advantage (e.g. given the need to manage downside risk and generate 'annuity' income as an ultimate goal in pension fund management). However, these capabilities need to be unleashed from the insurance company and managed separately. To capture value from our estimated \$5 trillion opportunity in private pensions, we believe it is essential that insurers also become recognized as good asset managers by consumers and corporates.

Insurers need to be able to point to their own investment capabilities and track record

In our view, the key competitive advantage for asset managers over insurers is their investment brand and reputation. To blunt this, insurers need to be able to point to their own investment capabilities and track record.

'Decumulation' Phase Also a Significant Opportunity

Guaranteed income solutions offered by insurers should be a significant advantage as retirees move from saving (accumulation) to spending (decumulation)

Insurers are unique in their ability to offer guaranteed income solutions to consumers, which should be a significant advantage as plan participants move from saving (accumulation) to spending (decumulation). A key difference between a traditional pension and a private defined contribution plan occurs at the time of retirement. Whereas a defined benefit pension begins paying out income, a defined contribution plan has no income provision, so the retiree is on their own to determine how to withdraw assets to support spending needs. This effectively has shifted the longevity risk, or risk of outliving one's assets, from the pension provider to the retiree. Rising longevity rates mean that in the developed world pensioners retiring at age 65 could expect to live for 20 years, if not more, creating real risk that retirees outlive their savings.

The closest re-creation of a traditional pension is a retail annuity which shifts the longevity burden to the insurer

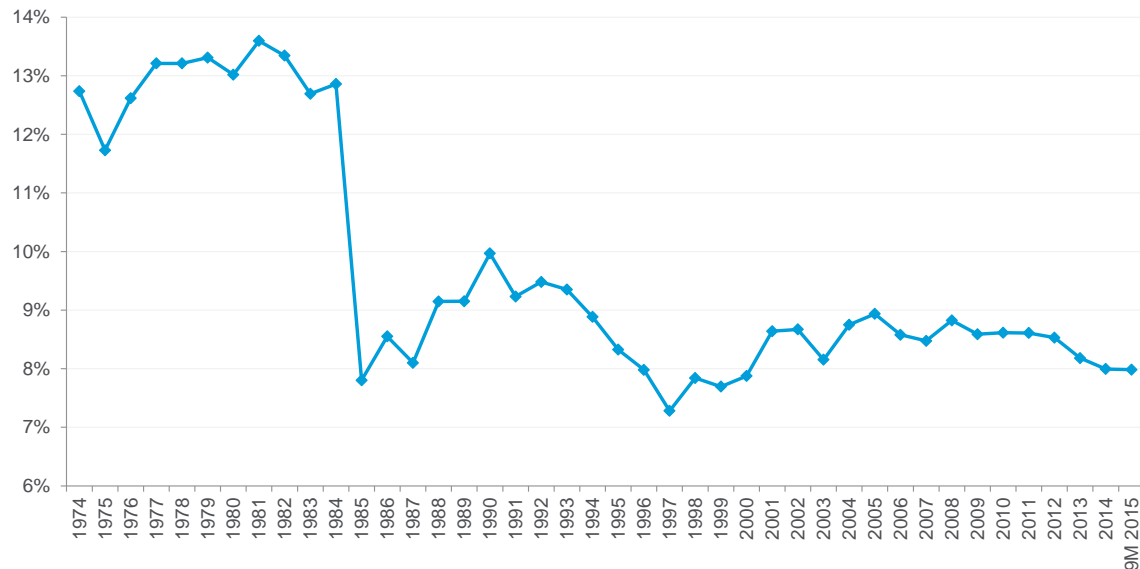
A retail annuity offered by a life insurer is the product that comes closest to recreating a traditional pension and shifts that longevity burden to the insurer. The US is a good example of a well-developed decumulation market. Here, annuities have many forms — fixed, variable, and indexed being the primary types — and typically have a tax-deferred accumulation period before converting to an income stream (similar to a traditional pension). Many annuities provide downside protection during the accumulation period, another unique feature. In order to create an annuity, a company needs actuarial expertise and data, as well as capital (we estimate required capital of 5%-7% per \$1 of sales). As a result, asset managers and banks are unable to compete against insurers in offering lifetime income solutions. Note, US annuities differ from the simpler 'payout annuities' offered in other markets such as the UK, which lock-in current yields and do not provide investment market upside.

Despite their appeal, penetration rates for annuities are low due to the product's complexity, relatively high fees and expenses, low interest rates, and withdrawal of supply in recent years

While annuities appear to serve a clear need, penetration rates remain relatively low. As the data in Figure 50 suggests for the US retirement market, the sale of annuities and their importance in retirement management has not been growing — in fact annuities are becoming a less important part of the US retirement market in recent years. We attribute this to several factors, most notably: (1) the product's complexity, (2) relatively high fees and expenses, (3) low interest rates, which have made terms less appealing to consumers, and (4) a withdrawal of supply in recent years, particularly in the variable annuity market.

Figure 50. Penetration of Annuities in the US Retirement Market (as a % of assets)

Annuities have declined in importance in recent years and have failed to capture the growing potential for retirement 'decumulation' in the US market



Source: ICI, Citi Research

Insurers need to innovate and create new products that appeal to consumers and address some of the issues that have held back annuities in the past

In our view, insurers need to innovate and create new products that appeal to consumers and address some of the concerns that have held back growth in recent years. For example, the immediate (or 'payout') annuity, which converts a lump sum investment into an income for life, forces consumers to rely on fixed income returns which results in a low level of income in a low yield environment. In the UK market, the removal of the requirement to buy an immediate annuity at retirement has resulted in a collapse in the market. At the same time, a pure fund-based approach, with no guarantees, runs risks from market volatility or retirees taking too much income too early. In the US, the variable annuity product addressed these drawbacks by combining investment funds with guarantees contingent on actuarial events (e.g. switching to an income or death). However, in the past these products have been marketed more as a form of investment savings vehicle rather than a retirement product, and imperfectly hedged or excessive guarantees led to capital issues and profit writedowns for US insurers during the financial crisis. We encourage insurers to devote more attention to this product space to come up with something that is more directed to income drawdown, with simpler, easier to hedge downside protection – some form of adjusted variable annuity that gives some form of guarantee on income for life. Additionally participating (or 'profit-sharing') traditional European life insurance products with 'hybrid' features and 'capital light' guarantees are another innovation that might form a good solution in this space.

Capturing the decumulation wave is a huge potential opportunity given the aging global population and insurers are uniquely positioned to take advantage. Therefore, it's critical for them to develop solutions that are both attractive to consumers and have an attractive risk/return profile for the insurer.

A shrinking asset base in defined benefit plans, continued de-risking of plan assets and increased competition from insurers mean asset managers need to think of ways to replace these assets

Asset managers should look at building out their liability-driven investing capabilities, creating more high alpha strategies, embracing the shift from a product to a solutions mindset, capturing the defined contribution opportunity, and recognizing the threat from insurance company buy-outs

Asset Managers Should Position for DB to DC Shift

Our analysis suggests that defined benefit (DB) pension plans will be a shrinking market over time, with most of the growth coming from defined contribution (DC) plans. In our view, companies that manage large pools of defined benefit plan assets need to be thinking now about how they will replace these assets in the future. We see several secular trends playing out that will affect this business: (1) a shrinking asset base as corporations freeze and/or exit pension plans, (2) continued de-risking of plan assets, likely leading to further shifts from equity to fixed income, and (3) increased competition from insurance companies to manage these assets. The biggest risk appears to be to equity-centric managers. Even for managers that are able to retain the assets by shifting them to other strategies, there is likely to be some fee compression in the move from equities to fixed income.

Trillions of dollars are likely to be available for asset managers — either in the defined contribution world as it exists today and grows, or even more so if CDC and private pension savings models are adopted as recommended in this report. Proper tax incentives and ‘opt-out’ structures will likely move tremendous amounts of assets into some form of retirement savings. Much of the world’s retirement savings will then be subject to some degree of market forces in determining which asset managers win the mandates to manage these enormous sums. In the following sections we touch on a few key strategic considerations for asset managers.

Continue to Build Out Liability-Driven Investing Capabilities

As discussed earlier in the section on corporate pension plan de-risking, we anticipate more plan sponsors will shift to liability-driven investing (LDI) strategies to reduce the volatility in plan funded status. This generally means a shift out of equities and into fixed income investments that better track the value of a plan’s liabilities. For asset managers, this creates a significant potential growth opportunity in institutional fixed income, especially if interest rates rise. However, it also means companies need to invest in the analytical tools and expertise to better understand plan liabilities. Here, traditional asset managers are at a disadvantage to insurance companies that have asset/liability management as a core competency. The shift to LDI strategies has already begun, but our analysis suggests there will be much more to come, so there remains an open window of opportunity.

Create More High Alpha Strategies

At the other end of the spectrum, some significantly underfunded pension plans will be unable to utilize an LDI approach and instead will need to take more risk to close the gap. For these plans, having strategies with higher alpha targets would be appealing. One solution is traditional alternative investments such as private equity, hedge funds, and real estate, which are already core allocations for many pension funds. We would also include strategies focused on commodities, currencies, and options strategies as well as higher alpha global and emerging markets funds. In addition to meeting a client need, high alpha funds should help combat the fee pressures caused by a shift to LDI and the encroachment of passive alternatives.

Pension funds benefit from a potentially very long time horizon, with long-term liabilities. Therefore, they can also afford to take positions in relatively illiquid assets that provide an appropriate return to compensate for this. Hence, we believe they could also play a more important role in long-term infrastructure investment than they already do.

The basic point is that we believe pension funds could embrace longer-term and more diversified portfolios than some of them currently do to meet long-term pension liabilities.

Embrace the Shift from a Product to Solutions Mindset

Over the past few years, we have seen the emergence of new products that depart from a traditional 'style-box' approach (e.g. a US large cap growth equity fund) and instead have unconstrained mandates or target a specific outcome (such as a 4% yield). This mirrors a move by some plans to use less traditional benchmark-oriented allocations (and focus instead on betas or other risk exposures). Similar to the high alpha strategies discussed above, this appears to be an opportunity for asset managers to differentiate themselves and fill a perceived need. The focus on solutions-oriented products in many ways seems like the next step from LDI where the manager focuses on solving for an individual plan's risk/return needs and parameters.

Capture the Defined Contribution Investment Only Opportunity

Asset managers have two ways they can benefit from growth in the private pensions market: (1) by serving as record keeper and investment manager to capture the full value chain and own the client relationship or (2) by serving as one of the investment managers available on a plan administered by another company. The latter is known as defined contribution investment only (DCIO) and may prove more attractive to many managers because it does not require the investment and scale needed to be an effective and profitable record-keeper. In order to be successful in DCIO, an asset manager needs a strong performance track record, institutional products/capabilities (such as separate accounts), and effective distribution and wholesaling. In addition, given that most of the assets under management (AUM) growth will be global, managers need strong global product capabilities, including investments that will satisfy local market requirements (such as Sharia compliant funds or single country fund options). This is a lot closer to most companies' core competencies, expanding the scope of potential winners. Importantly, some companies may take a specialized approach where they just target positioning one product or strategy (such as high yield fixed income or real estate) on DCIO platforms.

The downside of a DCIO approach is that the asset manager does not own the customer relationship, which may make it harder for them to retain the assets when a plan participant retires or changes jobs. Therefore, for companies like Fidelity that have a significant retail presence and are focused on capturing the rollover opportunity, being involved in the record-keeping business provides a critical advantage. Ultimately, the approach a company takes should be dictated by its retail aspirations/brand and ability to make the necessary investments to be competitive in plan administration and record-keeping.

Recognize the Threat from Insurance Company Buy-outs

Asset managers need to recognize that insurance companies represent a significant new competitor for defined benefit pension assets. As discussed earlier, we view pension buy-outs as a growing market and expect more plan sponsors to seek out insurance solutions going forward. When an insurance company takes over a plan, it moves almost all of the assets into its general account, so any existing managers will be disintermediated. Asset managers lack the capabilities, and likely the desire, to compete in the pension buy-out market, so there is little they can do to disrupt this phenomenon. The best they can likely hope for is that by implementing a de-risking strategy such as LDI plans see less need to execute a buy-out. As a result, management teams should assume some level of asset attrition (we estimate 5%-10%) to insurance companies in their strategic planning.

Conclusion

The world faces a retirement crisis. However, solutions — and opportunities — are available if governments and corporations take steps to begin addressing the issues. These conversations and actions need to happen now.

The global economy will not run into an explosive collision regarding retirement, but it is already experiencing the slow burn of steering increasing portions of government and corporate revenues into volatile and long-dated retirement liabilities.

Governments must take action, from providing more transparent disclosure to changing the terms of government pensions. They must change their private sector retirement systems to create Collective Defined Contribution systems and mandated private employer-provided retirement opportunities. And corporations should de-risk their pensions when funded status allows.

These changes — the de-risking of corporate pensions and the creation of new private pension savings vehicles — create opportunities for insurers and asset managers to help solve these enormous problems. We anticipate a wave of trillions of dollars of retirement assets building in coming years, and companies that provide advice and attractive product solutions to help solve savings and retirement income needs could experience significant growth.

Citi is pleased to participate in the discussion of this important topic, and we welcome the opportunity for dialogue with our customers and policymakers.



REGIONAL CASE STUDIES

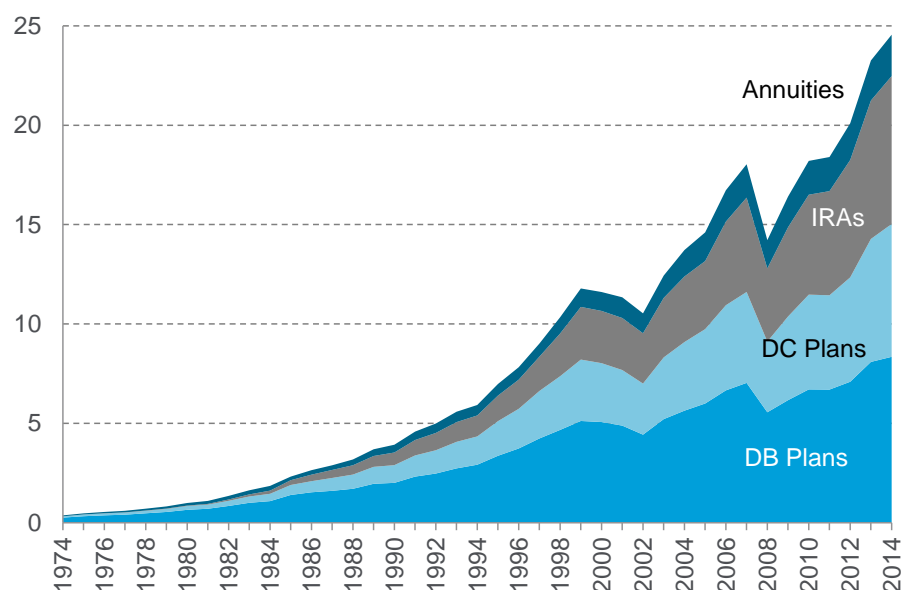
US Private Retirement Market

The US retirement market has nearly \$26 trillion of assets and has growth at a 6% CAGR over the past 10 years

The US has the largest private retirement market in the world, with nearly \$26 trillion of assets currently, and has grown at a 6% compound annual growth rate (CAGR) over the past 10 years. As a result, there is a huge opportunity for firms to manage retirement assets and/or provide financial advice. We expect asset managers, brokers, financial advisors, and life insurers to be the biggest beneficiaries of ongoing growth in the market. While growth could slow as more baby boomers retire and withdraw savings, we still anticipate mid-single-digit annual increases in the overall market over the next ten years.

We expect the key policy issues going forward to be incentivizing people to save more for retirement, and increasing regulatory scrutiny around products/fees. In our view, the primary challenges for investment providers will be retaining assets when people retire and maintaining adequate profitability in the face of intense competition and greater regulation.

Figure 51. US Total Retirement Assets



Source: Investment Company Institute (ICI)

Vehicles for Retirement Savings

Three main types of private retirement accounts are defined benefit pensions, defined contribution pensions, and IRAs

In the US, there are three main types of private retirement accounts in addition to government provided Social Security: (1) defined benefit pensions, (2) defined contribution accounts, such as 401(k) plans, and (3) individual retirement accounts or IRAs. Each of these has different characteristics, eligibility requirements, and tax benefits, outlined in the table below.

Figure 52. Private Retirement Plan Options in the United States as of end 2014(\$ in billions)

Type of Plan	Assets (\$ billions)	Eligibility	Tax features	Employer or employee paid	Employee contribution limit	Min. withdrawal age	Max. contribution age	Max. withdrawal age
Defined Contribution \$6,807								
401(k)	4,660	Offered by any business, including corporations, partnerships, and sole proprietorships	Contributions on pre-tax basis, gains tax deferred, ordinary income when withdrawn	Both	\$17,500 in 2014 and \$18,000 in 2015	59½	none	later of 70½ or retirement
403(b)	875	Offered by public schools and certain 501(c)(3) tax-exempt organizations (incl. churches, charities)	Referred salary is generally not subject to federal or state income tax until it's distributed	Both	\$17,500 in 2014 and \$18,000 in 2015	59½	none	later of 70½ or retirement
457	265	Offered by state or local government or a tax-exempt organization under IRC 501(c)	Eligible plans under 457(b) allow income tax deferral on retirement savings into future years. Ineligible plans may trigger different tax treatment under IRC 457(f)	Both	\$17,500 in 2014 and \$18,000 in 2015	59½	none	later of 70½ or retirement
Thrift Savings Plans	437	Federal employees or members of the uniformed services	Taxed contributions/tax-free withdrawals or pre-tax contributions/taxed withdrawals	Both	\$17,500 in 2014 and \$18,000 in 2015	59½	none	70½ or year separated from Federal service
Other DC plans	570							
Individual Retirement \$7,600								
Traditional	6,559	Anyone (or their spouse if filing jointly) with taxable compensation	Contributions are fully deductible if not covered by a retirement plan at work; withdrawals and distributions are taxable	Individual	Lesser of \$5,500 (\$6,500 if 50 or older) in 2014 and 2015 or taxable compensation in total for all IRAs	59½ (to avoid 10% added tax)	70½	70½
Roth	562	Anyone (or their spouse if filing jointly) with taxable compensation	Contributions are nondeductible, qualified distributions are tax-free	Individual	Lesser of \$5,500 (\$6,500 if 50 or older) in 2014 and 2015 or taxable compensation in total for all IRAs, potentially limited by modified AGI thresholds	59½ (to avoid 10% added tax)	none	none
SEP and SAR-SEP	380	Available to any size business; employer cannot have any other retirement plan	Contributions are fully deductible if not covered by a retirement plan at work; withdrawals and distributions are taxable	Employer only	n/a	59½ (to avoid 10% added tax)	70½	70½
SIMPLE	99	Available to any small business – generally with 100 or fewer employees; employer cannot have any other retirement plan	Contributions are fully deductible if not covered by a retirement plan at work; withdrawals and distributions are taxable	Both, employer matches up to 3% or nonelective 2% contribution	\$12,000 in 2014 and \$12,500 in 2015 or \$17,500 in 2014 and \$18,000 in 2015 if employee participates in any other employer plan		70½	70½
Defined Benefit Plans \$8,346								
Annuities \$2,108								
Total Retirement Assets \$24,861								

Source: Internal Revenue Service, Citi Research

Incentives to Encourage Retirement Savings

The government provides tax incentives to encourage employers and workers to contribute to private retirement plans

The US does not have a compulsory retirement system outside of Social Security, which alone is insufficient to provide for retirement income needs. Therefore, the government provides several tax incentives to encourage employers and workers to contribute to private retirement plans. Most plans allow people to contribute money on a pre-tax basis (traditional IRAs, 401k plans) and defer taxes on investment gains until retirement. Other plans, such as Roth IRAs, are funded with after-tax contributions, but withdrawals are tax-free. In addition, employers may be eligible for tax deductions on contributions to retirement plans made on behalf of workers.

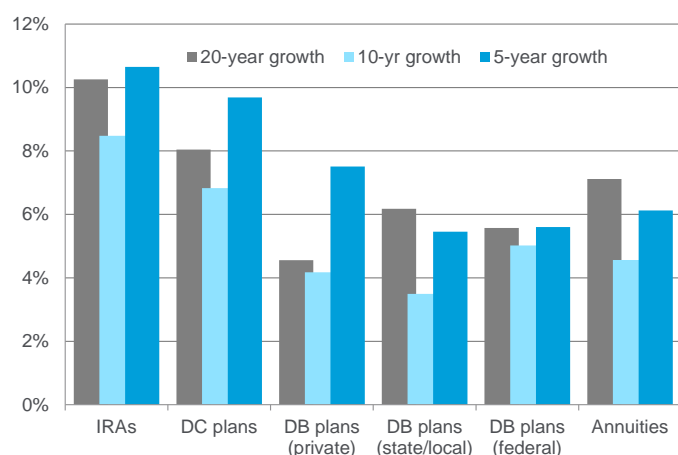
The Pension Protection Act of 2006 also introduced several measures designed to increase plan participation rates. Most notably, it allows employers to automatically enroll new employees in defined contribution plans with contributions capped at a modest level and the money allocated to 'qualified default investment alternatives' including life cycle or target date funds. These measures have contributed to lowering the percentage of workers not participating in 401(k) plans from 26% in 2001 to ~20% currently (Fed's Survey of Consumer Finances). However, private savings are still well shy of the level needed to fund retirement expenses. A Blackrock report notes the current average retirement portfolio of just \$136,200 only gets baby boomers 20% of the way towards a goal of \$45,500 per year in retirement income. As a result, we see potential for further incentives to encourage higher participation and deferral rates.

Retirement Plan Growth Trends & Outlook

Notable trends include a shift from defined benefit to defined contribution plans and the growth in IRAs

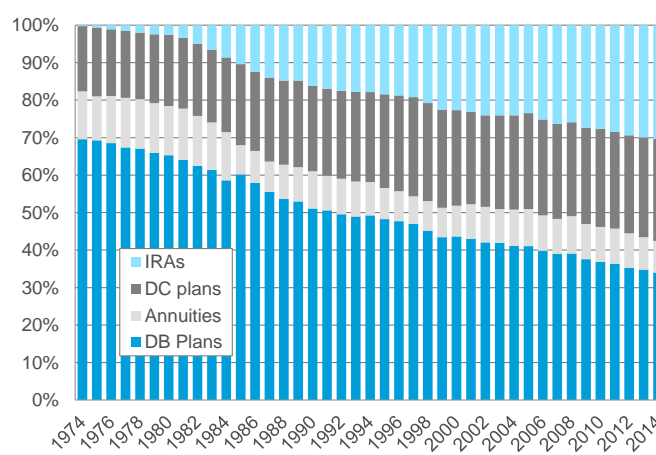
Over the past 40 years, the two most notable trends in the US retirement market have been: (1) the shift from defined benefit to defined contribution plans as employers transferred the retirement savings burden to employees and (2) the growth in individual retirement accounts. We expect both of these trends to continue, with defined benefit assets gradually shrinking over time and growth in IRAs outpacing other retirement plans.

Figure 53. Historical Growth in US Retirement Accounts



Source: Investment Company Institute (ICI)

Figure 54. Mix of US Retirement Assets



Source: Investment Company Institute (ICI)

Defined Benefit Plan Assets to Gradually Shrink Over Time

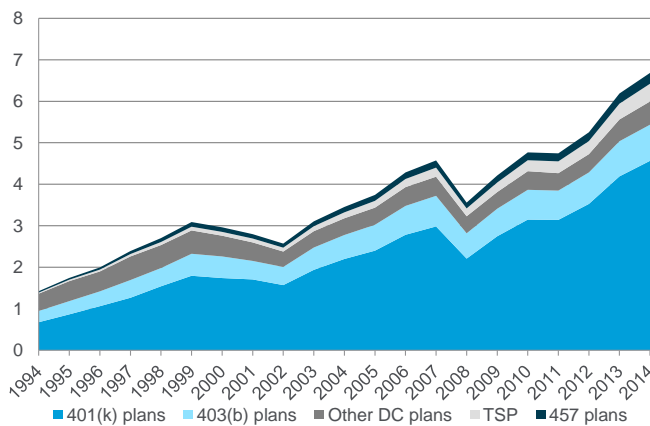
As discussed earlier in this report, most companies have stopped offering defined benefit plans to employees given the high and volatile/unpredictable costs. Most corporate defined benefit plans are now closed to new employees, and many have been frozen (no new contributions made for any employees). As a result, these are essentially run-off liabilities that will shrink as employees retire, receive payments, and eventually die. This process can be accelerated via pension risk transfer transactions such as group annuities purchased from an insurance company or lump sum offers.

Defined Contribution Plan Growth Has Likely Peaked

Growth in defined contribution plans has likely peaked as most mid/large employers have already converted from defined benefit plans and withdrawals are likely to increase as baby boomers retire

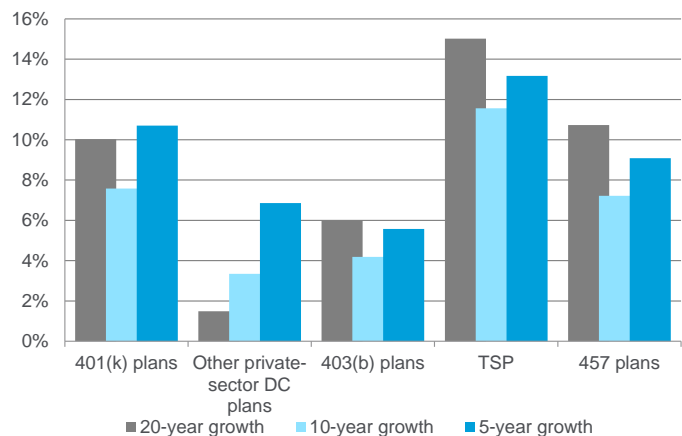
Defined contribution assets have seen significant growth over the past 20 years as more employers have shifted to offering defined contribution plans and participation rates have gradually risen. 401(k) plans have been the principal driver of the rise in defined contribution plan assets, growing at a compound annual rate of 10% since 1994 and accounting for two-thirds of total defined contribution plan assets at the end of 2014 (see Figure 55 and Figure 56). In our view, the historical growth rate is unsustainable as new plan formation will slow (as most mid/large employers have already converted from defined benefit to defined contribution plans) and withdrawals are likely to increase as more employees retire.

Figure 55. Growth in Defined Contribution Plans (\$ trillions)



Source: Investment Company Institute (ICI)

Figure 56. Growth in Defined Contribution Plans (CAGR per plan type)



Source: Investment Company Institute (ICI)

Defined contribution plan assets are expected to grow at a mid-single-digit level driven by market appreciation

We project defined contribution plan assets to grow at a mid-single-digit level over the next 5-10 years, with market appreciation being the primary driver. Near-term net flows are likely to be muted (or even negative) as more baby boomers begin to retire and withdraw assets. A June 2015 *Wall Street Journal* article highlights an analysis by BrightScope, which estimates net withdrawals from 401(k) plans of \$11.4 billion in 2013. Similarly, Cerulli Associates forecasts outflows to persist until at least 2019, at which point it projects investors to withdraw \$51.6 billion (based on a December 2014 report). This is consistent with our asset roll-forward analysis which projects modest negative flows and 5.0%-5.5% annual asset growth.

Figure 57. Projected Growth in Defined Contribution Plan Assets (\$ billions)

	2015E	2016E	2017E	2018E	2019E	2020E
Beginning assets	6,684.0	7,056.5	7,444.8	7,850.1	8,273.3	8,714.5
Contributions from existing participants	337.5	340.3	343.1	346.0	348.7	351.3
Contributions from new participants	4.7	4.8	4.8	4.9	4.9	5.0
Withdrawals from retirees	(150.0)	(153.8)	(157.3)	(160.9)	(164.9)	(169.0)
Withdrawals from job changers	(45.0)	(45.5)	(46.0)	(46.5)	(47.0)	(47.5)
Withdrawals from deaths	(162.0)	(165.6)	(169.2)	(172.9)	(176.7)	(180.4)
Total net flows	(14.8)	(19.8)	(24.6)	(29.4)	(35.0)	(40.7)
Investment performance	387.2	408.1	429.9	452.6	476.2	500.8
Ending assets	7,056.5	7,444.8	7,850.1	8,273.3	8,714.5	9,174.6
Organic growth rate in assets	-0.2%	-0.3%	-0.3%	-0.4%	-0.4%	-0.5%
Total growth rate in assets	5.6%	5.5%	5.4%	5.4%	5.3%	5.3%

Source: Citi Research

IRAs Likely to Remain the Fastest-Growing Retirement Accounts

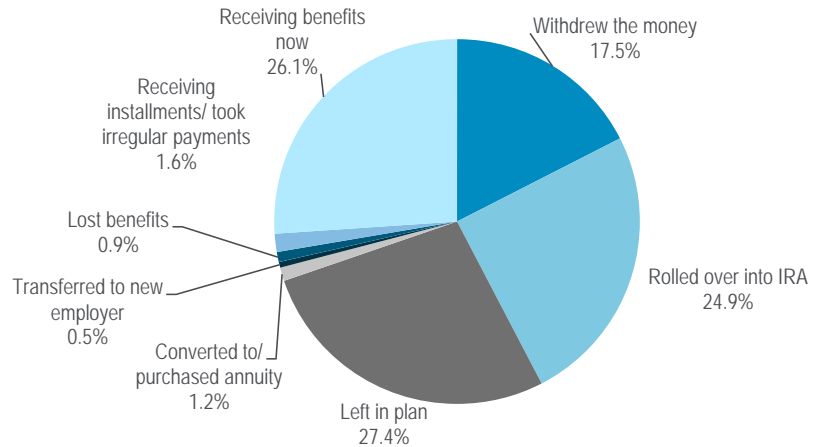
The share of IRAs in private retirement accounts will continue increasing as more baby boomers reach retirement age

Currently, IRAs account for about 30% of assets in private retirement plans. This is up from ~24% ten years ago, and we expect the percentage to continue increasing as more baby boomers reach retirement age. US tax laws allow individuals to 'roll over' assets from a defined contribution plan to an IRA on a tax-free basis. IRAs typically have a wider array of investment options, and individuals can consolidate multiple accounts into a single IRA. Therefore, an IRA-rollover is a popular option when an employee changes jobs or retires. We see regulatory changes for financial advisers as the biggest potential impediment to further growth.

IRA contributions are expected to reach \$546 billion by 2019, up from \$205 billion in 2003

Over the next ten years, nearly 45 million baby boomers are expected to retire, which could translate to an estimated hundreds of billions of dollars of assets potentially leaving defined contribution plans. According to Cerulli, contributions to IRAs are expected to reach \$546 billion by 2019, up from \$205 billion in 2003. In addition, in a February 2015 report, Cogent estimates there will be \$382 billion of flows into rollover IRA accounts in 2015 as investors move balances out of former employer-sponsored retirement plans. Not all assets in defined contribution plans will be withdrawn at retirement, but we expect a sizable portion to leave the plan. The figure below highlights results from an Employee Benefit Research Institute (EBRI) analysis of data from the University of Michigan Health and Retirement Study (HRS), which suggests nearly 50% of assets will leave the current plan. We note that all of the estimates cited above pre-date the Department of Labor (DOL) fiduciary proposal, which could reduce asset movement. Nevertheless, IRA rollovers represent a sizable opportunity for financial firms to attract new assets, and they also pose a key risk for firms that currently manage defined contribution plan assets. Therefore, we believe it is critical for companies with large defined contribution plan businesses to develop strategies for retaining these assets at retirement.

Figure 58. Distribution of Defined Contribution Plan Asset Disposition (2010)



Note: For respondents retired or self-employed
Source: Citi Research

New fiduciary standards on financial advisors working with retirement accounts are a risk to growth in the IRA market

In our view, the biggest risk to the growth of the IRA market is increased regulatory scrutiny. The US Department of Labor has proposed new fiduciary standards which will affect financial advisors working with retirement accounts. While the final standard has not been written, we believe a likely outcome is that advisors will be held to a higher standard (and subject to greater liability) when recommending either an IRA rollover or certain investments in an IRA. This could result in less rollover activity, particularly at the smaller end of the market.

Annuities: Sizable Potential, but Still a Niche Product

Market penetration of annuities is low at just ~8% of retirement assets, despite being the only financial product currently that can provide guaranteed lifetime income

We expect the overall annuity market to grow at a mid-single-digit rate over time, with indexed annuities being the fastest-growing category. Annuities are currently the only financial product that can provide guaranteed lifetime income, but overall market penetration remains low (~8% of retirement assets). There are three primary types of annuities: (1) fixed (in which policyholders receive a set crediting rate), (2) variable (the account value varies based on market performance), and (3) indexed (the crediting rate depends on the performance of a market index, but cannot be negative). Contracts may also include optional 'living benefit' riders that guarantee a certain level of income may be withdrawn regardless of market performance. Investment gains are tax deferred, and if a policyholder chooses to annuitize, they receive a steady stream of payments. The structure of annuities matches up well with how investors hope to utilize their savings in retirement, and the downside protection is a unique benefit that proved very attractive during the financial crisis.

The drawbacks to annuities include relatively high costs and limited liquidity

However, annuities also have several drawbacks, most notably relatively high costs (particularly for variable annuities) and limited liquidity (most contracts charge steep surrender fees for early withdrawals). In addition, annuities are much more complicated than mutual funds or individual stocks and bonds. Market capacity has also shrunk in recent years as several insurers have pulled back (or exited) due to low interest rates, the capital-intensive nature of the product, and poor profitability on older blocks. Another potential headwind is new Department of Labor (DOL) Fiduciary Standards, which could reduce the sale of variable annuities into IRA accounts (which currently account for ~60% of industry variable annuity sales).

The keys to generating attractive returns in the defined contribution retirement business are scale, management of the assets, and strong asset retention

Asset managers are best positioned to profit from assets within defined benefit and defined contribution plans; wealth management firms will likely benefit from the move of assets into IRAs

Record keepers with strong asset management capabilities will likely be winners in the defined contribution market

Profitability Still Attractive, but Some Pressure Points

Historically, the defined contribution retirement business has produced healthy margins and attractive returns, although profitability has come down as a result of steady fee compression. Going forward, we believe the keys to generating attractive returns are: (1) scale, (2) managing the assets, and (3) strong asset retention. We expect the pace of fee pressure to slow as much of the impact of unbundling, the move to more open architecture and passive product, and increased fee disclosure have already occurred. However, the increased focus on the market by Vanguard and other low-cost providers suggests fees will likely continue moving lower, particularly for asset management. In addition, the proposed new DOL fiduciary standards could result in higher costs. We are also concerned the DOL rules could accelerate the shift to open architecture. The combination of lower fees and higher expenses will make scale even more important and could drive further industry consolidation, particularly in the record-keeping business, where margins are already tight.

Best Positioned Competitors

In our view, certain companies and industries have clear advantages in different segments of the retirement market, but few companies have holistic models that position them as winners in both pre and post-retirement. We believe asset managers (and life insurers with asset management businesses) are best-positioned to profit from assets within defined benefit and defined contribution plans, while wealth management firms will likely benefit most as assets move into IRAs. There is also opportunity for financial advice providers who can engage clients both before and after retirement.

Defined Contribution Plans: Scale and Asset Management Key

We believe large record keepers who also have strong asset management capabilities are likely to be the winners in the defined contribution market as bundled solutions provide the highest profitability. While there is still some opportunity for pure record keepers, we see continued fee pressure, so scale is critical to earn adequate returns. In our view, this has been a key driver of industry consolidation in recent years. The biggest deal involved the creation of Empower Retirement, which is the combination of Great-West Retirement Services, the retirement business of Putnam Investments, and J.P. Morgan Retirement Plan Services. More recently, John Hancock Retirement Plan Services acquired New York Life Retirement Plan Services.

Figure 59. Top Record Keepers by Total Defined Contribution Assets (\$ million)

Rank	Record Keeper	Assets
1	Fidelity Investments	\$1,445,635
2	TIAA-CREF	\$429,808
3	Empower Retirement	\$416,313
4	Aon Hewitt	\$394,058
5	Vanguard	\$389,402
6	Voya Financial	\$352,173
7	Prudential Retirement	\$241,843
8	Wells Fargo	\$217,500
9	Xerox HR Solutions, LLC	\$194,398
10	Principal Financial Group	\$173,267
11	T. Rowe Price	\$146,439
12	Bank of America Merrill Lynch	\$134,822
13	John Hancock Retirement Plan Services	\$126,171
14	Transamerica Retirement Solutions	\$125,323
15	MassMutual Financial Group	\$120,810
16	Charles Schwab	\$115,447
17	Nationwide Financial	\$96,835
18	Mercer	\$96,179
19	VALIC	\$84,706
20	ADP Retirement Services	\$59,553

Source: PLANSPONSOR Recordkeeping Survey (June 2015)

In our view, the best positioned companies will have not only large record keeping operations but also manage a significant portion of the assets. This necessitates a strong asset management platform and outstanding performance. Among the top competitors, only a handful are leaders in both recordkeeping and management of defined contribution assets (Fidelity, TIAA-CREF, Prudential) or manage a large portion of the defined contribution assets they record-keep (Principal, T-Rowe Price). We see the biggest risk to the latter model being the ongoing shift to open architecture and more passive funds. This process could be accelerated by the DOL's new fiduciary standards, which could heighten advisors' focus on fees, performance, and manager diversification.

The other model that has proven to be successful is defined contribution investment only (DCIO), or managing defined contribution assets for plans with third-party record keepers or administrators. This market could expand further if the DOL proposal does result in less proprietary product in defined contribution plans.

Figure 60. Largest Managers of DC Assets
\$ millions

Manager	Assets
Vanguard Group	705,507
Fidelity Investments	620,198
BlackRock	584,828
TIAA-CREF	409,121
T. Rowe Price	289,401
State Street Global Advisors	273,153
Capital Group	265,131
Prudential Financial	225,897
J.P. Morgan Asset Mgmt.	153,009

Source: Pensions & Investments

Figure 61. Largest Managers of DB Assets
\$ millions

Manager	Assets
BlackRock	496,766
State Street Global Advisors	376,295
BNY Mellon	205,375
Northern Trust Asset Mgmt.	177,200
Prudential Financial	175,660
J.P. Morgan Asset Mgmt.	166,129
Wellington Mgmt.	109,379
NISA Investment	105,721
Legg Mason	79,027
Goldman Sachs Group	68,776

Source: Pensions & Investments

Post-Retirement: Retail Brand and Distribution Critical

In post-retirement, strong retail brand and a diverse product offering will offer the key competitive advantage in attracting IRA rollover assets

Mutual funds and ETFs should maintain a dominant market share in post-retirement assets and annuities will also likely remain important

In our view, having a strong retail brand and diverse product offering provides a key competitive advantage in attracting IRA rollover assets. Unlike the decision about a defined contribution plan record keeper or fund lineup, which is made by the plan sponsor with the help of brokers or advisors, the rollover decision is made at the individual level. We believe this gives well known brokerage firms such as Merrill Lynch, Morgan Stanley, Charles Schwab, or Fidelity an advantage over other post-retirement providers. Brokers are also helped by having direct-to-consumer distribution and the ability to offer a full array of products (including mutual funds and annuities). While most life insurers (and some asset managers) involved in the retirement market also have broker-dealer subsidiaries, these tend to be less well known and have more limited scale. We believe investing in these capabilities is key to retaining rollover assets. Record keepers also have to capitalize on their existing relationships with plan participants to develop stronger ties pre-retirement (or job change), such as by offering retirement advice.

While we believe brokers and financial advisors are best-positioned to capture the post-retirement client relationship, which products ultimately secure the greatest market share is harder to gauge. We expect mutual funds and exchange traded funds (ETFs) to maintain a dominant position given their simplicity and relatively low cost. Here, the winners are likely to be firms that generate consistent strong investment performance and have innovative products. Annuities will also likely remain an important asset class given anticipated demand for guaranteed lifetime income, and insurers with broad third-party distribution relationships should continue to dominate. Demand for alternative investments such as hedge funds, private equity, and real estate also seems likely to continue rising, although the impact of final DOL rules is a wildcard.

Figure 62. Total Annuity Sales (\$ million)

	3Q15		
	\$	Share	Rank
Jackson National (Pru Plc)	6,356	10.5%	1
American International Group	5,441	9.0%	2
Lincoln Financial Group	3,694	6.1%	3
New York Life	3,375	5.6%	4
TIAA-CREF	3,062	5.1%	5
MetLife Inc	2,596	4.3%	6
Allianz	2,506	4.1%	7
Axa SA	2,419	4.0%	8
Prudential Financial	2,293	3.8%	9
Nationwide Mutual	2,255	3.7%	10
Total Sales (\$bn)	60.6		

Source: LIMRA, Bloomberg, and Citi Research

Figure 63. Variable Annuity Sales (\$ million)

	3Q15		
	\$	Share	Rank
Jackson National (Pru Plc)	6,007	18.3%	1
TIAA-CREF	3,062	9.3%	2
American International Group	2,922	8.9%	3
Lincoln Financial Group	2,845	8.6%	4
Axa SA	2,411	7.3%	5
Prudential Financial	2,112	6.4%	6
TransAmerica (Aegon)	1,792	5.4%	7
MetLife Inc	1,769	5.4%	8
Ameriprise Financial Inc	1,340	4.1%	9
Nationwide Mutual	1,265	3.8%	10
Total Sales (\$bn)	32.9		

Source: LIMRA, Bloomberg, and Citi Research

Figure 64. Fixed Annuity Sales (\$ million)

	3Q15		
	\$	Share	Rank
New York Life	2,598	9.4%	1
American International Group	2,519	9.1%	2
Allianz	2,040	7.4%	3
American Equity Investment Life	1,827	6.6%	4
Forethought Annuity	1,567	5.7%	5
American Financial Group Inc	1,299	4.7%	6
Symetra Financial	1,216	4.4%	7
Nationwide Mutual	990	3.6%	8
Lincoln Financial Group	849	3.1%	9
MetLife Inc	827	3.0%	10
Total Sales (\$bn)	27.7		

Source: LIMRA, Bloomberg, and Citi Research

UK and Dutch Pension Systems

As we discussed at some length earlier in this report, the UK and European pension systems suffer from some of the most urgent and dramatic levels of public and private sector pension liabilities as a proportion of GDP. In the UK this is in spite of a relatively developed private pension saving system that has depended historically on private defined benefit pensions, but with a substantial shift to defined contribution pensions in the past two decades.

To address this, the UK Government has been relatively proactive by introducing a number of fairly radical pension reforms to promote the private pension sector and ease the cost of supporting retirement on the government. Central to this is the introduction of a system of 'auto-enrollment', which is a mandatory level of private pension savings that consumers have a right to opt-out from. Rather than going down the full pension 'compulsion' route (as in Australia) this is a form of 'soft compulsion'; however initial data suggests that the level of participation has been high. There are some potential downsides to the UK pension system, which include greater uncertainty over retirement income due to the introduction of 'pension freedoms' in how consumers spend their pensions, as well as lower levels of contributions into private defined contribution schemes.

We examine the UK Pension system in a little more detail in this section, together with a brief discussion of the highly developed Dutch pensions system.

Basic Structure of the UK Pensions System

The UK government has been simplifying the pension system and making relatively radical changes to the state pension age

The UK combines a 'social security' net of pension income and an additional third tier of private and occupational pensions in addition to the social security system. The social security system for pensions is being overhauled in the next few decades with the introduction of a simplified New State Pension from 2016/17. This will replace the current Basic State Pension and additional State Earnings Related Pension with a basic fixed weekly State Pension — allowing greater certainty of future costs for the UK's pay-as-you-go State Pension system. The government is also making relatively radical changes to the State Pension Age, from which social security funded pension payments are made, which should also help to limit the cost of social security pensions in the future:

- State Pension Age (SPA) is being equalized for men and women between 2010 and 2018 to 65 years for both sexes, from a previous 60 years for women and 65 years for men;
- There will be a further series of increases to SPA to reflect the threat of rising longevity. By 2020, SPA will rise to 66 for both men and women and to 67 years between 2026 and 2028; and
- The intention is to implement further increases to SPA based on 5-yearly reviews. Based on current government statements we may see State retirement age rise to 68 by the mid-2030s and to 69 by the late-2040s.

In the UK, 35%-40% of all income in retirement comes from some form of non-government pension

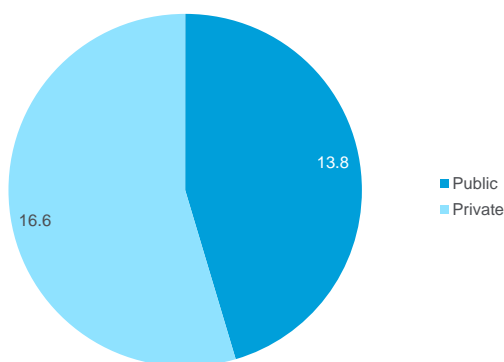
The private and occupational pensions system in the UK is highly developed and approximately 35%-40% of all income in retirement comes from some form of non-government pension. This is mainly based around workplace or occupational pensions from a mixture of private companies as well as public-sector workplace pension schemes (that are largely unfunded). There are around 30 million workers in the UK with a workplace pension, with approximately 45% in public sector schemes and the remainder in private schemes (Figure 65). As Figure 66 shows, around 50% of pensions are defined benefit schemes (both public and private

sector), and the remainder in some form of mainly defined contribution scheme providing no guaranteed pensions to members.

Tax benefits are fairly attractive for contributions into private or occupational pension schemes

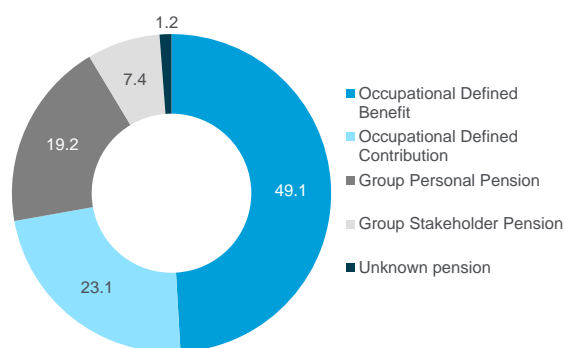
Contributions into private or occupational pension schemes have fairly attractive tax benefits. Currently all contributions into pension schemes are tax free, up to a maximum tax free level (currently £40,000 – although tapering down for higher earners). Retirement income is taxed for pensioners at their marginal rate of tax; however there is significant tax deferral in the system, and pensioners can still benefit from taking a lower level of income in retirement (and incurring lower tax rates) than during their working lives.

Figure 65. Members of Public vs. Private Occupational Schemes (mils)
Around 45% of occupational pensions are public sector



Source: ONS, Citi Research

Figure 66. Occupational Scheme by Type (%)
Approximately half of members are in defined benefit schemes



Source: Citi Research

Auto-Enrollment, Pension Freedoms and Charge Caps

Legislative changes have been introduced to encourage faster growth in the private pension savings landscape starting in 2008

A number of legislative changes since 2008, including the latest Pensions Act 2014, have overhauled the private pension savings system in the UK. These have been introduced to encourage faster growth in the private pension savings landscape than would otherwise have been achieved – and we believe provide an interesting case study for other countries looking to increase private pension provision.

The UK introduced a mandated 'auto-enrollment' for all working people into private pension schemes in 2012

Since 2012, the UK government has mandated 'auto-enrollment' for all working people into private pension schemes. This means that unless individuals actively opt-out of their schemes, they must join a scheme and with minimum mandated levels of contribution from employees and their employers. The aim is to increase contributions ultimately to a minimum 8% of pensionable salary by 2018 in a number of stages. To help ease the administrative burden of this new system, there has also been staging by size of employer – with the aim that all employers are covered by October 2018 (see Figure 67).

The system is ultimately a voluntary one and isn't viewed as some form of additional tax on citizens

Unlike the Australian system (see page 96), this is ultimately a voluntary system (on behalf of employees; employers must set up a pension scheme and contribute if their employees want to join). This helps to avoid this legislation being viewed as some form of additional tax burden on citizens to help pay for retirement.

So far, around 5.4 million individuals that were not part of the current private pension landscape have been automatically enrolled as a result of this new legislation in the UK. Opt-out rates have been lower than anticipated, with ~10% of employees actively deciding not to participate. The UK government expects this to rise to ~15% by 2018 as smaller schemes are staged into the auto enrollment system.

Figure 67. UK Auto-Enrollment Staging Dates

Staging date	Type of employer	Employer minimum contribution	Total minimum contribution
October 2012	>250 employees	1%	2%
April 2012	>50 employees	1%	2%
June 2015	<50 employees	1%	2%
October 2017	Employers existing after Oct 12	2%	5%
October 2018	All	3%	8%

Source: DWP, Citi Research

- Previously, the majority of pension savings, apart from a 25% tax-free lump sum, would effectively have to be used to purchase an immediate payout annuity or similar 'income drawdown' product. This effectively locked individuals into a low-yielding asset and made pensions appear unattractive. This has now been removed. Individuals still take up 25% of savings as a tax-free lump sum, but now have no restrictions on how to use the remaining capital. This can still be used to purchase an annuity or income product, but may also be simply withdrawn without any limits (although withdrawals are taxed at an individual's marginal rate).
- Pension savings can now be inherited after death by beneficiaries. If you die aged under 75, any money still in a pension savings vehicle is passed on tax free. After age 75, tax is incurred depending on whether the money is taken as a lump sum or an income. Overall, the flexibility to pass pensions on to your estate after death (and the levels of tax involved) is far greater than the previous regime.

On top of auto-enrollment, legislation introduced 'charge-caps' to ensure product providers don't make excessive margins on funds invested

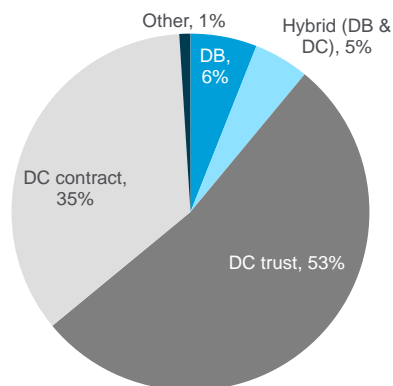
A final part of the pensions landscape that is an important factor is the use of 'charge-caps' on investment funds in defined contribution pensions; which have been the main area of growth in the auto-enrollment arena. After introducing some form of compulsion into savings (albeit with an opt-out), the UK government was keen not to have product providers being viewed as making excessive margins on funds invested. Hence a charge-cap of 75 basis points applies to defined contribution funds. This cap encompasses all pension scheme investment and administration charges (but does not include third-party costs when investments are bought and sold on the market). Defined contribution pension fund product providers and asset managers can charge in excess of 75 basis points for non-default funds, but there are limits on overall charges for these funds also.

Savings Levels Have Increased

Initial results from the changes to the private pensions regime are favorable with opt-out rates much lower than anticipated

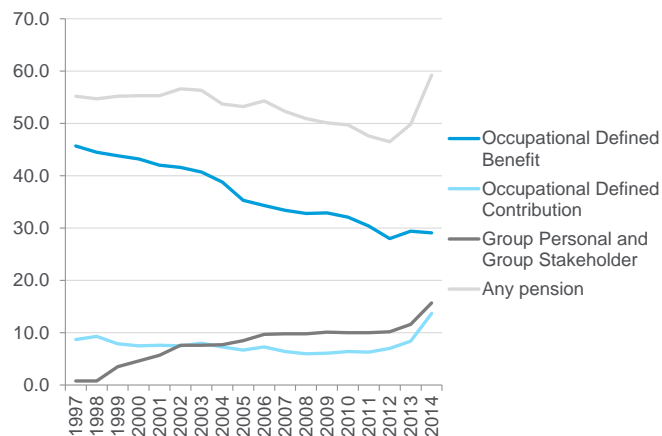
The initial impact of the introduction of changes to the private pensions regime in the UK appears to have been favorable. As we stated earlier, opt-out rates have been lower than anticipated and just over 5 million customers have been auto-enrolled into pension schemes since 2012, with the majority going into defined contribution schemes, either through a contract with an insurance or pension provider (defined contribution contract schemes) that provides all administration and investment services, or through a trust-based scheme where there are appointed Trustees that buy-in services for investment management, administration and other areas, but are ultimately responsible for managing the scheme independently of providers.

Figure 68. Types of New Auto-Enrolled Schemes Since 2012
 >90% of auto-enrollment start-ups have been Defined Contribution



Source: Pensions Policy Institute, Citi Research

Figure 69. Proportion of Employees with Workplace Pensions (by type)
 Membership of private pension schemes has grown substantially



Source: ONS, Citi Research

By 2014, 60% of employees were covered by a pension scheme, a record level in the past 20 years

This increase in employees with pension schemes has reversed a steady decline in private pension scheme membership, with 60% of employees covered by a scheme in 2014, a record level in the past 20 years. Since the mid-1990s, pressure on funding levels in corporate defined benefit pension schemes has resulted in a dramatic decline in more secure defined benefit pensions. Just under 50% of employees in the UK were covered by defined benefit schemes in the early- to mid-1990s, but this fell to 30% by 2014. The growth in occupational defined contribution schemes since auto-enrollment was introduced has helped to more than offset this decline in the space of only two years. We expect this trend to continue upwards as more schemes enter their auto-enrollment staging.

Auto-enrollment could more than double the amount of people actively saving in private sector defined contribution schemes to 2030 to between 12.5 and 14.5 million

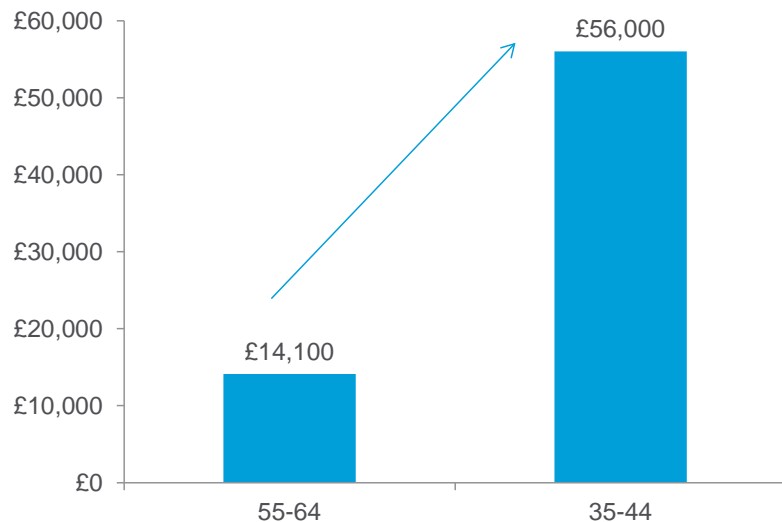
This should mean that the level of pension savings in the UK should start to improve well beyond what could have been expected had auto-enrollment not been introduced. Recent projections from the Pensions Policy Institute in the UK ('How will automatic enrollment affect pension saving', July 2014) suggest that auto-enrollment could more than double the number of people actively saving in private sector defined contribution schemes by 2030 to between 12.5 million and 14.5 million (compared to an estimated 6.5million without the introduction of auto-enrollment). The level of assets invested in workplace defined contribution pension schemes could rise to £450-£500 billion (\$640-\$715bn) based on these projections, an increase of £100bn-£150 billion (\$145-\$215bn) over a scenario without the influence of auto-enrollment.

The median pension savings per individual in defined contribution plans at State Pension Age could rise to £56,000 for those currently aged 35-44-yrs vs. £14,100 for those 55-64-yrs

These projections suggest that future generations of pensioners with defined contribution pensions (and therefore no built-in benefit guarantee) are likely to end up with higher levels of savings on average than those that have not benefitted from auto-enrollment. As we show in Figure 70, the Pensions Policy Institute in the UK believes that median level of pension savings per individual in defined contribution pension plans at State Pension Age could rise to £56,000 for those currently aged between 35 and 44 years old, compared to £14,100 for those between 55 and 64 and already approaching retirement.

Figure 70. Median Defined Contribution Pension Savings at State Pension Age (in today's terms)

Auto-enrollment could mean that median savings in DC pension plans improve to >£40k in 20 years



Source: Pensions Policy Institute, Citi Research

Uncertainty Has Also Increased with Shift to Defined Contribution Pensions

Despite the increased savings levels, the main downside risk in a shift to defined contribution schemes is increased uncertainty over retirement income and many individuals are outliving their savings and ultimately are depending on the government

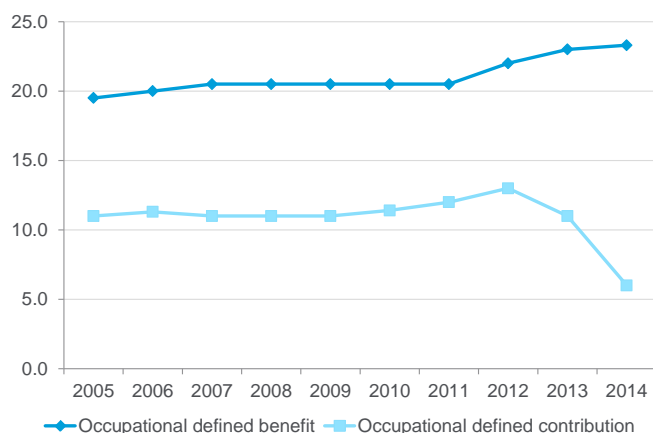
Despite the increased levels of saving that are likely to come through from auto-enrollment, the system has some flaws and downside risks — some of which are similar to those of the Australian system of compulsion. The main downside risk from the shift to a defined contribution private pensions system and away from defined benefit is increased uncertainty over retirement income. Also pension freedoms may mean that, although people are benefitting from increased savings, the lack of guarantees in retirement through the use of annuities — as well as a potential lack of sufficient financial advice — could mean that increased savings are not sufficient. We may still see many individuals outliving their savings and ultimately depending on the government.

We would highlight the following observations:

- **Still unclear whether savings are sufficient to provide adequate retirement income.** Although savings levels are likely to increase under auto-enrollment, it is not yet clear that they are increasing to a sufficient level to provide an adequate level of retirement income. In the projection in Figure 70, for example, the higher projected level of savings in defined contribution pensions is welcome, but is still unlikely to provide an adequate level of income in a low-yield environment. For example for an individual with median earnings of £25,000 per year, a replacement ratio of 54% (the OECD reference rate for the proportion of post-retirement to pre-retirement earnings) would require a pension of £13,500 per year. Based on current annuity rates in the UK, however, a pension pot of £56,000 would only buy an income of £2000-£3000 per year. Unless customers have other forms of income (e.g. an alternative defined benefit pension), the UK could still face a substantial burden on the government, in spite of auto-enrollment. Hence it is likely that a far greater level of contribution into defined contribution schemes will likely be necessary than the targeted 8% minimum contribution rate. We note that in Australia the minimum employer contribution is 9.5% and is expected to rise to 12% by 2021.

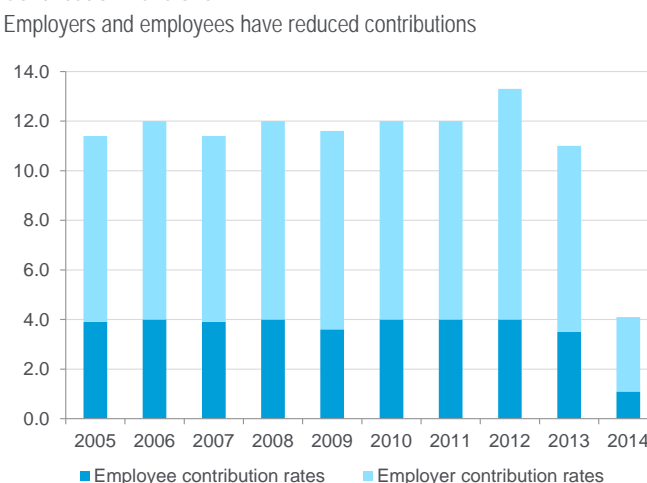
- **Minimum contribution rates resulting in 'levelling down'.** A primary issue in the UK is that contribution levels in defined contribution pensions have 'levelled down' to the minimum contribution levels mandated. This is not an issue in defined benefit pensions, since contributions are determined by funding calculations in these schemes and the majority of the burden falls on employers. As we show in Figure 71, since the introduction of auto-enrollment, the median total contribution rate in occupational defined contribution pensions has more than halved to ~5%. Looking at the median contribution rates from employers and employees separately, it is clear that both employees and employers have reduced contribution rates. This is in stark contrast to defined benefit pensions, where contribution rates are >20% as defined benefit schemes seek to rebuild funding levels and meet relatively high pension commitments. It is likely that defined contribution pension contribution levels will recover as auto-enrollment staging results in higher minimum contributions to 8%. However, the risk remains that few employers consider raising contribution levels beyond this minimum level, resulting in defined contribution pensions that are far less generous than historic levels with substantially lower likely outcomes than defined benefit pensions.

Figure 71. Median Total (Employer + Employee) Contribution Rate
Contribution rates to defined contribution pensions have collapsed to minimum auto-enrollment levels



Source: ONS, Citi Research

Figure 72. Median Employer and Employee Contributions to Defined Contribution Pensions
Employers and employees have reduced contributions



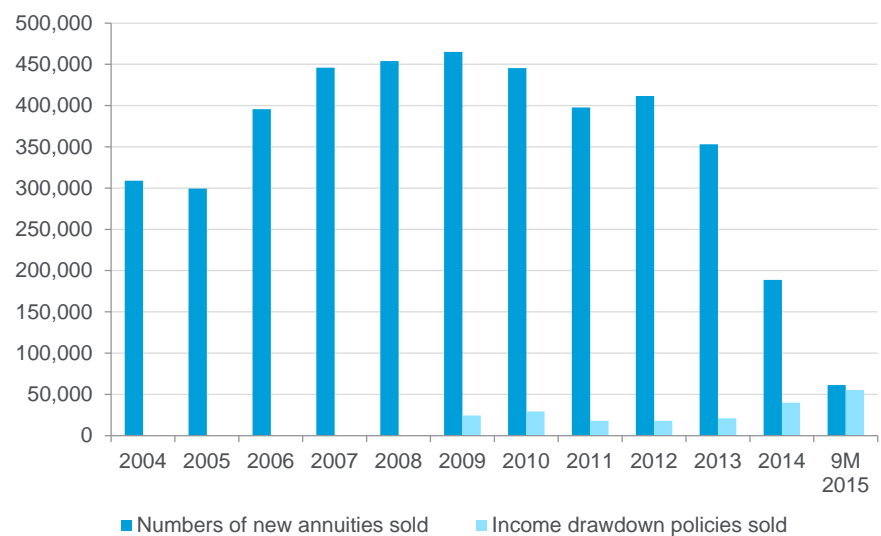
Source: ONS, Citi Research

- **A collapse in the individual annuity market.** It was inevitable that the introduction of flexibility over the use of pension savings pot would result in a decline in the take-up of annuities in the UK. The nature of annuities is that they are backed by fixed income investments and therefore offer poor yields, with annuity conversion rates (i.e. income levels as a proportion of pension saving) of 3%-6% based on current market conditions and mortality rates. In addition, they offer low flexibility — once you buy an annuity you cannot surrender the policy and it is not easy to transfer the underlying asset to a beneficiary on death (unless this is built into the annuity terms). We illustrate the sharp fall in the level of individual annuity sales in Figure 73. We also show data on the sale of income drawdown products that provide vehicles from which to start taking an income, but with flexibility over the amount taken. These have increased in popularity as more customers look to use pension freedoms to use their pensions more flexibly. We expect this market to grow rapidly in the next few years, particularly aimed at higher net worth customers with more significant pension savings pots.

We also expect companies to introduce new product categories that provide some form of downside protection for income (e.g. some form of variable annuity or structured income product). However, the decline in the annuity market is concerning for those with lower levels of pension savings. It clearly reduces certainty over pension income and the risk that people outlive their savings due to the lack of longevity protection. It may also suggest that a large number of customers are choosing simply to take out money from their pensions and not use this to meet longer-term retirement needs. One of the major issues in the UK is a lack of financial advice — since recent reforms to the remuneration of financial advisors in the UK (and the banning of commissions) there has been a sharp reduction in the provision of adequate financial advice to the ‘mass market’.

Figure 73. Total Individual Annuity Policy Sales in the UK

Annuity sales have collapsed, but income drawdown sales are becoming more important



Source: ABI, Citi Research

Changes to the Pension System

Further changes to the UK pensions system are expected, including limiting the level of tax relief for high earners in the system

Due to the pressures of the financial crisis, the UK government is making further changes to the pensions system to limit the level of tax relief for higher earners in the system, and it is possible that further changes will be made in the near future. The most recent change is to limit the level of contributions that high earners can make to gain from tax relief. From the 2016 tax year, workers earning £150,000 will have their annual pension allowance (the maximum contribution that can be made, which is currently £40,000) lowered to £10,000 until they earn £210,000. This will drastically cut the level of tax relief that higher earners can make from the UK pension system and, in our view, will likely drastically cut the level of pension savings that such high earners make. This group, albeit a small proportion of the population, will likely look at other savings vehicles and wealth management products.

From the government's perspective, this will initially create a fiscal benefit since the level of tax relief paid out on the contributions from higher earners will reduce dramatically. However, it is too early to say what the longer-term impact of these changes could be for future pension savings.

Other potential changes include a 'flat-rate' pension tax relief and the removal of tax relief on contributions into plans through a Pension Individual Savings Account

Industry experts and the press in the UK have discussed further potential changes to the retail pension savings system. Two particular ideas being floated include a shift to a 'flat-rate' pension tax relief and secondly the removal of tax relief on contributions into plans through the introduction of a Pension Individual Savings Account (ISA).

The 'flat-rate' concept is meant to support lower wage earners, but limiting tax relief on contributions to a fixed percentage amount (e.g. 30%) rather than at the savers own marginal tax rate (which could be up to 45% for higher earners). This means that regardless of your tax position, the pension tax relief on contributions will be the same percentage level. This may result in lower earners getting better tax relief on pensions than they previously did. The cost of this could be funded by the substantial removal of tax relief for higher earners (due to the introduction of the tapered contribution limit for those earnings more than £150,000 per year).

In a Pension ISA, contributions would be taxed but investment returns and income taken from the funds would be tax-free

The Pension ISA concept that is also being discussed would change the pension tax treatment entirely. Instead of receiving tax relief on contributions, with pension income being taxed in retirement, the Pension ISA would not provide any tax relief on contributions at all. However, once the funds are invested in the Pension ISA, all investment returns and income taken from the funds will be tax free. This mirrors the normal ISA product in the UK where investors can save up to £15,000 per year into mutual funds, securities or cash with tax-free investment returns.

It is too early to say whether the Pension ISA will be introduced. We fear that this would change the upfront incentive for individuals to save into their pensions. However, given that most retail pension savings are currently from wealthier individuals, this may not make a big difference to the vast majority of the population. In addition, with the introduction of auto-enrollment, we believe the main source of pension savings will come through the auto-enrolled corporate defined contribution plans rather than individual savings.

We see the Pension ISA as a large disincentive to save compared to the current system

Hence, the Pension ISA is probably only likely to affect higher net worth segments of the population. Nevertheless it is a large disincentive to save, in our view, compared to the current system, particularly for a segment of the population that may ultimately not depend on a government 'means-tested' pension at retirement.

Conclusion – A Good Start, But More Action Required

Current savings levels in the UK are too low to provide an adequate retirement income for most and incentives may be needed to encourage higher investment. Both the government and private sector need to step up to better provision financial advice and manage retirement income

We believe the UK auto-enrollment model has been a success in increasing pension provision to a wider section of the population and will continue to help alleviate dependence on government pensions in the next few decades. However, it appears that current savings levels (and defined contribution plan contribution rates) are too low to provide an adequate retirement income for most and more incentives may be needed to encourage higher investment and focus on pensions in the next few years. In addition, a large part of the market faces the risk of lower income certainty with the collapse in demand for annuities. Customers taking the management of retirement income into their own hands (managing longevity and financial risks for themselves) face the real risk of having insufficient income and outliving their savings. We believe both the government and private sector may need to step up with better provision of financial advice to manage retirement income, but also products that combine flexibility in retirement with some form of downside longevity protection.

Despite the system not being mandatory, 90% of employees in the Netherlands have a pension scheme with their employer

The Dutch Pension System

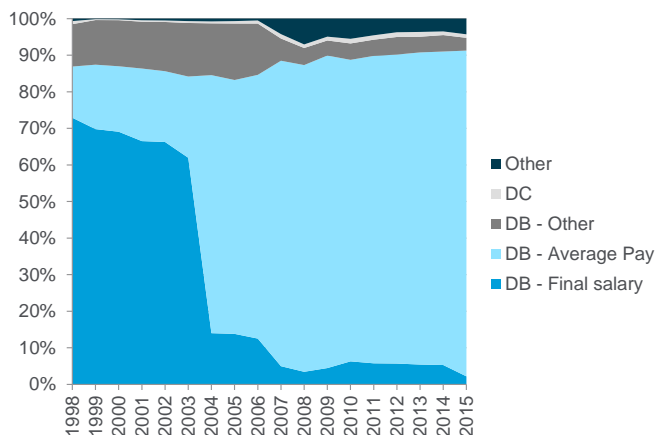
The Dutch public and private pension system is highly successful in the sense that it has wide coverage of the population. Although it is not a mandatory system, around 90% of employees have a pension scheme with their employer. Replacement rates, i.e. the level of income in retirement as a proportion of pre-retirement salary, are also some of the highest in the world, reaching close to 100%. Therefore, as well as having wide coverage, individuals also receive a high level of income in retirement compared to other countries.

Like many other countries, the Dutch system consists of three main pillars. Normal retirement age is 65 in the Netherlands for older pensions, but since January 2014, the retirement age for all three pillars is being pushed up to 67 (for the first pillar 'government pension' this will be put into place gradually up until 2020).

- The first pillar is the government pension, which is based on a pay-as-you-go concept and provides a very basic level of pension linked to minimum wage.
- The second pillar consists of corporate and employer schemes. These are mainly industry-wide schemes, which account for 75% of the second pillar (e.g. pension schemes for a whole sector such as civil servants or the retail sector), but they also include company pension schemes (~20%). Second pillar pensions provided by insurers are a relatively small segment (~5%), but are expected to grow as increasing numbers of companies choose to take defined benefit liabilities off their balance sheets and transfer the risk to an insurer. There are tax advantages to investing in the second pillar pensions.
- The third pillar consists of individual pension policies, used mainly by self-employed citizens or those not covered by a corporate or industry-wide scheme. There are tax advantages to investing in third pillar schemes, but these are a small part of the Dutch pensions landscape currently.

Figure 74. Dutch Pension Schemes by Type

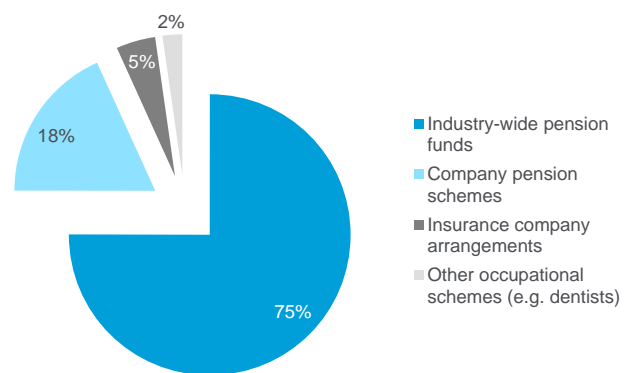
The vast majority are defined benefit, based on career average pay



Source: DNB, Citi Research

Figure 75. Occupational Pension Schemes by Plan Sponsor

Industry-wide schemes dominate the Dutch pensions landscape



Source: Citi Research

Although most pensions are defined benefit, there has been a shift towards 'average pay' schemes

As we illustrate in Figure 74, the vast majority of pensions are defined benefit. However, due to the pressures of low yields and volatile markets (and relatively strict funding and valuation requirements for pension schemes in the Netherlands), to control the cost of liabilities, there has been a shift towards 'average pay' schemes. Unlike traditional defined benefit schemes that calculate retirement benefits based on final pay (or pay in the last three years before retirement), most schemes accrue pensions based on average pay over a person's career.

Dutch defined benefit schemes have an element of risk-sharing where plan sponsors can reduce benefits to employees to help relieve a low funding level, therefore they're considered more 'hybrid' in nature

Defined benefit schemes tend to work on an accrual basis — for example accruing 1.875% of salary for a career average scheme (which is a current regulatory limit for pillar two schemes). Indexation is provided on accrued benefits, but as we comment below, this can be reduced in a situation where a pension scheme is underfunded. Unlike defined benefit schemes in the US and the UK, there is an element of risk-sharing in Dutch defined benefit schemes where plan sponsors can under certain circumstances reduce benefits to employees to help relieve a low funding level. This can often be done without needing to consult employees first. Hence, defined benefit schemes in the Netherlands could be considered as more 'hybrid' in nature than pure defined benefit schemes in the US or the UK — when they are in financial difficulty, all stakeholders involved contribute to improving the funding level, including employees and employers.

Funding requirements are very strict in the Netherlands therefore the level of underfunding in both public and private sector schemes is low compared to other countries

It is worth noting the regulatory requirements for valuing liabilities and funding requirements in the Netherlands. Funding requirements are very strict and occupational defined benefit schemes have to get back to an appropriate funding level relatively quickly. While some schemes are underfunded, the level of underfunding in both private and public sector schemes is low compared to other countries with developed defined benefit systems, such as the UK and the US.

Discount rates are also very punitive compared to other countries

Discount rates for defined benefit schemes are very punitive compared to other countries and are currently based on the Dutch swap rate (or alternatively risk-free rates based on government bond yields in the EU). Insurance companies are actually now using a slightly less punitive discount rate based on the Solvency II discount curve, which allows some premiums slightly above the swap rate, but they hold far higher capital requirements than non-insurance pension funds.

The discount rate benefits from an 'ultimate forward rate' (UFR), which assumes that short-term rates will rise in the long-term to a nominal level — for pension schemes this is currently 3.3% in the Netherlands and was recently reduced from 4.2%. For insurance companies subject to Solvency II, the UFR is still 4.2%, in line with the Solvency II framework across Europe. For very long-term liabilities this offsets the use of the risk-free rate to value liabilities, however, we believe the Dutch liability measurement framework is still very conservative for employer-based schemes compared to most other countries.

The minimum coverage rate for non-insurance pension schemes is 105%

For non-insurance pension schemes, the minimum coverage rate (of assets to liabilities) is 105%. Pension schemes used to have to get back to this level within three years, but this has recently been relaxed to five years. If the 105% level is not reached within this time, then adjustments can be made — to contribution levels, the level of benefit indexation provided in the scheme and, ultimately cuts to benefits. Overall, in a situation where adjustments are made, schemes could be given around 12 years to recover their coverage ratio position. This partly compensates for the negative impact of reducing the UFR for non-insurance defined benefit pension schemes. In the longer term, Dutch defined benefit schemes are required to target a coverage ratio with a strong buffer, up to a coverage ratio of 130%.

Strict requirements mean Dutch defined benefit schemes can be volatile and put strain on corporate balance sheets leading to a shift in liabilities and responsibility from corporate to insurance companies over the next 5-10 years

These relatively strict requirements for measuring coverage ratios and returning to a positive funding level mean that Dutch defined benefit schemes can create quite a significant amount of volatility and balance sheet strain for corporates. We expect an increasing number of corporate schemes to shift liabilities and responsibility of managing defined benefit schemes to insurance companies over the next 5-10 years, with a market opportunity of €100-€150 billion (as we commented earlier in our section in pension de-risking).

However, the high liability cost of defined benefit schemes is encouraging a shift to defined contribution schemes. These are currently a small part of the in-force landscape, but certainly in the insurance company sector, there is a marked shift toward defined contribution policies rather than defined benefit. In insured pensions, contracts are renewed on a five-year basis (a regulatory requirement). At this point, insurance companies can quote new pricing for providing a scheme if pricing is too high and a scheme has the option to shift new premiums to another provider or consider shifting a scheme to a less onerous defined contribution structure. Through this mechanism of five-year renewals, we expect a strong shift towards defined contribution pensions in the insured company sector. We also expect an increasing number of industry-wide schemes and corporate schemes to consider shutting down defined benefit plans to new contributors and shifting to defined contribution plans.

Collective Defined Contribution (CDC)

One in ten defined contribution schemes in the Netherlands use CDC which is a hybrid system

The Dutch pensions system also benefits from a 'hybrid' system of Collective Defined Contribution schemes. These are a growing part of the defined contribution landscape in the Netherlands (an estimated 1 in 10 schemes use CDC) and provide an interesting compromise between defined benefit and defined contribution schemes. As we set out in our Recommendations section, we believe this provides an attractive model for other countries since it provides the benefit of institutional and actuarial management of targeted benefits for individuals with the flexibility of limited downside risk for plan sponsors due to its defined contribution nature.

CDC schemes are managed as 'defined ambition' vs. guaranteed distribution

A good way of explaining a CDC scheme is 'defined ambition'. Like a defined benefit scheme, the managers and sponsors of a scheme try to target a level of benefits for employees. Rather than having individual defined contribution accounts for each employee (where the employee takes all the risk for the performance of his or her funds), assets are pooled in a fund that is shared across all employees. Actuarial and asset-liability modeling calculations are used to determine a level of overall assets necessary to meet the 'ambition' benefit for each employee. Funds are managed centrally and contribution levels are set to help support the 'defined ambition' level. Ultimately, though, these are defined contribution schemes and do not provide a guaranteed benefit, hence if the fund performs poorly, all employees may suffer from lower benefits. However, the risks are shared across the whole pool of liabilities.

The pros and cons of CDC are as follows:

The benefits of CDC are include risk-sharing and for employers, the targeted 'ambition' vs. a guarantee to employees. The downside is that it suffers from intergenerational sharing risk

- The main advantage is the ability to retain some elements of risk-sharing that exist in pure defined benefit schemes. Since assets are pooled and managed centrally, and there is strict actuarial and professional management of 'ambition' liabilities, individual employees benefit from sharing of risk with their co-workers. They do not have to make asset allocation decisions on their own and benefit from the institutional knowledge and scale of a defined benefit scheme. Highly sophisticated stochastic asset-liability modelling can be used to apply the most appropriate asset liability approach that benefits all employees. This means that

employees reaching retirement, who would otherwise hold a highly de-risked portfolio in an individual defined contribution fund, could benefit from better overall investment returns and more professional management of asset allocation than they could have achieved individually. Unlike pure defined contribution schemes, CDC does not require individuals to purchase an annuity when they come to retire. Instead, the scheme pays pension income from the CDC fund in a similar way to defined benefit schemes. Hence, a high degree of actuarial and asset-liability management is applied in a similar way to a defined benefit scheme.

- CDC is also very attractive from an employer perspective since there is no guarantee to employees, only a targeted 'ambition'. Hence there is a greater likelihood that employers and corporate will take up CDC in the future, especially if they are closing down their existing defined benefit schemes. In the Netherlands the legislative framework for pensions encourages CDC — in other countries, changes to the framework may be necessary to allow the CDC concept.
- The main downside risk from CDC is that it continues to suffer from inter-generational sharing risk. Hence, current retirees could end up being supported by younger workers if funding levels are lower than necessary for any period. This could also be a benefit for those workers in the longer term when they come to retire. But at that point, given an aging population, there may be fewer workers to support their pension in the future (as dependency ratios reduce over time). In addition, since these plans do not carry guarantees, they do not offer the same level of security of pension income as defined benefit plans do. Ultimately, low interest rates and increased longevity means that the cost of providing defined benefit plans has gone up substantially in recent years, and CDC schemes do not provide a way around this increased cost. The only benefit they provide is the ability to smooth the 'ups and downs' of funding levels for employees.

Arguably the flexible nature of Dutch defined benefit pensions (with their high degree of risk-sharing for schemes that underfunded), means that CDC as a concept works better in the Netherlands than in other countries. In the UK and the US, this risk-sharing concept for defined benefit schemes is less well developed. The step from a defined benefit to a CDC scheme in the Netherlands is not as great as in other countries since defined benefit schemes also have the ability to cut benefits for employees if the need arises.

We believe CDC schemes provide a good model for future private pension development in other markets

However, despite this and despite the lower protection for CDC schemes compared to pure defined benefit schemes, we believe they provide a good model for future private pension development in other markets. They provide a good 'halfway house' between defined contribution and defined benefit schemes and, most importantly, they provide the benefit of institutional management and asset-liability management for individuals that may often not be as financially educated as they need to be to manage their own liability risks.

Australia's Superannuation System

Overview of Australia's Compulsory Superannuation System

Superannuation is a way to save for retirement where contributions come from employers and are ideally topped up by employee contributions

Australia has a three pillar approach to retirement savings, which includes: (1) compulsory savings in super funds via the Superannuation Guarantee (SG), (2) voluntary contributions to super, and (3) a means-tested age pension.

Superannuation as a form of savings has existed for many years for Australian workers, but was generally limited to a minority of employees, such as white collar, permanent employees of large corporations, and public servants.

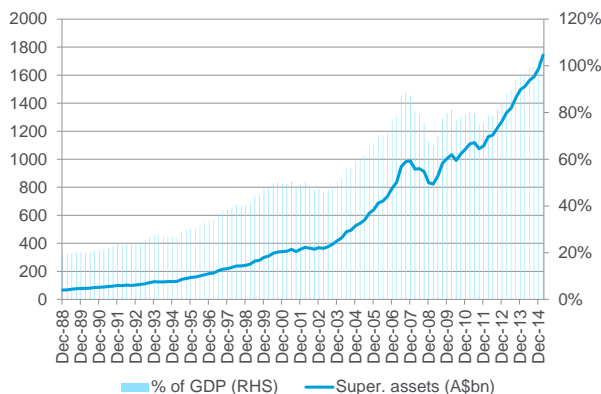
By 1985, the compulsory savings pillar was introduced to a number of industrial awards when the Australian Council of Trade Unions (ACTU) sought a 3% super contribution from employers. Subsequently, the government introduced the SG in July 1992, which required employers (with very few exceptions) to provide a compulsory minimum superannuation contribution on behalf of their employees.

The contributions are to be invested to fund the employee's future retirement and under most circumstances, funds in superannuation cannot be accessed until the preservation age of at least 55 (increasing to 60).

The Superannuation Guarantee rate in Australia is now 9.5% and is expected to increase to 12% by 2021 to 2025

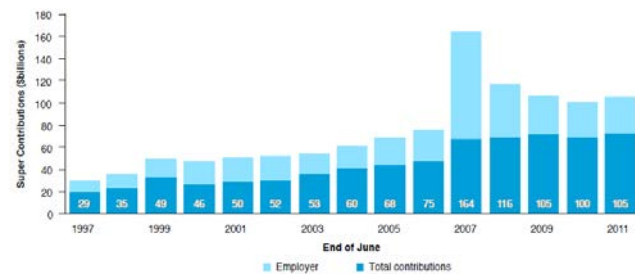
Over the 10 years after 1992, higher levels of employer contributions were phased in and eventually reached 9% (of salary) contribution in 2002/03. The current SG rate is now 9.5% and is expected to increase to 12% by 2021 to 2025.

Figure 76. Strong Growth in AU Superannuation Assets – Driven by the Mandated Nature of Super and Favorable Tax Incentives



Source: RBA, Citi Research

Figure 77. Types of Super Contributions – Tax Changes Impact the Level of Contributions, yet Employer Contribution Tends to be the Main Source



Source: APRA, Citi Research

There are 3 main forms of superannuation contributions, including: (1) employer (either the mandatory minimum or above-minimum contributions), (2) voluntary personal contributions, and (3) other (e.g. spouse, government co-contribution).

Varying tax rates and limits apply to each type of contributions, but generally speaking, superannuation tends to be a preferentially taxed savings vehicle, where: (1) super funds are taxed at a flat 15% rate, (2) most super benefits to those aged over 60 are tax exempt, and (3) contributions of up to A\$30,000 (more for older age groups) can be made pre-tax, while there is a A\$180,000 limit on after tax contributions.

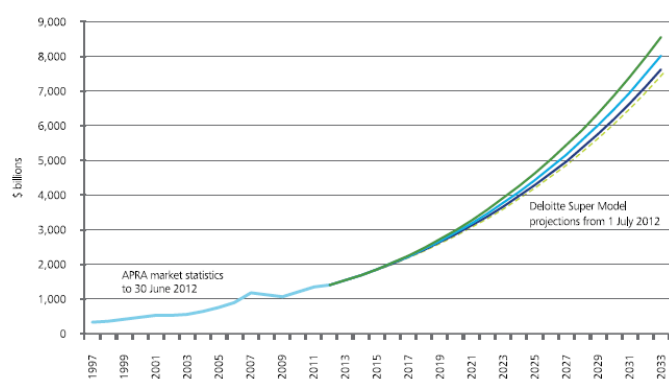
Nonetheless, the tax regime for superannuation has changed various times over the past two decades and has resulted in vast changes in the behavior for contributions. For example, non-employer contributions more than doubled in 2007, mainly due to favorable tax treatment where the government proposed to remove the tax on super pensions and lump sums taken after age 60. Hence, as part of this transition, employees had until end-June 2007 to make a non-concessional contribution of up to A\$1 million (\$750k), this one off opportunity saw a substantial rise in contributions.

Strong Growth in Super, yet Pensions Still Required

Superannuation assets have grown to A\$1.7 trillion, or 109% of GDP and are expected to rise to A\$8 trillion by 2033

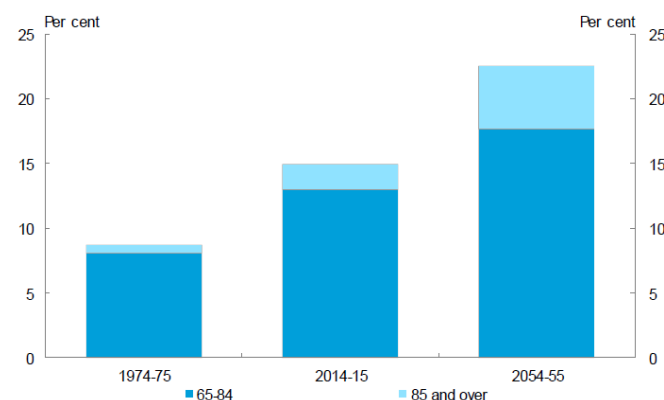
The combination of mandatory contributions since 1992 and tax incentives have resulted in strong growth in Australian superannuation assets to A\$1.7 trillion (\$1.3trn) or ~109% of GDP, making it the fourth largest superannuation system in the world. Given the mandated nature and an expected rise in contribution rates to 12% by 2025, super assets are expected to grow further, with Deloitte expecting these to rise to ~A\$8 trillion (~\$6trn) by 2033.

Figure 78. Expected Growth of Superannuation Assets



Source: Deloitte (*factors in the expected increase in SG rate to 12%)

Figure 79. Proportion of Australian Population Aged 65 and Over



Source: ABS, Treasury

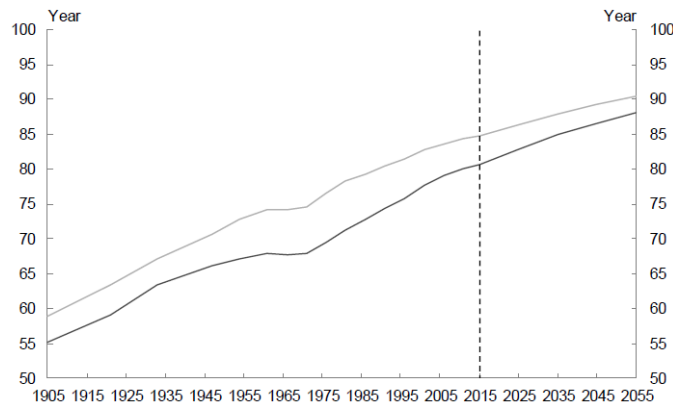
The central role of superannuation has never been properly defined but consensus appears to be emerging that this is to help Australians to maintain an adequate and comfortable standard of living in retirement. However, this has not always been the way it has been used, and projections suggest this self/employer funded superannuation alone is unlikely to be sufficient to fulfil this aim for most.

Despite the rise in assets, ~70% of pension age people were receiving or reliant on a government age pension to supplement their incomes in 2013-14 due to demographics and mix impact

In 2013-14, ~70% of people at 'age pension' age were receiving, or at least partially, reliant on a government age pension to supplement their income. Unless structural changes to indexation and age of eligibility are adopted, the Australian government's Age and Service pension payments could rise further as a percent of GDP. Some of the reasons behind the ongoing reliance on government pension include:

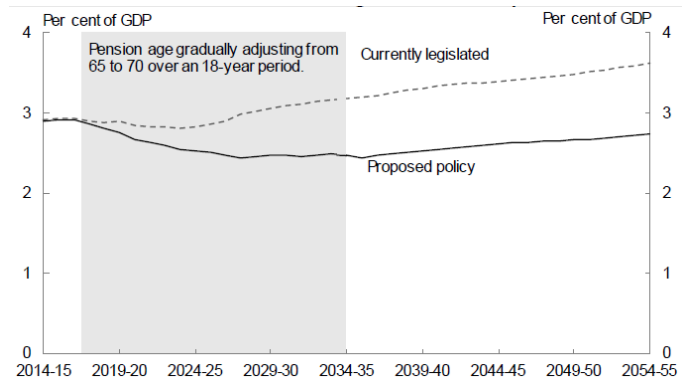
- **Demographics:** With more people entering retirement (age >65) and higher life expectancy (~90 years old); effectively having more people in retirement.
- **Mix impact:** The adequacy of superannuation may prove to be enough for those who spend their entire working life with an SG rate of at >9%, but for those who participated in the SG half way, it is clearly insufficient.

Figure 80. Male and Female Life Expectancy in Australia (1905-2055)



Source: ABS, Treasury

Figure 81. Australian Government's Expected Spend on Age & Service Pensions

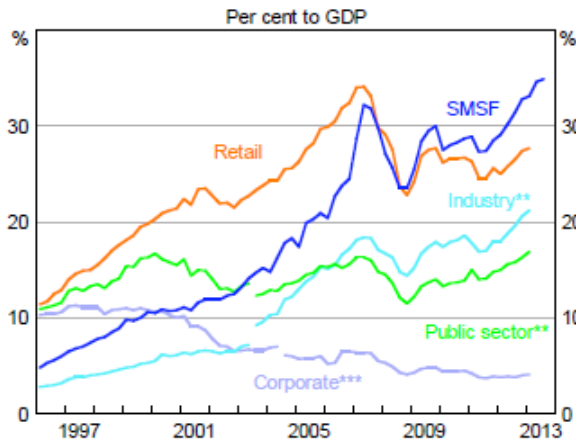


Source: Treasury (proposed policy on changes to indexation and age of eligibility)

Industry Winners and Losers

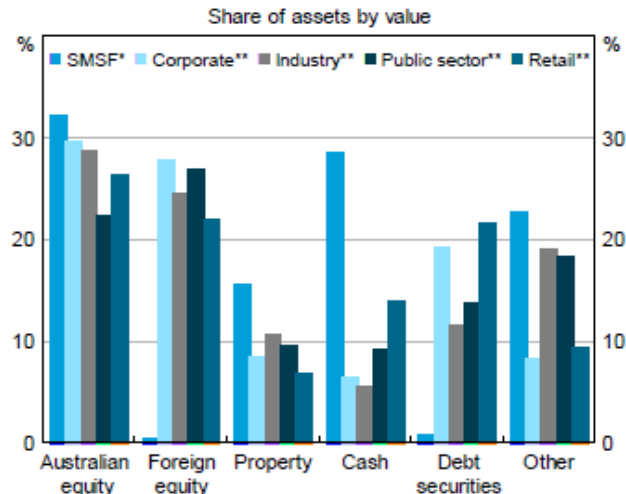
Individuals can invest their savings into a number of different types of funds, split into: (1) industry funds (tend to be for employees working in the same industry), (2) retail funds (super funds for the public on a commercial basis), (3) public sector funds, (4) corporate funds (for employees of a particularly company), and (5) self-managed super funds (SMSF) usually with less 5 members.

Figure 82. Types of Superannuation Funds



Source: APRA, ATO, RBA

Figure 83. Asset Mix of Super Funds by Type



Source: APRA, ATO

With growth in the self-managed funds, retail, and industry funds, we see opportunities for asset managers, distributors, life insurers, consumers, and administrators

Broadly speaking, the bulk of the Australian super funds are provided by the private sector, with strong growth in SMSF, retail and industry funds in recent years.

Given the dominance of the private sector in the provision of superannuation and the bias towards equity allocation, there have been a number of beneficiaries of the system; we make some broad comments for the industry participants below:

- **Asset managers:** have been clear beneficiaries of the mandated nature of superannuation and positive flow on impact on fund flows. However, the competitive position of asset managers in general is not as strong as some players in other parts of the wealth industry value chain. Hence, managers have been and are likely to continue to suffer margin pressure, in part driven by super funds seeking a more cost efficient model as well as competition from passive/index funds.
- **Distribution:** a powerful industry force, with (1) financial advisers the front line of product distribution and (2) platforms integral to how advisers select investment options and facilitating complex administration/tax needs. The major banks are significant players with ~55% of platform assets under management, although wealth management has not become the fast growing, low capital intensive earnings stream that integrated seamlessly, as they expected. Customers appear to have sought more flexible and lower cost investment structures that remain separate from their banking arrangements suggesting divestment of platforms by some banks could be on the cards. Issues with planners have also been paramount. Interestingly a recent market research survey by Investment Trends showed smaller player netwealth leading the platform industry in terms of overall adviser satisfaction, followed closely by another small player HUB24. AMP and Macquarie are also major superannuation platform providers. Recent moves to simpler super products — MySuper — for default members have placed downward pressure on revenue margins requiring cost savings to protect profit margins.
- **Life insurers:** benefit from the ability to offer insurance within super. Again AMP and bank-owned life insurers are the main players.
- **Consumers:** combined household savings are substantially higher given the mandated nature of SG. However, it is debatable how much of this is offset by the corresponding rise in consumer debt leverage over the past 20 years.
- **Administrators:** as the market for back office administration of super funds consolidates, the large administrators are likely to be clear beneficiaries.

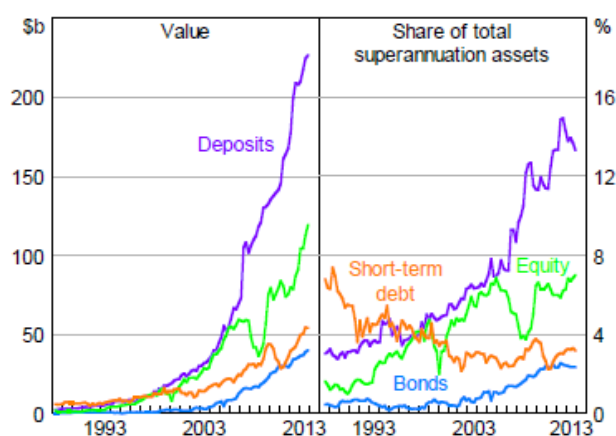
Residual Forward Looking Issues

We briefly outline some of the key issues impacting the Australian superannuation system below:

- **Adequacy of retirement income:** ~70% of people at 'age pension' age are receiving, or at least partially, reliant on the government age pension to supplement their income. Given longer life expectancy and greater amount of people entering retirement, there are challenges on how superannuation coupled with pension can provide sufficient retirement income for future retirees.
- **Post retirement products:** The SG regime is successful in accumulating savings for retirees, yet focus is much less on the post-retirement phase, where retirees can either: (1) take their super as lump sum or (2) as an account-based pension. For lump sum, there is the risk of individuals spending it in the early years of retirement and then falling back onto the government pension. For account based pensions, the individual is exposed to investment risks. An alternative product that could provide greater protection from longevity and investment risk is annuities, albeit it has yet to gain substantial acceptance in Australia. Notably, there has recently been growing industry acceptance for income layering, the concept of supplementing other retirement products with annuities.

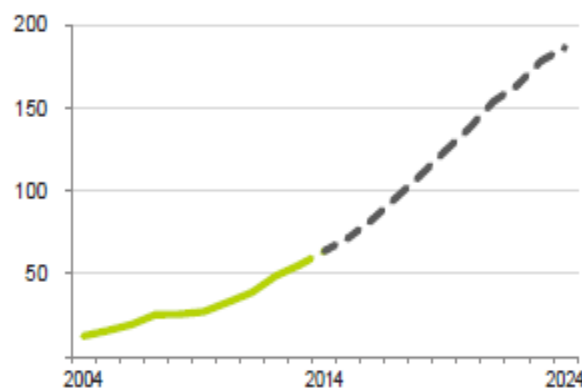
- **Super fees for end users:** While not directly comparable, the operating costs of Australian super funds are higher than most other OECD countries, in part due to Australia's defined contribution system which is mainly privately managed, with a large number of small funds. The government has introduced the MySuper initiatives to partly address this. However, remaining issues are whether the fee structure itself promotes efficiency and competitive pressure within the super system.
- **Political interference:** One of the virtues of a compulsory superannuation system is its tax advantages to incentivize savings and ability to quarantine the use of funds until the preservation age of >55. However, there has been a constant political debate as to whether some of these favorable features should be tweaked or changed (including whether the preservation age of 60 for most people now should itself be lifted).
- **Interconnectedness in the financial system:** The superannuation and banking sector combined dominate Australia's financial sector, but are also interconnected through various channels. Given most superannuation liabilities have little leverage, it is likely super will continue to play a stabilizing role within the financial system.

Figure 84. Bank Funding from Superannuation Funds – Super Funds are a Major Contributors to Bank's Deposit Funding and Equity



Source: RBA, ABS

Figure 85. Retirement Assets Expected to Increase to ~35% of the Super System Over the Next 10 Years (A\$bn)



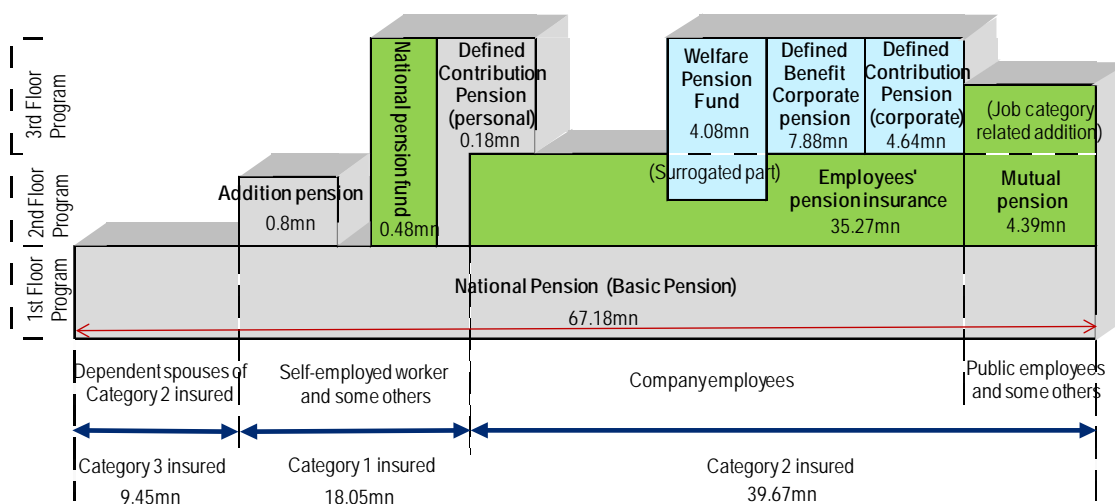
Source: CGF, ABS, Rice Warner

Japanese Pension System

The Japanese system is based on a two-tier public pension system and a third tier of private pensions

The Japanese pension system consists of a public pension that covers all residents, and private pensions that pay benefits on top of the public pension. The public pension is a two-tier system, with the national pension (basic pension) covering the self-employed and housewives with around 67 million members under the age of 60 as of end-March 2014 and forming the first tier. The second tier is for company employees, and includes employee pension insurance for corporate employees and mutual pensions for public sector employees. The government funds half of the national pension, with the rest made up of contributions. Employers and employees each pay half of the contribution to an employees' pension insurance, pro-rated to the income of the person covered, and pension benefits are paid in accordance with the amount of contribution paid. Mutual pensions were integrated with employees' pension insurance in October 2015 (public sector employees will also be covered by employees' pension insurance).

Figure 86. Structure of Japan's Pension System



Source: Health, Labour and Welfare Ministry, Citi Research

There is also a third tier of private pensions — mainly welfare pension funds, defined benefit pension plans, and defined contribution pension plans. Welfare pension funds set up by employers manage some contributions on behalf of the government, and the difference between actual returns on investment and the expected yield (positive yield margin) along with additional contributions from employers are added to the employees' pension insurance. Employees simply pay the welfare pension contributions in order to receive benefits that exceed those of the employees' pension insurance scheme. However, poor management of welfare pension funds has caused negative investment yield margins, and the government has had to make up the difference. Because of an increasing number of cases in which funds have had to be liquidated due to poor asset management, legislative amendments in 2014 mean that all welfare pension funds will be liquidated by March 2019. For defined benefit corporate pensions plans, the employer decides the amount of the future benefit and invests accordingly, while the member of a defined contribution pension plan is able to choose what investments are made by deciding on their preferred management policy and the amount of the benefit varies with returns on investment.

The public pension system is a mandatory universal pension system, is a social insurance system, and is an intergenerational transfer of income

In order to maintain the public pension fund, the government is planning to raise the retirement age, increase contributions and reduce benefits, given low birth rates, an unfavorable investment environment, and a deterioration in national finances

Total public pension reserves were ¥137.5 trillion at end-March 2015

Reserves are expected to be drawn down until the replacement ratio declines to 50%

If actual conditions differ from assumptions in the actuarial valuations, the decline to 50% could happen sooner than expected

For the self-employed and housewives, there is the national pension fund (480,000 members) and defined contribution individual annuities (180,000 members), in addition to the national pension (basic pension).

Public Pension Fund System: Problems

Japan's public pension system has three main characteristics: (1) it is a mandatory universal pension system, (2) it is a social insurance system, and (3) it is an intergenerational transfer of income. It adopts a pay-as-you-go scheme rather than a savings scheme, but unlike systems in other countries, contributions are accumulated into reserves, which have grown to a large amount. These are ring-fenced and separately managed, and target a level of 'replacement ratio', i.e. the ratio of pension benefits to average income.

Given low birth rates, an unfavorable investment environment and deterioration in national finances, in order to maintain the public pension fund, the government is implementing plans to raise the retirement age, increase contributions, and reduce benefits. The age from which benefits are paid is being raised in stages from 60 to 65 for both employees' pension insurance and mutual pensions. The transition period is between 2013 and 2025 for men and between 2018 and 2030 for women. Contributions will be raised to: (1) ¥16,900 per month (2004 prices) by 2017 and then fixed for the national pension and (2) to 18.3% of standard salary and then fixed for employees' pension insurance. To reduce benefits, the automatic adjustment of benefits based on macroeconomic indexation will be introduced. The automatic adjustment of benefits based on macroeconomic indexation keeps growth in pensions to less than inflation, taking into account the decline in the working population and increase in lifespans, until the replacement ratio of the public pension⁹ falls from the 62.7% of 2014 to around 50% in 2043, and then fixes them.

Contributions to the public pension are managed by the Government Pension Investment Fund (GPIF). Total public pension reserves were ¥137.5 trillion (\$1.2trn) at the end of March 2015, and returns on asset management in the same time period were ¥15.3 trillion (\$134bn), for a yield of 12.2%. At the end of March 2015, the asset allocation was 39.4% to Japanese bonds, 22.0% to Japanese equities, 12.6% to foreign bonds, 20.9% to foreign equities, and 5.1% to cash.

The GPIF has set its real expected yield (nominal yield – increase in wages) at 1.6% for the medium term. The asset allocation of its base portfolio is 35% to Japanese bonds, 25% to Japanese equities, 15% to foreign bonds, and 25% to foreign equities.

After reserves peak in 2017, they will be drawn down until the replacement ratio of the public pension gradually declines to 50%. Reserves are expected to decline to the equivalent of one year's pension benefit payments (the equilibrium level) in 90 years' time, in 2105. There will also be an actuarial valuation (review of the conditions assumed for the calculation of pensions) every five years.

As discussed above, Japan's public pension is a pay-as-you-go system, so there is no problem with reserve shortages currently. However, there is the possibility that if actual conditions differ from those assumed in past actuarial valuations then the replacement ratio of the public pension could decline to 50% sooner than expected and reserves reach the equilibrium level before planned.

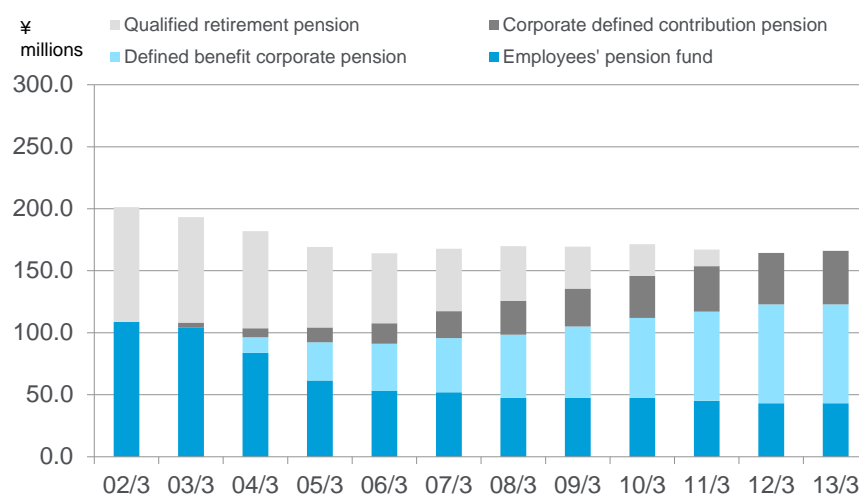
⁹ The replacement ratio of the public pension is a measure of the amount of the pension benefit when it starts to be paid (total annual benefit paid to a retired couple living together) as a percentage of the income of the working generation at that time.

Corporate Pension Fund System, Problems

Japan's first corporate pension system, the tax-qualified retirement pension, was established in 1962 and abolished in 2012. Next, the welfare pension fund system was established in 1966, and is scheduled to be abolished in March 2019. The mainstream corporate pension plans now are defined benefit corporate pensions, established in 2001, and defined contribution corporate pensions, established in 2002.

The number of members as of end March 2014 was 4.08 million for welfare pension funds, 7.88 million for defined benefit corporate pension funds, and 4.64 million for defined contribution corporate pension funds.

Figure 87. Snapshot of the Corporate Pension System



Source: Health, Labour and Welfare Ministry, Citi Research.

Japan is seeing increasing adoption of defined contribution plans and only 18.6% of SMEs put pension plans in place as of March 2014

The number of members of defined benefit and defined contribution corporate pension plans has grown steadily since the systems were established, but there has recently been a decline in the number of defined benefit plans and increasing adoption of defined contribution plans. With companies trying to control personnel costs, there has been a decline in the number of particularly small and medium enterprises (SMEs) that put in place pension plans, with only 18.6% of those with 30–99 employees having corporate pension plans as end-March 2014.

Comparison of Defined Benefit and Defined Contribution Pension Plans

Figure 88 compares defined benefit and defined contribution pension plans. They share some common features, but benefits are defined in the former and vary according to returns on investment in the latter. Contributions are normally paid by the employer in defined benefit plans, but in defined contribution plans the employee may make contributions up to a combined total of ¥660,000 annually, so there are many differences.

Figure 88. Outline of Corporate Pension System

		Defined-Benefit Corporate Pension (DB)	Defined-Contribution Pension (DC)
Brief description		DB is provided to employees who are employed by a business to which Welfare Pension applies. Different from the Welfare Pension Fund, this pension does not invest or administer the Welfare Pension Fund on behalf of the state. It only provides pension benefits that are additional to Basic Pension.	DC is provided to Cat I insured under National Pension and Cat II insured exclusive of public employees. Each contribution is clearly separated per participant individual. Amount of benefit is determined based on the sum of contributions and returns on their investment.
Who pays premium		As a general rule, employer contributes the premium. Contribution by Participant is permitted if he/she agrees.	Payable by employer (participant may also contribute in an amount that does not exceed that of the employer or the upper limit of contribution)
Benefits		When benefits begin to be paid At an age between 60 and 65 (both inclusive) set forth in the pension agreement between Employer and Employee Payable as Old-age pension or Old-age lump-sum payment	When benefits begin to be paid At an age between 60 and 65 (both inclusive) (depends upon the period of participation) Payable as Old-age pension or Old-age Lump-sum payment
Applicable tax	At the time of contribution	For employer Fully charged against revenue For participant Deductible as life insurance premium (about ¥40,000 as a maximum per year)	For employer Fully charged against revenue For participant Deductible as small enterprise mutual aid premium (up to upper limit permitted)
	At the time of investment	Special corporate tax (1.173%) is imposed on pension reserves Note: Taxation suspended until FY2016	Special corporate tax (1.173%) is imposed on pension reserves Note: Taxation suspended until FY2017
	At the time of contribution	Old-age pension Taxable as miscellaneous income (after deducting public pensions and other items) Old-age lump-sum payment Taxable as retirement income (at the time of retirement only) or as occasional income	Old-age pension Taxable as miscellaneous income (after deducting public pensions and other items) Old-age lump-sum payment Taxable as retirement income (only at the time of retirement) or as occasional income

Source: Health, Labour and Welfare Ministry, Citi Research

Outline of Defined Benefit Corporate Pension Plans

The total standard reserves of the 622 plans that are members of the Pension Fund Association stood at ¥24.3 trillion (\$214bn) at end-March 2013, while total pension assets were ¥2.2 trillion larger at ¥26.5 trillion (\$234bn). However, reserves were larger than assets at only 89 individual plans, or 14% of the total. The expected returns of most plans are in the 2.5%–5.5% range, with only 22% having an expected return of 3.5% or higher.

The total reserves of defined benefit corporate pension plans were ¥53.6 trillion (~\$475bn) at end-March 2014, and the return on assets was 8.6%. The breakdown of assets under management in that time period was 29.1% for Japanese bonds, 12.1% for Japanese equities, 14.9% for foreign equities, 16.4% for the general account of life insurers, 4.7% for hedge funds, 5.1% for 'other', and 3.5% for cash.

The number of defined benefit corporate pension plans grew through March 2012, but then turned downwards in the year ending March 2013. The main reasons were the end to the transition from the tax-qualified retirement pension system and a shift to defined contribution corporate pension plans.

Outline of Defined Contribution Corporate Pension Plans

There have been a series of changes since the defined contribution corporate pension system was introduced in 2001, increasing the upper limit on contributions and lifting the ban on matching contributions. The number of businesses with defined contribution plans has increased from 363 at end-March 2002, directly after the system was established, to 18,393 at end-March 2014, and the number of members has increased from 88,000 to 4.64 million over the same period.

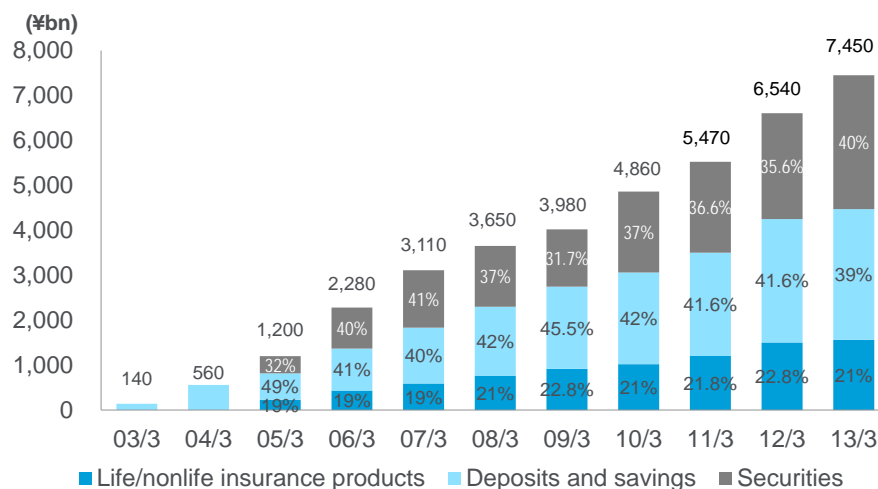
The total assets of defined contribution corporate pension plans have grown from ¥140 billion at end-FY3/02 to ¥7.45 trillion (\$66bn) at end-March 2014. However, the assets breakdown is 39% to deposits and 21% to insurance, so capital-guaranteed products account for 60% and marketable securities for just 40%. As a result, returns on investment were below 2% at the majority of plans in fiscal year ending March 2014, and 1% or less at 44.6% of plans.

A questionnaire survey of defined contribution corporate pension plan members indicated that 30% of respondents did not know the details of their plans and 70% had no experience of changing the assets allocation of their contributions or switching.

The poor investment literacy of members and the fact that 60% of defined contribution corporate pensions are invested in default products and that 96% of default products are capital-guaranteed are the reasons for the high weighting of capital-guaranteed products.

As discussed above, defined contribution pensions are highly biased towards capital-guaranteed products, so returns on investment are much lower than for defined benefit pensions plans. If more than half of defined contribution pension assets remain invested in capital-guaranteed products, it will be difficult to earn returns that exceed inflation, so defined contribution pension plans may not be able to fulfil their role in supporting older people in retirement.

Figure 89. Assets Under Management and Products Available in Defined Contribution Plans



Source: Health, Labour and Welfare Ministry, Citi Research

Corporates will likely continue to shift to defined contribution plans, but with returns on investment remaining low, these plans may not provide sufficient support for older people in retirement

Future Direction of Corporate Pension System

Companies continue to shift from defined benefit pension plans to defined contribution pension plans in order to avoid having to make additional contributions, so the weighting of defined contribution plans within overall corporate pension plan members continues to grow yearly. With returns on investment remaining low, defined contribution pension plans may not provide sufficient support for older people in retirement.

The Nikkei reports that the government is considering the introduction of a third type of pension system that combines characteristics of both defined benefit and defined contribution plans, possibly in fiscal 2017. Media reports indicate that the new system could be based on the collective defined contribution system used in the Netherlands, and could be used to take over the assets of welfare pension funds, which are to be abolished by 2019. On September 11, 2015, Social Security Council's corporate pension committee reached broad agreement on a proposal for flexible management of defined benefit contribution plans (including collective defined contribution plans).

The most sizable market opportunities in Latin America are in Brazil, Chile and Mexico

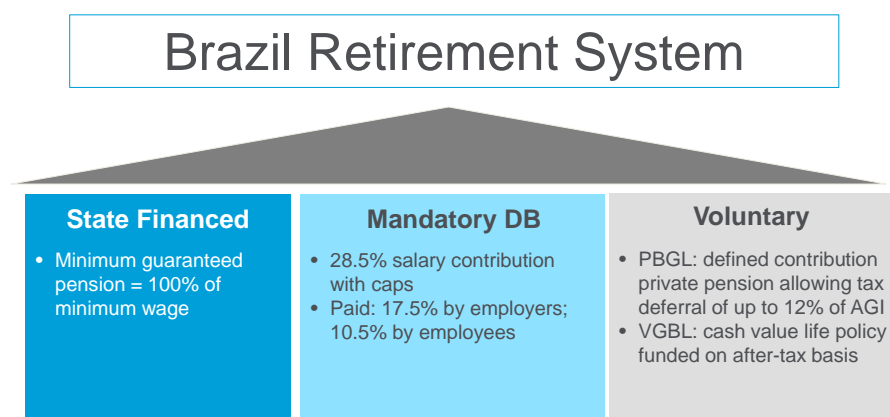
Latin America Retirement Market

A number of countries in Latin America have developed sizable private retirement markets to supplement government run programs, and we see strong growth potential. The most sizable market opportunities are Brazil, Chile, and Mexico, which are discussed in more detail over the next few pages.

Brazil: Sizable Pension Market Dominated by Large Banks

The retirement system in Brazil has 3 components: 1) a government paid plan, 2) a defined benefit plan with mandatory contributions from employers and employees, and 3) voluntary savings options with tax incentives. The key opportunity for insurers and asset managers is voluntary plans, typically referred to as P/VGBL plans, which are predominantly sold through banks.

Figure 90. Brazil Retirement System Structure & Product Offerings

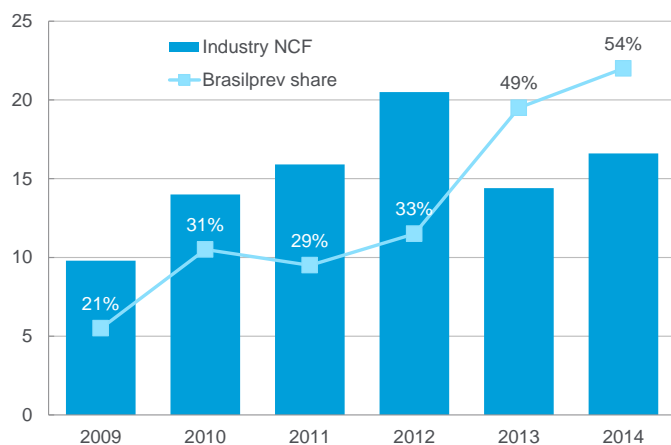


Source: Principal Financial and Citi Research

Bradesco, Brasilprev, and Itaú Have > 75% Market Share

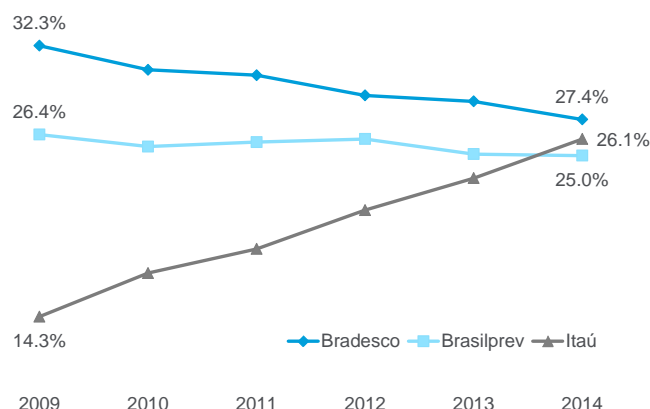
Bradesco, Brasilprev, and Itaú have 78.5% share in the P/VGBL market. As shown below, Brasilprev has gained significant market share over the past five years, which we attribute to a few factors. Most notably, Banco do Brasil appears to have become more aggressive in pushing the pension product to grow fee income. Pension revenues have grown slower than asset under management, suggesting some decline in fee rates. This growth also coincided with Banco's expansion in Sao Paulo and the initial public offering of BB Seguridade (Banco's insurance sub, which includes the Brasilprev joint venture). At the same time, Bradesco's historical market share of >30% was likely unsustainable, and both it and Itaú have made changes to distribution structure that may have caused some disruption.

Figure 91. Brasilprev has Captured an Increasing % of Net Flows...
Based on P/VGBL products only



Source: Quantum Axis as of December 2014 (P/VGBL products only)

Figure 92. ...Enabling it to Steadily Gain Market Share
Based on P/VGBL assets under management



Source: Fenaprevi

Fees and Margins Likely to Compress Gradually Over Time

Fee rates on pension products are expected to lower over time in Brazil

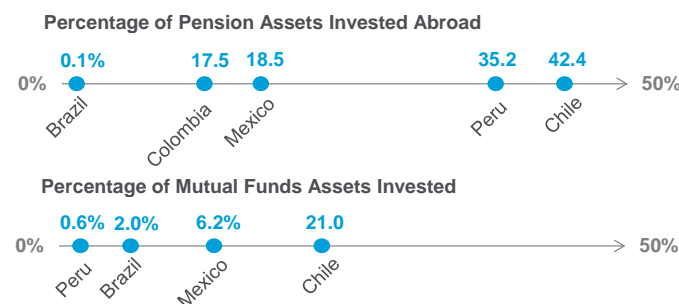
Based on our discussions with companies and distributors, we expect fee rates for pension products to gradually trend lower over time. This already appears to be occurring to some extent. In 2014, Brasilprev's assets under management grew 34% while management fees increased by 20%. We do not anticipate this having a material impact on profitability near-term, but the trend bears watching.

Potential Asset Management Opportunity as Market Opens Up

We expect increased foreign investment as markets open up which would create greater performance dispersion

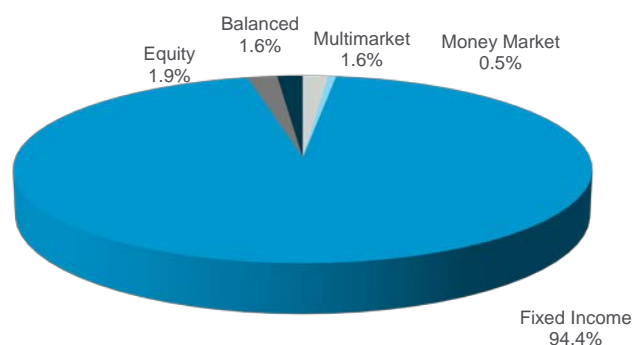
Currently, 98% of pension money is invested within Brazil, and 94.4% of pension funds are invested in short-term fixed income given high interest rates. As a result, investment performance has been less of a differentiator than in other markets. Over time, we expect increased foreign investment as the market opens up, which could create greater performance dispersion and boost demand for high-alpha asset management. In addition, the mutual fund market in Brazil appears likely to expand over time, although it is unclear how quickly this will happen.

Figure 93. Brazil Market Largely Closed to Foreign Investment



Source: Cerulli Latin America Distribution Dynamics 2014, World Bank Pensions

Figure 94. Pension Fund Asset Allocations Very Conservative



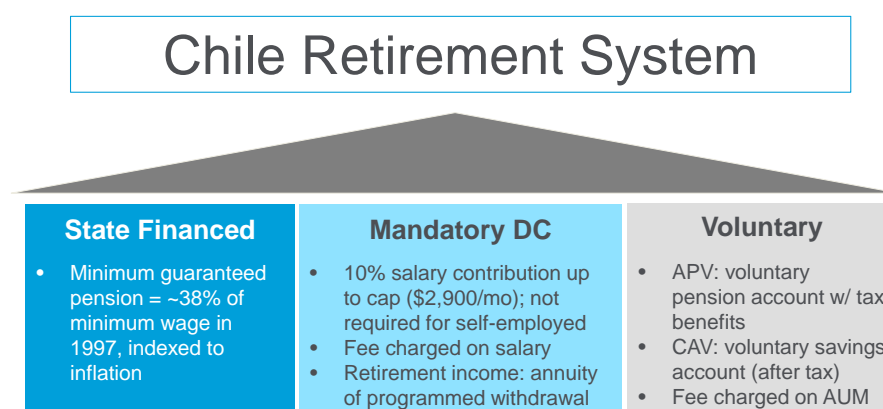
Source: Cerulli Latin America Distribution Dynamics 2014

The retirement system in Chile is a mandatory defined contribution system run by private companies (AFPs)

Chile: AFP Business Outlook Generally Favorable

In 1980, the Chilean government switched from a pay-as-you-go defined benefit program to a mandatory defined contribution system run by private companies known as Administradoras de Fondos de Pensiones or AFPs. Each full-time formal worker in Chile is required to contribute 10% of their salary (up to a cap, which is currently ~\$3,000 per month) to an AFP. New contributors to an AFP are assigned to the low cost provider (determined by a bid process every two years), but employees are free to switch to the AFP of their choice after that point. The AFP charges a fee based on a contributor's salary (up to a cap) as opposed to assets under management. This results in relatively steady fee income that is not directly affected by market fluctuations. In addition, each AFP is required to invest 1% of asset under management in its own funds, which is known as encaje.

Figure 95. Chile Retirement System Structure & Product Offerings



Source: Principal Financial and Citi Research

The table below compares the six AFPs currently operating in the market. As the low cost provider, Planvital receives all new enrollees until the next auction.

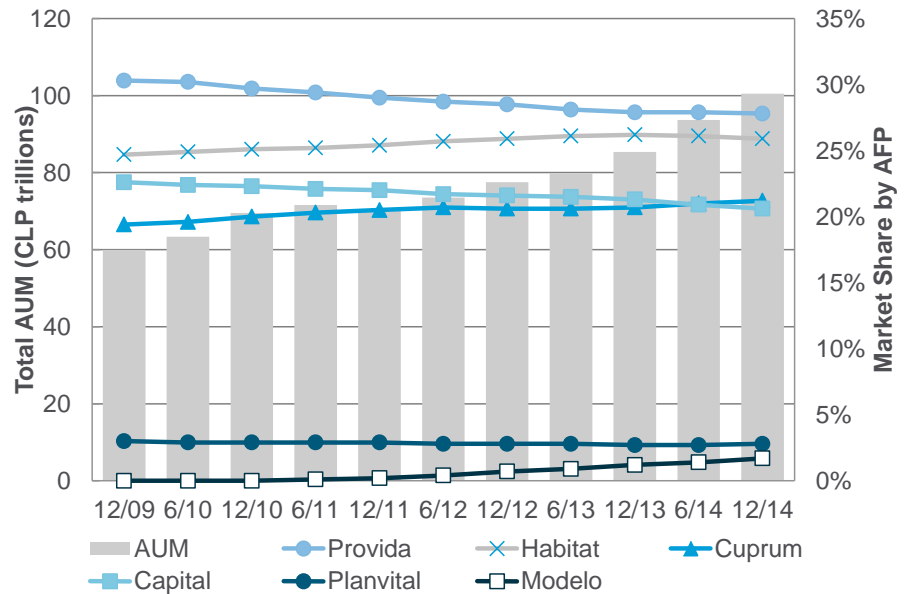
Figure 96. Summary Details for Chilean AFP Competitors (US\$ millions, as of December 2014)

	AUM			Market Share	Mandatory Fee	Salary Growth	Avg. Salary	Branch Offices	Avg. AUM
	Mandatory	Voluntary	Total						
Provida	45,165	825	45,990	27.8%	1.54%	6.59%	11,400	82	28,700
Habitat	40,713	2,107	42,820	25.9%	1.27%	8.18%	15,000	27	38,200
Cuprum	32,937	2,135	35,072	21.2%	1.48%	8.97%	25,100	32	78,600
Capital	33,144	935	34,079	20.6%	1.44%	7.42%	14,400	6	36,800
Planvital	4,610	22	4,632	2.8%	0.47%	12.25%	9,800	39	27,300
Modelo	2,758	54	2,812	1.7%	0.77%	11.83%	10,300	3	4,300
Total/Avg	159,353	6,079	165,432	100%	1.36%	7.34%	12,900		32,750

Source: Superintendencia de Pensiones

Figure 97 shows the recent trend in market share. ProVida had been losing share prior to its sale to MetLife, which we attribute largely to financial difficulties faced by its former owner. MetLife has invested in adding new branches and improving customer service, and its flows have rebounded over the past year. Habitat's share has moved in the other direction, which suggests some consumer switching between companies. Cuprum has been steadily gaining share, helped by growth in the voluntary market.

Figure 97. Chilean AFP Asset Under Management Growth and Market Share
Market share based on total AUM



Source: Superintendencia de Pensiones

Job Growth and Wage Inflation are Key Growth Drivers

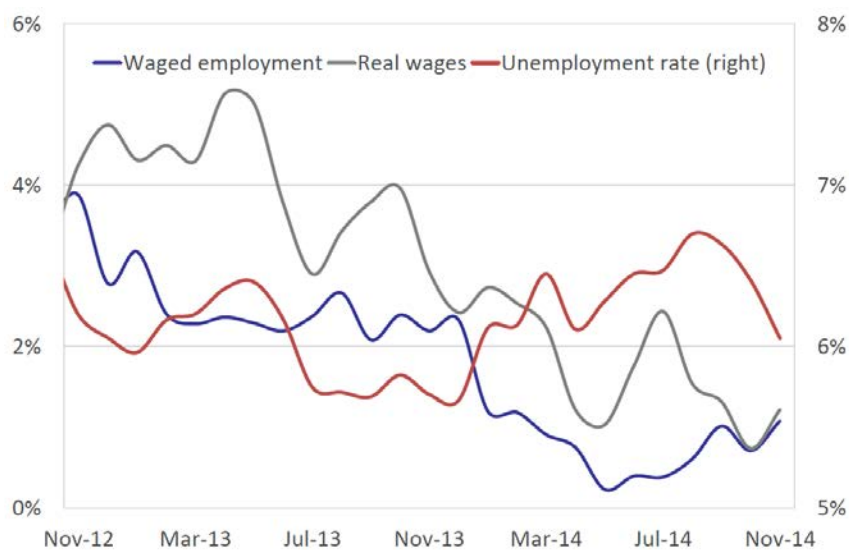
The primary driver of growth in fee income is additional contributor enrollments and wage inflation as fees charged as a % of salary are capped

Since mandatory AFP fees are charged as a percentage of salary (up to a cap), the primary drivers of growth in fee income are additional contributor enrollments and wage inflation. For the overall industry, growth in contributors should roughly track employment growth over time. Growth in salaries provides a direct lift in fees (unless a worker already earns above the cap). In 2014, employment rose ~1% and real wages increased slightly over 1%. Given inflation of 4-5%, total nominal fee growth for the AFP industry based on natural factors was likely 6-7% in 2014. Over time, nominal wage growth is expected to increase ~7% annually, with employment rising ~3%. This suggests growth in mandatory AFP fees of ~10% annually.

Adding self-employed workers to the mandatory AFP system would also be an additional source of growth

An additional source of growth would be the inclusion of self-employed workers and informal (non-salaried) workers in the mandatory AFP system. Currently, self-employed workers are expected to begin contributing in 2015.

Figure 98. Growth in Employment and Wages Slowed in 2014



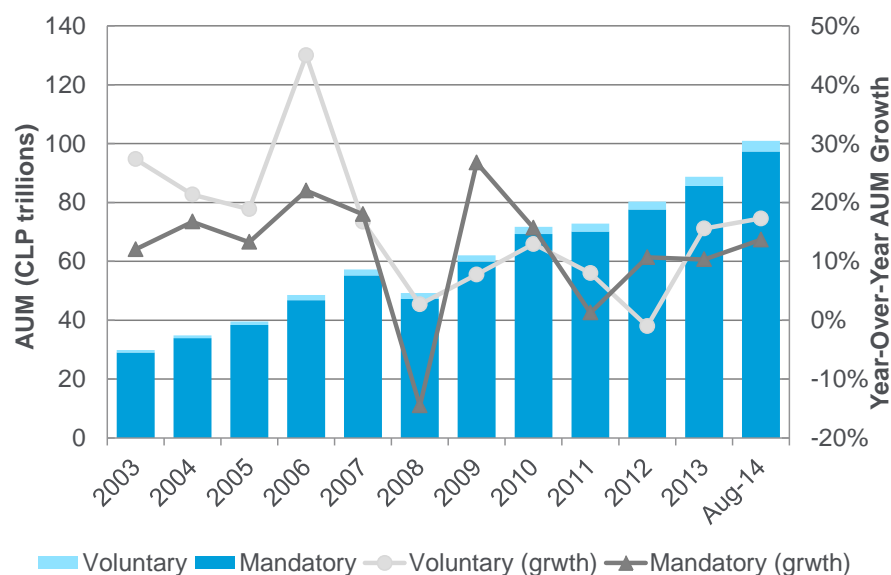
Source: Nueva Encuesta Nacional de Empleo (NENE), Instituto Nacional de Estadísticas (INE)

Mandatory fees are expected to grow ~10% per year while voluntary savings are a significant long-term opportunity for AFP providers

Voluntary Growing Faster, but Mandatory Bigger Near-Term Driver

Currently, about 95% of the AFP industry's earnings come from mandatory contributions. As discussed earlier, we expect mandatory fees to grow at ~10% per year. The voluntary market can likely grow faster than this over time given the small current assets under management base and need for additional savings. In addition, because voluntary fees are charged on assets under management, there is market leverage over time. However, while we view voluntary savings as a significant long-term opportunity for AFP providers, its incremental contribution to earnings is unlikely to exceed that of the mandatory market for the foreseeable future.

Figure 99. Voluntary Growing, but Mandatory Market Remains Dominant Earnings Driver



Source: Superintendencia de Pensiones, Citi Research

The level of fees is not the primary driver of choice for consumers when choosing an AFP

Competitive Market, but Limited Fee Pressure So Far

Based on our conversations with AFP providers, distributors, and consumers, it is clear that the level of fees is not the primary driver of which AFP someone chooses. In fact, ProVida is the largest AFP despite charging one of the highest fees, and the low cost providers (Planvital and Modelo) attract limited flows outside of auto-enrollees. Given the low correlation between fees and flows, companies have little incentive to compete on price.

Regulators also do not appear particularly focused on fees, outside of ensuring that there is a low cost option in the market for new enrollees. While the median fee on salary of 1.36% appears high, if converted to a fee on AUM, this would translate to something in the 50-60 bps range. This makes pricing very competitive with the US 401(k) system. In our view, the biggest risk to pricing would be the addition of a government run AFP.

Despite proposing a government-run AFP that would focus on increasing savings, we don't view this as a likely outcome

Potential for Regulatory Change, but Government AFP Unlikely

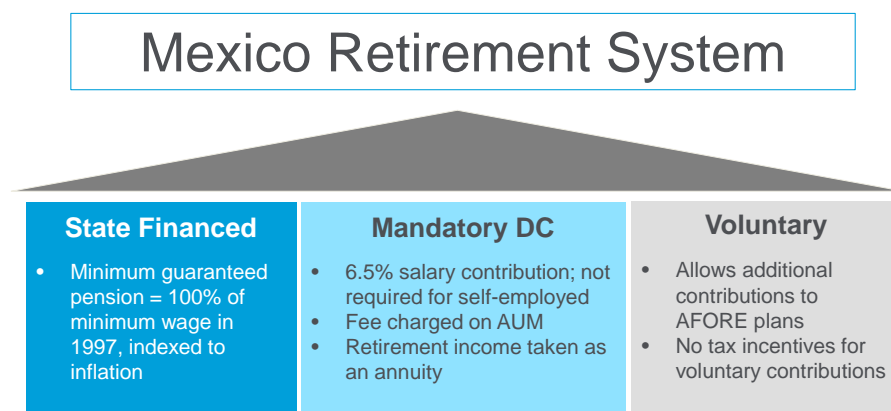
When President Bachelet was elected in December 2013, pension reform constituted a significant portion of her platform. Among her key goals was to increase savings rates, particularly among low-income consumers, women, and in rural areas. One of her proposals was to create a government run AFP that would focus on these targets. However, based on our conversations with economists, strategists, and market participants, we no longer view a government AFP as a likely outcome. The auction process (instituted in 2008) has brought down fees for new workers, and with Planvital winning the 2014 auction there is now competition at the low-cost end of the market (Modelo had won in 2010 and 2012). Also, assuming a government AFP would have to conform to the same rules as private companies, it is unclear what it would be able to do to expand participation and savings. In our view, a more likely outcome is a proposal to gradually increase required contribution rates or raise the current cap on mandatory contributions. This would probably face some resistance from voters, so employers may be asked to pay a portion directly (currently only the employee pays). There may also be proposals to further broaden the contribution base.

Mexico uses a mandatory defined contribution system (AFORE) which also allowed voluntary contributions

Mexico: Growing Retirement Market, but Pressure on Fees

Mexico has a mandatory defined contribution system known as AFORE, which requires a 6.5% salary deduction (lower than most countries). The government also allows voluntary contributions to AFORE accounts, although there are no tax incentives for additional savings. Given the low contribution percentage, Mexico's expected gross income replacement rate is 29%, well below the OECD average of 54%. It will likely be politically difficult to raise the required contribution rate near-term, but we anticipate heightened focus on ways to increase voluntary savings. This should help drive strong growth in AFORE asset under management over time.

Figure 100. Mexico Retirement System Structure & Product Offerings

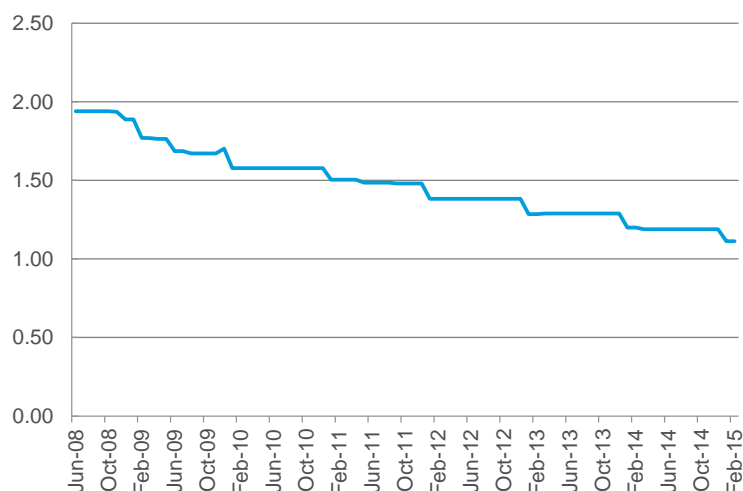


Source: Principal Financial, Citi Research

Fee Compression Expected to Continue

Fees charged by AFOREs have steadily compressed over the past few years, and we expect this trend to continue given competitive dynamics. Companies have the option of charging a fee based either on salary (similar to Chilean AFPs) or on assets under management, and the fee structure has to be approved by the regulator (Consar Board). Currently, the average fee is 1.11%, which is down from 1.19% in 2014. There is relatively little fee dispersion amongst companies.

Figure 101. Average AFORE Commission in Mexico
Annual commission in basis points



Source: Comisión Nacional del Sistema de Ahorro para el Retiro (CON SAR)

Further Market Consolidation Likely Over Time

Given the downward pressure on fees, companies need to be able to drive down their expense ratio in order to maintain margins. As a result, we believe that scale has become increasingly important. The AFORE market is currently relatively fragmented with only 3 companies having >10% share. There have been some recent deals, including Principal Financial Group's purchase of HSBC Afore in 2011, and we expect further consolidation among smaller players over time.

Figure 102. Market Share for Mexican AFORE Providers
In millions of pesos, as of February 2015

	Mandatory AUM	Voluntary AUM	Social Welfare AUM	Capital of Afore	Total AUM	Market Share	Share Rank
XXI Banorte	573,982.3	9,970.2	32,108.7	4,254.7	620,316.0	25.3%	1
SURA	357,519.7	2,752.6	0.0	2,889.9	363,162.2	14.8%	3
Profuturo GNP	300,434.1	2,053.9	0.0	2,226.3	304,714.3	12.4%	4
Invercap	157,237.4	548.7	0.0	1,153.8	158,939.9	6.5%	5
Principal	151,580.8	581.4	0.0	1,342.8	153,505.0	6.3%	6
PensionISSSTE	106,609.7	7,035.7	0.0	988.1	114,633.5	4.7%	7
Coppel	113,310.3	296.4	0.0	883.5	114,490.2	4.7%	8
Inbursa	104,229.1	613.1	0.0	1,339.5	106,181.7	4.3%	9
Mellife	69,802.7	579.5	0.0	542.2	70,924.3	2.9%	10
Aztec	34,435.8	49.3	0.0	411.9	34,897.0	1.4%	11
Total	2,370,284.9	28,130.9	32,108.7	18,991.6	2,449,516.1	100.0%	

Source: CON SAR, Citi Research

Asia ex-Japan Retirement Market

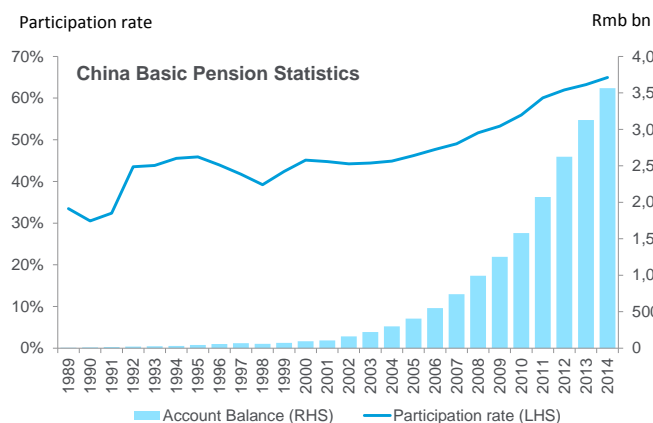
China

China's pension system is currently mainly supported by the Basic Pension of the Social Security Fund as Pillar One, and the Enterprise Annuity (EA) as Pillar Two. The government is also studying the possibility of implementing a tax-deferred annuity scheme as part of the pension reform.

- Basic Pension comprises pooled funds (e.g. pooled at the municipal or provincial level) and individual accounts. The pooled fund is a defined-benefit, pay-as-you-go scheme. The individual accounts are a defined contribution, fully-funded scheme. Basic Pension is supposed to be mandatory. However, due to aging population, inflation, and low investment return, the Basic Pension is likely in notable deficit and the shortfall continues to expand over time.
- Enterprise Annuity (EA) is a voluntary, defined contribution, fully-funded pension plan that has similar features to the US 401(k) scheme. EA contributions are mainly made by employers, and are supposed to enjoy some form of tax deductions. It is a 'trust-type' scheme that involves a series of service providers such as trustee, custodian, investment manager, and account manager. However, in reality, EA contributions often do not enjoy tax deductions at the local level, and participation rates of the EA scheme have remained low.

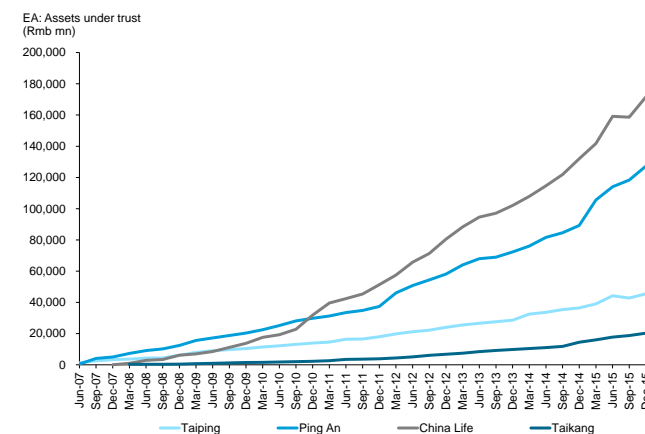
Local newswires have widely reported that a tax-deferred pension pilot scheme will be launched in Shanghai and/or several coastal cities (e.g. Shenzhen) and would eventually be rolled out to nationwide. The scheme would involve workers buying annuities products from insurance companies, and the pension contributions would be eligible for tax deduction. Withdrawal of annuity payments would be subject to taxation, but retirees would most likely fall out of the tax bracket upon retirement. The cap on tax-deductible pension contributions is reportedly capped at Rmb1,000 per month (~\$150/mo). Given salary tax is currently handled by employers in China, pension contributions in this pension pilot scheme will also likely be centrally handled by employers. As such, the tax-deferred pension pilot scheme will likely be in the form of group insurance.

Figure 103. China Basic Pension: Account Balance and Participation Rate



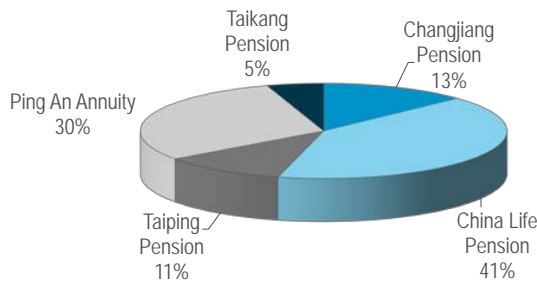
Source: CEIC, National Bureau of Statistics, Citi Research

Figure 104. China Enterprise Annuity: Assets Under Trust for Major Players



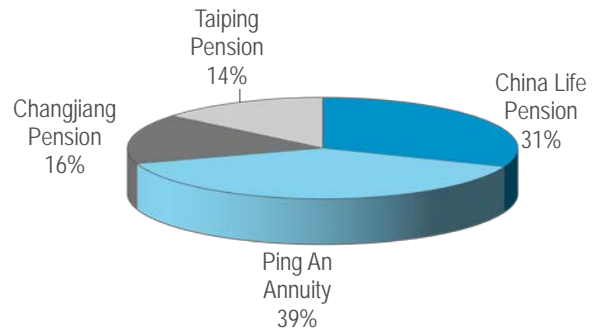
Source: CIRC

Figure 105. Enterprise Annuity: Market Share by AUM



Source: CIRC

Figure 106. Enterprise Annuity: Market Share by Assets Under Trust



Source: CIRC

The MPF is a mandatory, privately managed, fully funded pension scheme where employees and employers are each required to make contributions of 5% of the employee's relevant income

Hong Kong

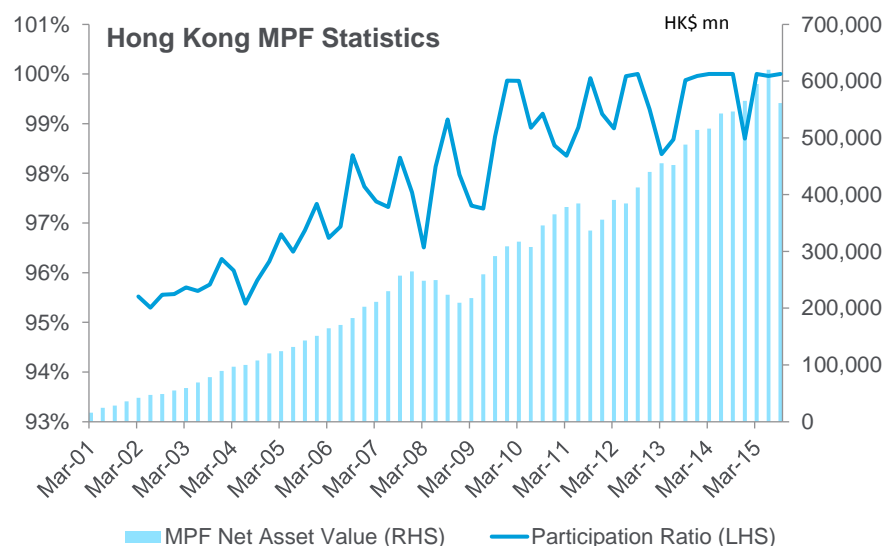
Launched in December 2000, the Mandatory Provident Fund (MPF) system in Hong Kong is a mandatory, privately managed, fully-funded pension scheme. It is an employment-based retirement protection system wherein all employees (regular or casual; full time or part-time) and self-employed persons who are at least 18 but under 65 years of age are required to join (except for exempt persons). Employees and employers are each required to make contributions calculated at 5% of the employee's relevant income to an MPF scheme, subject to the minimum (HK\$7,100 per month) and maximum (HK\$30,000 per month) relevant income levels. Withdrawal of accrued benefits in the MPF accounts is only allowed when scheme members reach the age of 65.

Prior to the establishment of MPF, the major retirement protection for employees was provided by defined-benefit plans in government organizations and defined-contribution Occupational Retirement Schemes Ordinance (ORSO) plans but which were mainly present in large corporates. Employees of small & medium enterprises (SMEs) and self-employed persons lacked formal pension coverage (other than tax-financed social security and personal savings). From this perspective, MPF has played a key role in providing old-age protection.

However, there have also been criticisms about the inadequacy of MPF:

- The contribution rate of 5% and maximum relevant income level are both too low, resulting in insufficient accumulated funds when employees retire;
- The related financial services for MPF (e.g. trustee, asset managers, custodian) are dominated by large players and banks, and as a result service charges stand at high levels; and
- The use of MPF funds is restrictive, as withdrawal is limited to retirement age and MPF funds cannot be used for other purposes (e.g. property purchase as in the case of the Central Provident Fund (CPF)) during the work-life of an employee.

Figure 107. Hong Kong MPF: Net Asset Value and Participation Ratio



Source: CEIC

Singapore

The Central Provident Fund (CPF), established in July 1955, is a comprehensive social security system that enables working Singapore citizens and permanent residents to set aside funds for retirement. It also addresses healthcare, home ownership, family protection, and asset enhancement. Both employees and employers make monthly contributions to the CPF account, which are then deposited in three accounts, the Ordinary Account (for housing, insurance, investment, and education), Special Account (for old age and investment in retirement-related financial products) and Medisave Account (for hospitalization expenses and approved medical insurance). The percent of contribution from employee/employer, and the percent of allocation to the three accounts, depends on the employee's age. CPF savings in the Ordinary Account earn a guaranteed interest rate of 2.5% per year, while savings in the Special Account and Medisave Account earn guaranteed interest rates of 4% per year. The first S\$60,000 of the combined CPF balances, of which up to S\$20,000 comes from the Ordinary Account, earns an additional 1% interest per year.

Some of the more recent changes as of the latest recommendations made in 2015 which are effective from 2016 onwards, are as follows: (1) the salary ceiling for CPF members have been raised from S\$5,000 to S\$6,000, (2) Workers above age 50 will have their CPF rates increased between 0.5% to 2% (depending on the age band they fall into), (3) Members above age 55 will get 1% more interest on first S\$30k, making it 6% a year, (4) Different retirement sum for different needs (contingent on factors such as home ownership), and (5) New option to withdraw up to 20% of CPF savings at age 65.

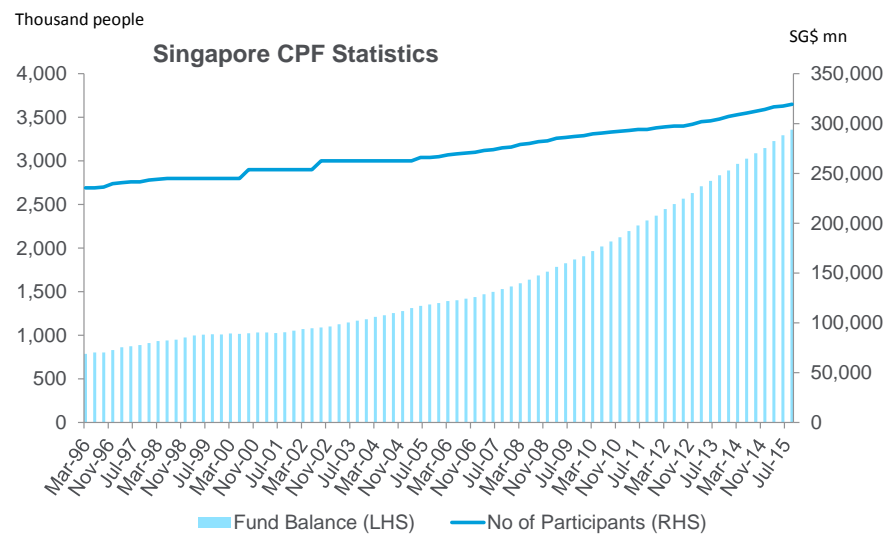
Based on Mercer Global Pension Index research (2014), Singapore's CPF scheme is one of the best retirement systems in Asia. We believe CPF was successful on three accounts:

- Unlike other social security systems, it does not place a big burden on the next generation;

- It provides retirement income for ordinary people that did not require them to be successful investors; and
- Funds in CPF account do not only address retirement needs, but can also be used for healthcare, property purchase, family protection and asset enhancement.

That said, the efficacy of the CPF has been called into question pertaining to its adequacy, given the rise in cost of living/inflation. Payments from CPF post-retirement are not indexed to inflation. Singapore's government has launched a Silver Support scheme to augment retirement income for the pioneer generation of retirees. It also lacks adequacy, such as the lack of tax-approved group corporate retirement plans, and retirement savings for non-residents.

Figure 108. Singapore CPF: Fund Balance and Number of Participants



Source: CEIC

Author Bios



Farooq Hanif is the Head of Citi's European Insurance equity research team, covering European Life and Composite insurers. He joined Citi in 2012, from Morgan Stanley where he spent five years as a senior analyst. Farooq has been an analyst for over 11 years in various firms and prior to that spent six years as an actuary for Mercer, consulting on pension fund liabilities and asset / liability management. Farooq is a Fellow of the Institute of Actuaries and holds a degree in Chemistry from Magdalen College, University of Oxford.



Charles Millard leads the Citigroup Pension Relations team. Mr. Millard was the Director of the United States Pension Benefit Guaranty Corporation from in the administration of President George W. Bush. As the first Director of the PBGC to be confirmed by the United States Senate, Mr. Millard served as the chief executive officer of the corporation and carried the rank of Under Secretary. Mr. Millard was the President of the New York City Economic Development Corporation and Chairman of the New York City Industrial Development Agency in the administration of Mayor Rudolph W. Giuliani. He was twice elected to the New York City Council, where he was the first Republican from Manhattan in 25 years. He has appeared on CNBC and CNN, and his writing on pension-related topics is regularly published in The Wall Street Journal, the Financial Times, Bloomberg and other publications. He received a B.A. Honors Degree, Phi Beta Kappa, from the College of the Holy Cross and a J.D. from Columbia Law School, where he was ranked as a Harlan Fiske Stone Scholar. He is currently a member of the faculty at the Yale University School of Management and a member of the Editorial Board of the Journal of Retirement.



Erik J. Bass, CFA is a Director and joined Citi Research in September 2012 as the Senior Analyst covering the Life Insurance sector. Prior to Citi, Erik spent 7 years as an Associate Analyst covering the Life sector at J.P. Morgan, where he had lead coverage for select small and mid-cap insurers. He began his career as an analyst in the J.P. Morgan Private Bank. Erik has a BA degree in Business Economics from Brown University and is a CFA charterholder.



Elizabeth Curmi is Vice President and thematic analyst working on Citi's GPS series. Prior to joining Citi, she worked for over four years as a researcher at the University of Cambridge focusing on natural resources in particular on the connections between water, energy and food resources and their effects on greenhouse gas emissions. She has published numerous papers in academic journals and has presented her work at a number of international conferences. Liz received a PhD from the University of York in 2010 in Environmental Economics and Management



Sarah Deans is Head of Accounting & Valuation Research in the EMEA Equity Research department. Sarah joined Citi in June 2010 from JP Morgan, where she had worked in the same role since 2004. Sarah was ranked first in the Accounting & Valuation category of the Institutional Investor poll for the last seven years. Previously Sarah worked in Equity Research at Lehman Brothers from 1998-2004, as an analyst in both the Chemicals and Media sectors before focusing on accounting. Sarah qualified as a Chartered Accountant in 1997 and worked for Coopers & Lybrand (now PricewaterhouseCoopers) in London and Zurich. She has an MA degree in Mathematics from the University of Cambridge.



Darwin Lam, CFA is the Head of Asia Pacific Insurance and has direct coverage of the Chinese insurance sector. Darwin joined Citi Research in November 2009 from RBS, where he was the head of regional insurance and Hong Kong financials research. Prior to that, he was with Goldman Sachs' Asia Financials Team for more than eight years, where he assumed various research roles including China insurance (2006-08), Asian exchanges (2004-08) and Hong Kong banks (2000-06). Darwin graduated from the University of Chicago with a BA degree in Economics and obtained an ME degree in Financial Engineering from Princeton. He is also a CFA charterholder.



Hiroyuki Maekawa is an Analyst covering the Insurance sector. He joined the firm in March 2015. He began his career at the Industrial Bank of Japan in 1984, where he spent four years in the International Finance Research division in charge of forecasting forex and interest rates. In 1992 he joined Tokio Marine and Fire Insurance Co., where he was responsible for financial strategy, and in 2001 he joined Nikko Salomon Smith Barney as an Analyst covering the Insurance sector. After studying in London in 2004-2005, he worked as an Analyst covering the Insurance and Brokerage sectors at Deutsche Securities from 2006 through 2008. Mr. Maekawa is a 1984 graduate of the University of Tokyo with a BA in economics, and he received his Master's degree in Management from the London Business School in 2005. He is a chartered member of the Security Analysts Association of Japan (CMA).



Nigel Pittaway is the Lead Insurance Analyst and Managing Director of Insurance/Diversified Financials Equity research for Citi Research Australia/New Zealand. Nigel has more than 20 years' experience in the financial services industry and leads a team that has been rated top three or better in external surveys over the past nine years. He was also the 2007 CFO analyst of the year. Prior to joining the firm in March 2000, Nigel worked for Cazenove in Australia and for KPMG both in London and in Sydney. Nigel holds a Bachelor of Science degree (Honours) in Statistics and Economics from the University of St Andrews, Scotland. He is also an Associate Member of the Institute of Chartered Accountants in Australia and a Fellow of the Institute of Chartered Accountants in England and Wales.

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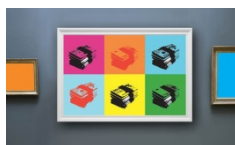
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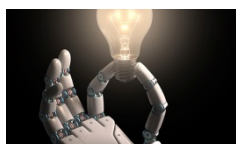
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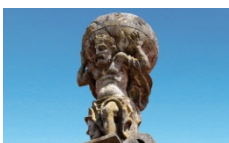
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