ROBECO
The Investment Engineers

Getting old and
staying wealthy

Jeroen van Oerle

TABLE OF CONTENTS

Executive summary

The impact of demographic change on pensions is only conditionally investible

A range of papers starting from the late 1980s have tried to infer investment opportunities from demographical trends. However, many of the fundamentally accurate conclusions ultimately did not generate an investment edge due to the political, legal and social organization of society. These conclusions were not wrong, but tried to time the trend, underestimating the fact that the trigger ultimately depends on a political decision-making process that has multiple other dimensions besides the economic rationale. Especially in the world of pension system changes, economic reasoning and political outcome can be miles apart.

'Conditionally investible' implies there are indeed investment opportunities

Under the precondition that politics allow for the pension system trends to be implemented in the country's current system, we have identified winners and losers from an industry and a geographical perspective. It is important to understand that we do not predict timing nor do we make investment recommendations. We identify companies that will be the winners and losers within the context of these specific demographical trends, without considering other factors that impact the investment decision, such as valuation and ESG performance. In addition, the investment suggestions in this paper should be considered during the limited time horizon between clarity on the political direction in a specific country and the full incorporation of policy changes in company valuations.

Potential winners and losers[1]

We have identified four trends that are currently shaping the global pension system discussion. The main triggers for discussion are demographic change in combination with inadequacy and/or unsustainability of the current pension system design.

- As a first trend we see that public (first pillar) pay-as-you-go defined benefit systems are being replaced by funded (notional) defined contribution systems. On the private side (second and third pillars) we also see a shift away from defined benefit and towards defined contribution. This opens up the door for private companies to step into the pension market or strengthen their position in it.
- Secondly, we believe there will be an increasing level of individualization/ customization that is intensified by the move to defined contribution.
- Thirdly, we see an increased need for financial planning and education in countries where defined contribution is implemented. We also observe an increased general demand for ICT integration in order to manage the progressively complex pension data as a result of individualization.
- Fourthly, we think there is potential for the development of an insurance triangle that combines home, health and life into one product solution.
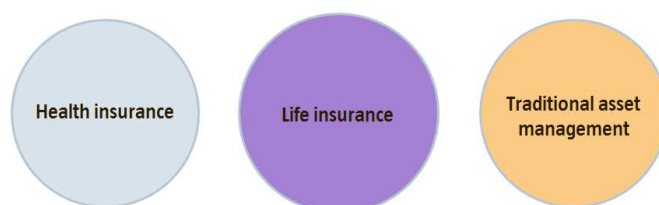
[1] Specific company names that fit our description of winners and losers can be found in the discussion below and appendix D.

Figure 1 | Potential winners and losers of the pension theme

Winners are well integrated, make use of technology and have scale
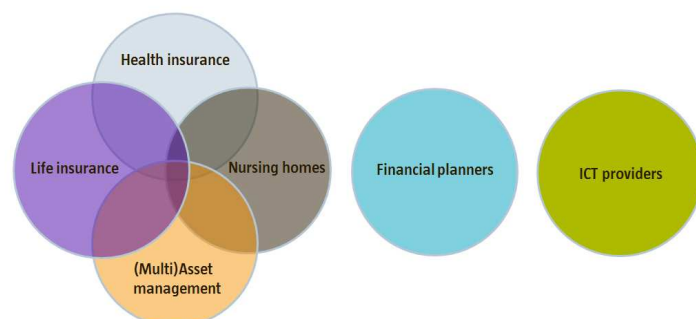
Losers lack scale and scope
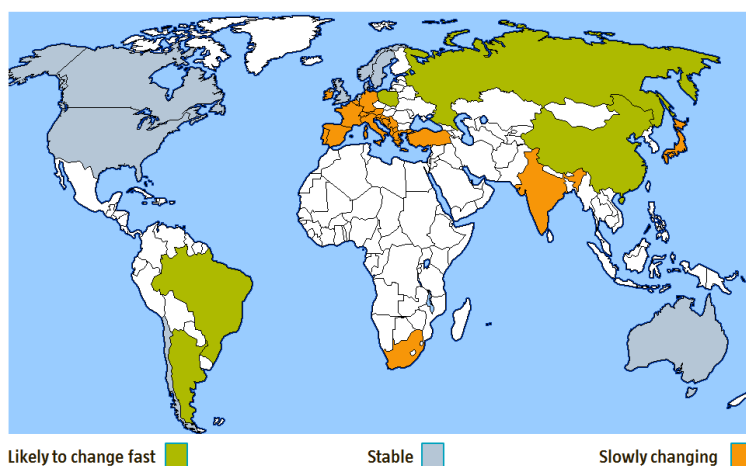

Source: Robeco fundamental research

Places to be: China and Brazil

We think the aforementioned trends are likely to be observed globally. However, we believe they can be boosted in certain countries because of the need to change in combination with local government's willingness to change. Based on our country matrix we think China and Brazil are most likely to transform their current pension system, thereby boosting the speed of trend implementation. Europe is likely trapped in very long bureaucratic decision-making processes to change the unsustainable pension systems of several member countries. India and South Africa are not likely to change soon because the demographics are less stringent. The US, UK, Canada, Scandinavia and Australia have steady pension systems that will probably not change drastically but gradually move into the direction of the aforementioned trends.

Figure 2 | Geographical opportunity heat-map

Likely to change fast ▮   Stable ▮   Slowly changing ▮

Source: Robeco fundamental research

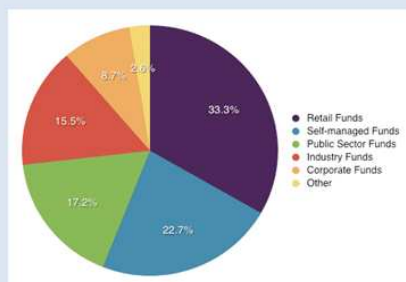# Introduction: pension trends that shape future systems

Based on recent pension system overhauls in countries like Chile (1980), the UK (1990) and Australia (1992), as well as research data on pensions we observe four trends that are likely to ultimately influence global pension system designs. First, it is likely that we will see a further shift away from pay-as-you-go defined benefit systems (DB) towards funded mandatory defined contribution (DC) schemes. Second, we believe that the shift towards DC will lead to personalization as provisions and investment styles are likely to become custom-made. Third, increased system complexity is likely to lead to a larger role for ICT and financial planning. Fourth, we believe there will be more room to offer combined product solutions (home, health, life) without direct monetary flows.

Shift from DB to DC likely to continue
Compared with 1990, 29 more governments have notified second pillar defined contribution schemes as basic system architecture (for an explanation of the pillar structure please refer to appendix A). We also see a shift towards defined contribution (DC) in the first pillar. This shift is less marked than in the second pillar because of legacy issues for which change represents political pressure. On the corporate side the shift to DC is also noticeable. Since 2005 the number of defined contribution schemes offered to new hires has exceeded the number of defined benefit schemes for Fortune500 companies. The same trend is observed industry-wide.

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Case- Study: Superannuation – Australia

In 1992 the Keating Labor government introduced a compulsory superannuation guarantee system as part of a large pension system overhaul in Australia. The defined contribution scheme is government supported and a minimum provision is compulsory for every employee. Employers are required to pay 9.5% (12% in 2020) of employee's total income (wages including bonus) into a fund selected by the employee. As of 2013 the default fund is the so called "MySuper" product and there are 500 superannuation funds in operation in Australia. 99% of the funds are self-managed superannuation funds (SMSF's), but collectively they hold only 23% of the 1.6 trillion AUS$ super assets. The biggest are the financial institutions run retail funds.

Pie chart: Retail Funds 33.3%, Self-managed Funds 22.7%, Public Sector Funds 17.2%, Industry Funds 15.5%, Corporate Funds 8.7%, Other 2.6%

Strong characteristics	Weak characteristics
Mandatory minimum provision	High level of freedom comes at a price for those that are less financially educated
Employees own pension assets and decide their investment profile based on their risk attitude	Lump-sum arrangement might weaken system
High standard of technology could lead to more informed members	Retirement age is relatively low
Well-designed oversight by four regulatory bodies	Provision rate increase (from 9.5% to 12%) is fairly slow in order to finance the age-created funding gab
Combination of life, health and home products possible (though based on monetary terms currently).	Pension system costs are higher than under collective management approach

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Source: Robeco fundamental research and Australian government

Figure 3 | DB and DC structures in public pillars (pillars 0 and 1) and private (pillar 2)

Basic system architecture by region, 2011 (and 1990)

	Pillar 0		Pillar 1			Pillar 2	
	Targeted	Basic	NDB	NDC	PF	FDC	FDB
East Asia & Pacific	4	3	8	1	10	1	0
Europe & Central Asia	11	4	28	5	0	15	0
High income: OECD	8	9	16	2	0	3	3
Latin America & Caribbean	16	2	29	0	0	9	0
Middle East & North Africa	1	1	17	0	0	0	0
South Asia	3	0	2	0	3	1	0
Sub-Saharan Africa	3	2	30	0	4	2	0
2011 Total	46	21	130	8	17	31	3
Grand Total	67		155			34	
1990 Total	20	10	140	0	17	2	3
Grand Total	30		157			5	

Notes: NDB/NDC: Notional Defined Contribution Scheme; FDC/FDB: Financial DC or DB scheme; PF: Provident Fund

Source: Pallares-Miralles, Romero and Whitehouse 2012, and author.

FORTUNE 500 RETIREMENT PLAN SPONSORSHIP TRENDS, 1998 – 2013*

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total DB plans	299	296	294	290	285	277	263	242	224	202	185	171	151	139	123	118
Traditional DB plans	251	236	228	206	187	169	157	138	125	105	88	75	57	48	39	34
Hybrid DB plans	48	60	66	84	98	108	106	104	99	97	97	96	94	91	84	84
DC plan only	195	200	202	206	212	220	234	256	275	297	315	329	349	361	377	382

Notes: Sponsorship shown as type of plan offered to salaried new hires at year-end. Trend data are shown for the 2013 *Fortune* 500 companies and capture changes to their retirement plans from 1998 through 2013.
*Sums do not equal 500 because a small number of the 2013 *Fortune* 500 companies did not exist in earlier years.
Source: Towers Watson analysis of 2013 *Fortune* 500

Source: Pallares-Miralles, Romero and Whitehouse, 2012, World Bank and Towers Watson analysis of 2013 Fortune 500

Shift driven by changing demographics

The main reason for the shift in public pension systems (pillar 1) is that the current PAYGO set-up of the defined benefit schemes is neither adequate nor sustainable (see Appendix A). This can also be concluded from the steep increase in pillar 0 systems that basically reduce public pension spending to a poverty-level contribution versus the income smoothing first pillar. The cause of this inadequacy and unsustainability is a shift in demographics that hinders the functioning of original pension system designs (see Appendix B). The demographic dividend is used up in many Western counties (dependency ratios are increasing) and maintaining GDP growth to finance higher pension expenses becomes harder due to a decreasing working population. This puts pressure on systems that are based on PAYGO funding.

## Impact on corporate balance sheets

The reason for many corporates to change to DC is not demographics per se (although it becomes more costly to finance life-long benefits due to longevity) but rather a change in accounting regulation (SFAS132R) in 2003. Since that date the pension account has an impact on the balance sheet and income statement of companies. Underfunded corporate DB schemes can be a serious threat to the financial stability of the company if the balance is substantial. Goodyear, for example, had pension deficits which were 100% of its asset value in 2013. Once the company switches to a DC scheme and sells the current DB obligations to an insurance company or pension fund, the negative impact of underfunding on future financial statements disappears.

The move to DC opens up the road for personalization......

Looking at recent pension system changes, we see that a move to defined contribution will eventually lead to a move to personalization. The main reason is that the number of personal input variables increases under DC. We expect to see more personalization in defined benefit dominated countries as well, although it is more obvious to expect faster and more dominant changes under DC. Direct ownership under DC also leads to an increase in portability of pension plans, requiring customized solutions from pension providers.

Figure 4 | Decision tree under defined contribution (left) and defined benefit (right)
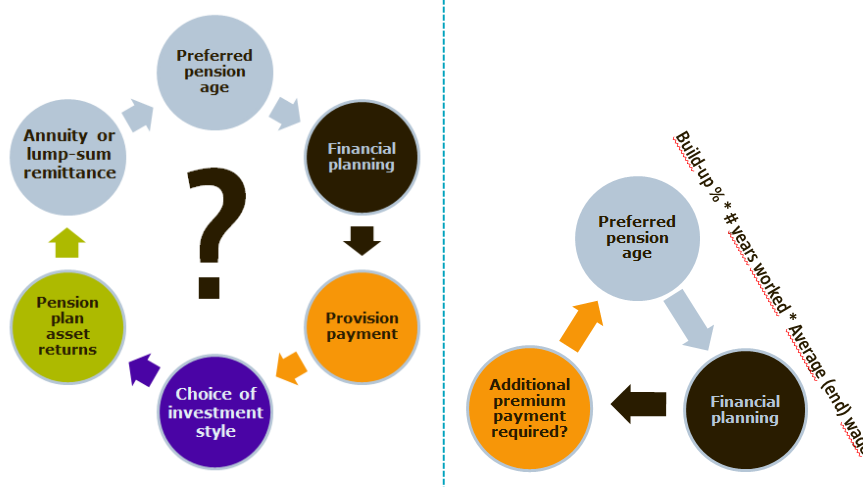
Source: Robeco fundamental research

.....requiring financial education to improve, especially in transitory systems

In the US and in Sweden the shift towards DC led to an increase in pension awareness (Gustman and Steinmeier (2001; 2004))[2]. Although pension awareness improves after the shift from DB to DC (40% to 50%), many respondents to surveys view pensions as too complicated still. For example, every citizen in Sweden receives an orange letter annually. This letter states accumulated pension assets as well as the assumptions and requirements for retirement and the build-up of pension assets. Even big government campaigns such as in Sweden were not able to increase financial literacy substantially. Outsourcing of financial planning and the need for financial education are observed as a consequence. Also in existing systems where the level of personal input is high we think the demand for financial planning services will grow further because of increased personalization and complexity. In the Netherlands BeFranc and Knab see an increased demand for their services while no drastic restructuring of the current pension system has taken place yet.

Increased complexity leads to increased demand for ICT

The move from DB to DC followed by the personalization of pensions requires a high-quality ICT environment. At the moment, many IT environments are not yet optimally prepared for the coming change. If more people get personalized accounts, which they can tailor-make according to their specific needs, the complexity of the ICT environment will increase further. Many pension administrators are also required by law to provide at least annual pension overview reports and it is not unthinkable that future pension asset account holders will demand timely and accurate account data on multiple platforms. In a survey by EY in 2014, 80% of customers indicated that they embrace IT and expect to find this back in the service of their insurance provider.
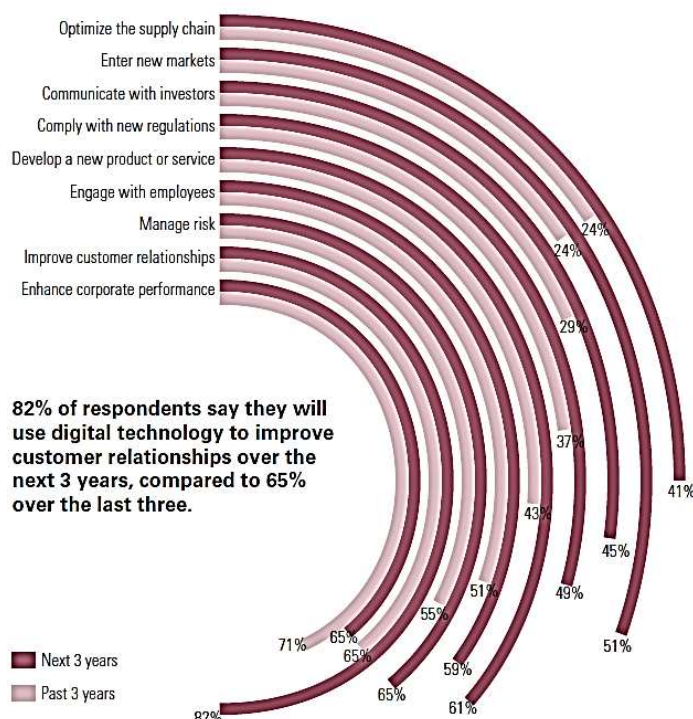
Next to complying with law and increasing the level of customer service, ICT is also a big cost saver if implemented correctly. The Dutch pension fund PGGM recently contracted CGI Corporation to streamline their ICT systems with cost reduction as the main reason. Surveys found that ICT is high on the agenda of many insurance companies in the coming three years. The alignment with corporate strategy though is not yet fully clear. We argue that companies that integrate ICT performance with business performance are more likely to benefit in the long term than companies that use ICT improvement on an ad-hoc basis.

[2] Gustmann and Steinmeier, 2001; 2004, 2001. "Imperfect Knowledge, Retirement, and Saving." NBER Working Paper 8406, National Bureau of Economic Research, Cambridge, Massachusetts. 2004. "What People Don't Know About Their Pensions and Social Security: Analysis Using Linked Data From the Health and Retirement Study." In *Public Policies and Private Pensions*, ed. W. Gale, J. Shoven and M. Warshawsky, 57–125.

Figure 5 | ICT integration insurance companies

Insurers will continue to use digital technology to enhance their entire business

Optimize the supply chain
Enter new markets
Communicate with investors
Comply with new regulations
Develop a new product or service
Engage with employees
Manage risk
Improve customer relationships
Enhance corporate performance

24%
24%
29%
37%
43%
45%
41%
49%
51%
51%
55%
59%
61%
65%
65%
65%
71%
82%

82% of respondents say they will use digital technology to improve customer relationships over the next 3 years, compared to 65% over the last three.

■ Next 3 years
■ Past 3 years

Source: Digital Technology's Effect on Insurance survey, KPMG International, May 2014.

> **69 percent say they have a digital strategy beyond a website. However, only 37 percent say their digital initiatives are fully aligned to their company's strategic objectives.**

Source: Digital Technology's Effect on Insurance survey, KPMG International, May 2014.

> **47 percent say developing innovative propositions to meet changing customer preferences is their greatest priority for the next 2-3 years**
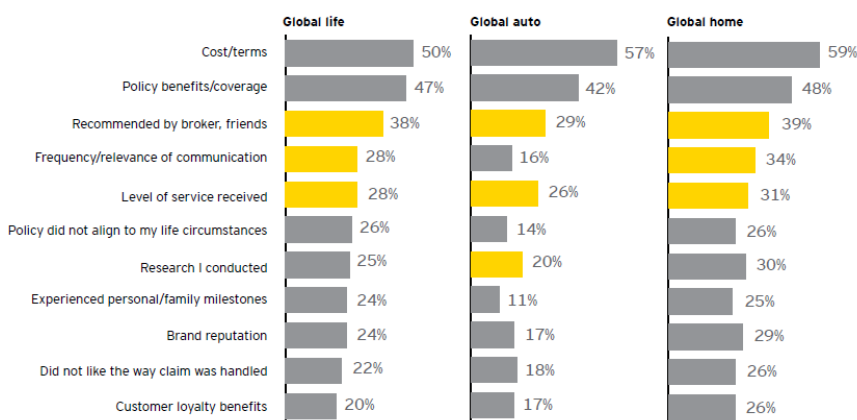
Source: Digital Technology's Effect on Insurance survey, KPMG International, May 2014.

Source: KPMG International, 2014

Combining home, health and life is a very likely scenario……

Due to individualization, risk aversion and the government's diminishing social security role, we think insurance can transform from a product that needs to be sold to a product that is being bought. Several insurance companies are currently working on products that combine insurances and are able to transfer premiums into (non) monetary services. This combination of products could lead to economies of scale, internal hedging and reduced total product provisions. The combination of several insurance products also leads to higher switching costs for customers, thereby increasing consumer stickiness. At the moment, the main reasons for switching are costs, terms and policy coverage. By combining products the coverage increases and the costs per product can be brought down. This already addresses the main reasons for switching. If customer service also improves through the usage of IT, the insurance companies of the future are likely to have a much stickier customer base.

Figure 6 | Focus of customers when deciding on insurance provider

Top reasons for closing or replacing a policy

	Global life	Global auto	Global home
Cost/terms	50%	57%	59%
Policy benefits/coverage	47%	42%	48%
Recommended by broker, friends	38%	29%	39%
Frequency/relevance of communication	28%	16%	34%
Level of service received	28%	26%	31%
Policy did not align to my life circumstances	26%	14%	26%
Research I conducted	25%	20%	30%
Experienced personal/family milestones	24%	11%	25%
Brand reputation	24%	17%	29%
Did not like the way claim was handled	22%	18%	26%
Customer loyalty benefits	20%	17%	26%

Source: Ernst and Young (EY), 2014

......but politics needs to allow it

At the moment it is not yet allowed to combine home, health and life into one product. It is impossible to receive a premium and provide a service to the client by means of, for instance, offering the customer a space in a nursing home. In the current political setting every product that has a monetary inflow must also provide for a monetary outflow. In addition to this requirement the monetary outflow must have a relationship to the monetary inflow; ergo you cannot pay for a car insurance and receive medical reimbursement. The insurance industry is actively lobbying for this change and we believe the future will indeed allow for such products.

Potential winners

Fully integrated insurance companies, ICT providers and financial planners are expected to benefit.

Fully integrated insurance companies become the new one-stop insurance shops

Many people have insurances on their possessions and often on their health as well. In a world in which defined contribution becomes the standard, pension insurance is the final additional insurance option. We believe that the combination of products will push people towards insurance solutions rather than products. The diminishing role of governments in social security combined with risk aversion could transform the demand structure for insurance. By means of paying a single, personalized, premium the customer will receive a service solution for home, health and/or life and is able to cover all risks with one single solution.

Although this is currently not yet legally possible we believe that the personalization resulting from the shift to DC will lead to public pressure for these kinds of services. We think it is very hard for an insurance company to exactly price health insurance or pensions as stand-alone products, but the combination of products leads to dynamics that are positive for providers and customers. Because of the internal hedging of risks it is possible for the insurance provider to bring down portfolio risks (and thereby the required capital under solvency II). On the consumer side a combination of insurance products into one solution is likely to lead to a substantial premium discount.

**Figure 7 | Combining insurance products into one customized solution**
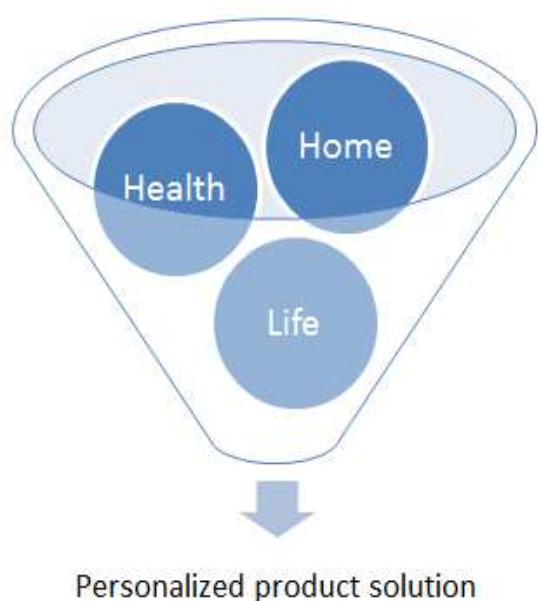
Source: Robeco fundamental research

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Integrating asset management capabilities is another plus

We also believe that insurance companies that internalize their asset management capabilities have a benefit versus those that do not have that capacity. The main reason is that there is more flexibility in asset class diversification when the asset management capability is internalized. Next to that, a large part of strategic asset allocation can be implemented by using low-cost investment products such as ETFs. Through the integration of IORPS (International Organizational Retirement Providers) on the pension side, insurance companies can benefit from both the asset accumulation phase and the annuity phase.

Figure 8 | Asset management adds build-up phase to insurer's addressable market
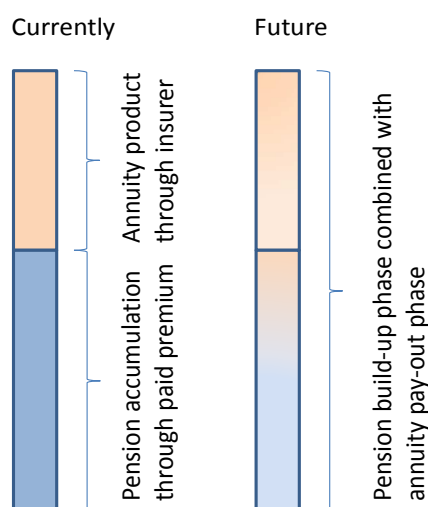
Source: Robeco fundamental research

Companies that fit this winner description

We believe that Prudential and Ping-An are well-integrated insurance companies active in China. Manulife, Sunlife, Prudential, Aviva, Legal and General are fully integrated insurers operating in stable business environments such as the UK, Canada and Australia. Within the US we think Principal Financial and Prudential are well positioned and within Europe we believe the best examples of fully integrated insurers are Axa and Aegon.

ICT providers and financial planners become indispensable rather than optional

The move from DB to DC will lead to personalization and is therefore likely to increase the need for financial planning. In many current DB systems the beneficiary only makes minimal calculations, and does not plan in advance how to get to a certain pay-out level. The inputs are fixed and the outcome is guaranteed. As described above, the number of variables to manage becomes much larger under a DC system. Surveys found that many people do not understand the complex pension systems or are not interested in spending much time and effort in order to educate themselves on something that will take place in the far future (Sudén 2005[3]). We believe that these dynamics will lead to an increased demand for financial planning services. In case customers want to do it all on their own, we think the ICT environment must be capable of dealing with such flexibilities. We expect input data, update data and financial planning to be combined into software solutions

[3] Sudén, 2005. "How Much Do People Need to Know about Their Pensions and What Do They Know?"

that will be offered by either individual software providers or insurance companies in the near future. As explained earlier, ICT is not solely a tool to communicate to clients, it also serves to administrate individual requirements and choices and to decrease overall operating costs.

Companies that fit this winner description

In terms of financial planners we think St. James, Challenger, Primerica and Ameriprise are well positioned. We like it when companies also have exposure to low income groups. It is precisely this group of users that we expect to grow rapidly due to the shift to DC.

In terms of ICT providers we think Accenture and IBM have the largest exposure to the insurance market. In India there is also a fast growing ICT provider that focuses on the financial sector named Tata Consultancy Services. We do not think that the Indian pension market is going to offer opportunities soon though, but TCS is an interesting company for those who seek exposure to ICT opportunities.

Potential losers

Not every company will be able to grasp the opportunities

Although it looks like the opportunities in the pension market are beneficial for all companies with exposure to the theme, we argue differently. We think that many of the insurance companies and asset managers that lack scale and scope will not be structural winners of the changing demographics theme. In developed markets, insurers that only focus on healthcare for example will have a hard time covering morbidity risk and those that only focus on life take on longevity risk. By means of combing products with different risk exposures the internal hedging set-up works. Scale is another very important aspect. In order to keep costs down, scale is a necessity.

Traditional asset managers are not a perfect match

We do not think traditional asset managers are optimally positioned to benefit from an increased asset management pool. The lack of scale and scope are important determinants. The accumulated pension assets are likely to be invested in multi asset products with large asset managers in order to keep overall management costs low. In addition to the search for multi-asset solutions we think insurance companies will become more active in terms of ETF allocation and alternative investments (like mortgages or direct real estate). Large insurance companies are internalizing asset management capabilities. Although this is a logical step for insurance companies, it is less logical for asset managers to take on insurance capabilities. The increased competition amongst traditional asset managers in addition to the increased volatility in manager choice is an industry dynamic we do not like from an investment perspective.

Companies that fit this loser description

We think China Pacific and New China Life in Asia, Power Financial and Sanlam in Canada and South Africa and Metlife in the US are not going to be able to profit from this theme. We believe their product offering is too limited or the markets they operate in are not yet mature enough to benefit from the changing trends we identified (i.e. impossible to price upscale products). In terms of traditional asset managers that are not likely to benefit we identified Franklin Resources, and Legg Mason in the US as well as Aberdeen, Ashmore and Henderson in the EU.

Geographical exposure

On top of the trends we can look at geographical exposure. Although the trends are likely to play out globally, there are specific opportunities in certain geographies. In Europe, for instance, it is possible to invest in names with exposure to the trends we identified, but we think that Chinese and Brazilian companies with exposure to the same trends are more interesting.

Figure 9 | Country matrix

	China	Brazil	Argentina	Japan	Russia	Poland	Germany	UK	Spain	France	India	Hungary	US	Italy	S. Africa	Netherlands	Turkey	Canada	Sweden
Macro	2.4	2.4	2.0	2.6	2.2	2.2	2.4	2.2	2.2	2.4	1.2	1.8	1.8	2.0	2.0	2.2	1.8	1.8	2.0
Government	2.4	2.2	1.8	2.2	1.8	1.8	1.8	1.8	1.8	1.6	2.0	2.0	2.0	2.0	1.8	1.8	1.6	2.0	1.2
Pension system	2.5	2.3	2.3	1.7	2.2	2.2	2.0	2.0	2.0	2.0	2.5	2.0	2.0	1.8	1.8	1.7	2.0	1.5	1.7
Total score	2.4	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.7	1.6

Source: Robeco fundamental research. The full table and matrix explanation can be found in appendix C.

Country matrix identifies places with the largest potential for companies

We have constructed a matrix in order to assess which countries are most interesting from a pension investment perspective. In that matrix we look at three main factors that determine the attractiveness of the pension environment in terms of opportunities for commercial pension providers. We assign a weight of 30% to the macro environment, 30% to the government dynamics and 40% to the pension system dynamics.

We rank the factors under each dimension where 3 is the highest score and 1 is the lowest. For instance, under the government dynamics we look at the willingness to change. If pension reform is high on the political agenda, the country ranks a 3. If the willingness to change is low the country ranks a 1. We base that score on OECD survey data from 2014. Another example is that if the country already allows for DC structures it scores higher than when it only allows for DB. Based on these scores we get a ranking. It is important to realize that the ranking is not an exact science. Rather than concluding a highly ranked country will be a winner, we search for companies with the best mix of exposure to the highly ranked regions. Principal Financial is a good example of a company that has exposure to many of our highly ranked countries on top of the integration of multiple insurance products.

Splitting the world into three categories
Likely to change in the near future
We think China, Brazil and Argentina are likely to rapidly change their current pension systems, thereby opening up new market opportunities for (inter)national companies. Political statements (especially in China) have been positive towards allowing international commercial pension providers to operate in these countries. The political visibility is clouded though, which brings us back to the first statement: this is only a conditionally investible theme.

Stable countries with little pressure to change

Countries where we expect a steady pension environment (gradual change with plenty of room to maneuver) are the US, Canada, the UK, Chile and Australia. Their pension system is less likely to be at risk due to changing demographics. Moreover, these countries are far ahead in terms of implementing and allowing for the pension system trends to take shape. We expect companies that have exposure to these regions to earn decent returns on those investments, although a lot of this should be incorporated in the price already.

Regions to be cautious about

Finally, we argue it is best to stay out of Europe because the political agenda of the European Union is entangled with members' agendas and pension system reforms are likely to take very long without clear visibility on the outcome or scope (targeted first pillar restructuring or second pillar as well?). The only exception in Europe is the Netherlands, which is more positioned as the UK in terms of pension system stability.

In Japan the government remains very protective of the current system (although it is neither adequate nor sustainable) and there is very limited room for change or internationally operating companies. India and South Africa have plenty of demographic dividend and enough time to implement a well-functioning pension system. Next to that, GDP per capita is not yet high enough to function as inflection point on the income elasticity curve to set off a massive uptake in demand for insurance products. Simply put, it's too early for India and Africa, but the opportunities in the very long run can be large.

Concluding remarks

We believe that from the perspective of pension system reforms, the 'changing demographics' theme is a conditionally investible theme. Politics has a large influence on the design of the pension system. As costs pile up, many of the current systems are not sustainable from an economic perspective. However, if political pressure is high to keep the current system up and running (because it is likely that pension benefits will deteriorate in a new system), there is less likelihood of big pension system reforms.

When looking at recent pension system reforms in Chile, the UK and Australia we find that politics have been the critical component, but we could not find a homogenous set of variables that triggered the change. We believe we are able to identify the direction in which the global pension system debate is moving, but we cannot pin-point exact timing.

In this paper we have identified countries which we deem most likely to change their current pension systems. We think this paper is best used in the period of time when it is clear, from a political point of view, which companies are able to operate and under what conditions. We argue that once pension systems move into the direction we have seen in the most recent pension system reforms, it is best to buy well-integrated insurance companies, financial planners and ICT providers and avoid insurance players and asset managers that lack scale and scope.

Jeroen van Oerle
Trends Equities

Appendix A: current pension systems

Three pillar system

In 1889 the first modern state pension system was introduced in Germany. The age of entitlement was 70 years and was a pure longevity protection. Many pension systems can be subdivided into three pillars.

- The first pillar is a state financed pension which is distributed to all people who reach a threshold retirement age (irrespective of whether they ever worked). Funding comes from taxes and the system is set up in a PAYGO form which implies that those who currently work pay for those who are entitled to receive pension. Examples of these first pillar state financed pension plans are 'Algemene Ouderdoms Wet' in the Netherlands, 'Gesetzliche Rentenversicherung' in Germany and 'Social Security' in the USA. As long as the population is growing; this system works perfectly, but when the base shrinks the system will collapse.

- The second pillar is a mandatory savings system. Employees pay a pension premium which is often tax exempt. This premium is deposited into a pension fund, insurance company or international organizational retirement provider. Upon retirement the accumulated account is transferred into an annuity payment in most countries, or a lump sum. Many countries in Europe do not allow lump sum payments and the only option for retirees is to take annuities.

- The third pillar is a completely voluntary savings pillar with often beneficiary tax treatment. The investment strategy is individually determined. In many countries, the third pillar preceded the formal introduction of the second pillar.

Adding two more pillars

In current discussions, two more pillars are added. The zero pillar is the poverty reduction pillar (set apart from the consumption smoothing first pillar) and the fourth pillar covers informal additional premiums like health care savings and housing assets. We think that the zero pillar as well as the fourth pillar will become more important in the discussions. Governments are likely to retreat to zero pillar systems in which they only provide residents with a minimum monthly income just above the poverty level. The rest will become the responsibility of the individual. The fourth pillar will grow in significance because future pension calculations will most probably include all assets versus only pension assets currently.

Defined benefit versus defined contribution

Defined benefit crème de la crème for employees

In defined benefit plans the benefit is determined by a set formula. Usually this formula consists of the build-up percentage multiplied by the number of years worked/entitled multiplied by the salary basis. Traditionally the defined benefit formulas were based on final wage. Currently most are based on average wage. Defined benefit is guaranteed for the receiver. All funding risks lie with the provider.

*Defined contribution as a DIY retirement product*

Under defined contribution the employer could also pay a pension contribution, but the employee is responsible for the accumulation of his/her pension assets. In most cases the

employee simply transfers his contribution to a pension fund or insurance company in order to have it invested but that varies widely amongst countries. Whether or not there is a high enough pension balance upon retirement depends on the returns made over the investment period. There are no guarantees and it could be that, due to negative returns , the balance is less than required.

Funded versus unfunded
Pension schemes can be funded or unfunded. Funded schemes have a transfer of premiums into a fund. The accumulated balance of this fund is then invested in order to meet future pay-out requirements. In unfunded pension schemes there is a transfer of money upon pay-out requirement that is not set aside earlier. It is paid-as-you-go. Most traditional public defined benefit schemes are unfunded and paid by tax receipts in that particular year.

Appendix A, figure 1 | Pension system design
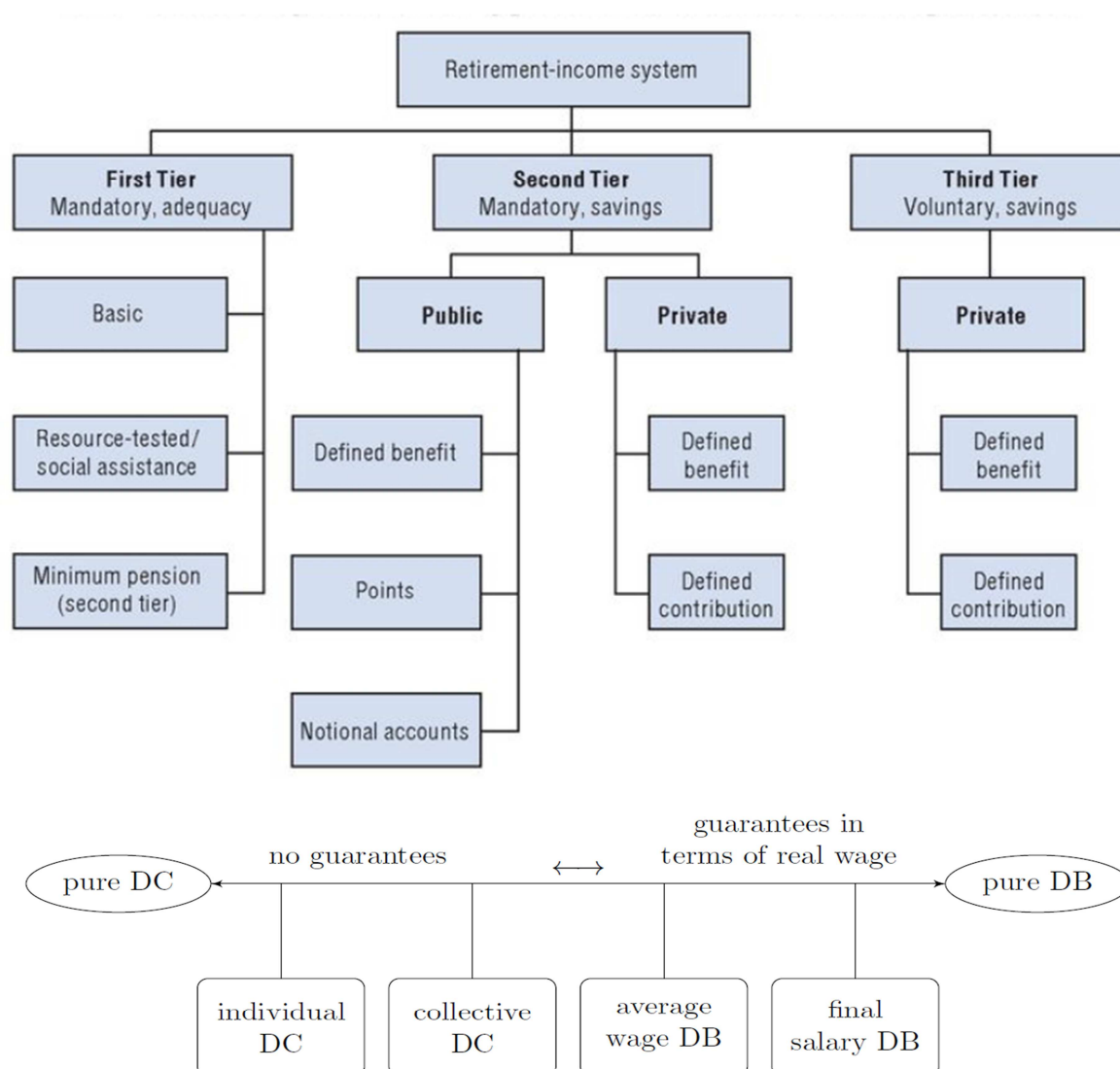
Source: Chen and Beetsma, 2013. Mandatory participation in occupational pension schemes in the Netherlands and other countries.

Appendix A, figure 2 | Pension demographics
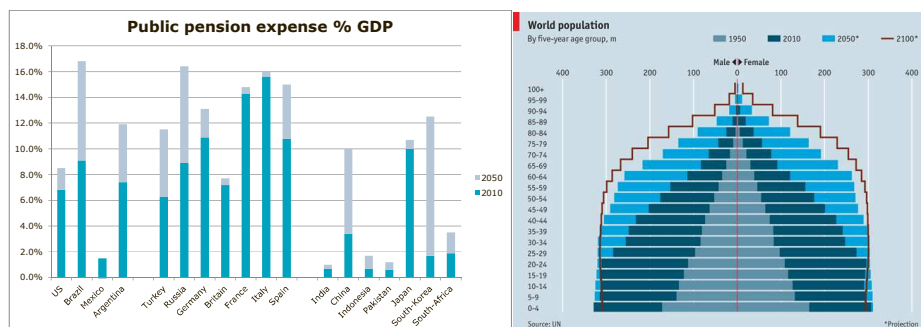
Source: Robeco fundamental analysis and World Bank

Pension costs become big burden on public budget

Pension costs as a percentage of GDP are expected to grow to 12-16% by 2050 in countries with PAYGO defined benefit pension systems. In many of those countries the government makes up about 50% of GDP which implies pension budgets would be between 24% and 32% of total government spending in 2050 versus an average of 12% currently. It is not likely that the increase in pension expenditure can be 'saved' by spending less on the younger population. An interesting dynamic in the entire discussion is that the majority of voting power in 2050 will be in the age cohorts that will be most hit by the Pareto-inefficient pension system overhaul. Although many economic indicators predict system unsustainability, it is up to politics to decide how much cost is too much.

High replacement rates not sustainable

When we look at the current replacement rates, we see that countries with high pension costs as percentage to GDP also have the most generous (publicly sponsored) replacement rates. Greece, Spain, and Italy all have public system replacement rates above 65% which implies the government provides every citizen with a pension that is 65% of the average wage. All of this is paid for via direct taxation. In comparison, the Netherlands provides its citizens with a pension that is, on average, 30% of average income (AOW). The rest of the pension money is built up through the second and third pillar system.

Appendix A, figure 3 | Global gross replacement rates
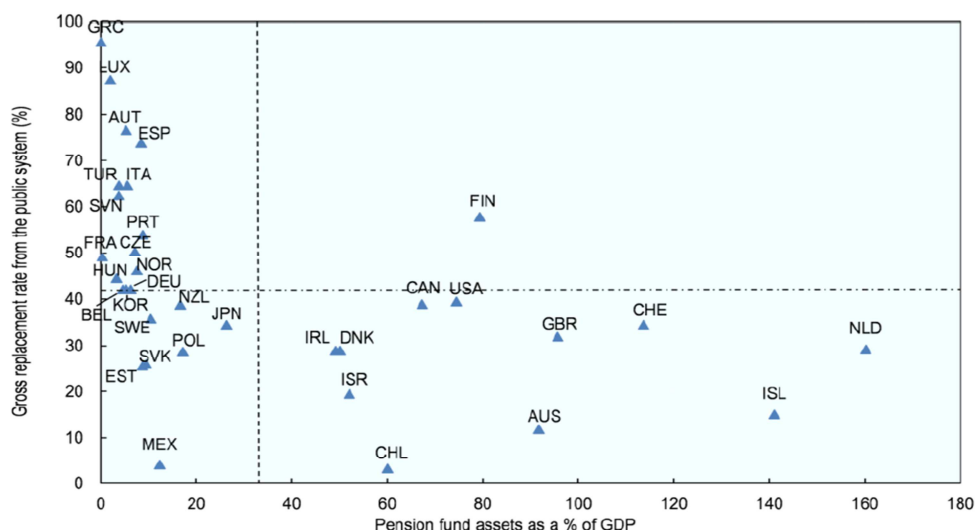
Source: OECD Global Pension Statistics.

Appendix B: the loss of the demographic dividend

"A growing nation is the greatest Ponzi scheme ever contrived" (R. Samuelson)
And that is exactly what kept many current systems up and running. In the future this is no longer the case because many Western countries no longer have an organically growing nation. As can be seen in the table in the left three columns, the dependency ratios (% of dependents to working population) for the world are increasing after a decrease between 1950 and 2000. This decrease in the total dependency ratio created a demographic dividend that was most profound in the West and China. Regions that are likely to benefit from demographic dividend in the future are India, South Asia and Africa. If current pension systems are to be kept up and running, many countries will depend on immigration.

Appendix B, figure 1 | Global dependency ratios

	Total Dependency Ratio			Child Dependency Ratio			Old-age Dependency Ratio		
	1950	2000	2050	1950	2000	2050	1950	2000	2050
World	73.16	67.09	71.44	59.15	50.48	34.03	14.00	16.61	37.41
Continent									
Europe	62.05	60.85	96.44	42.40	28.18	28.59	19.65	32.67	67.85
N.America	65.60	60.08	79.74	45.06	34.15	30.73	20.54	25.92	49.01
Asia	75.20	64.44	71.47	63.46	50.23	30.79	11.74	14.21	40.68
Africa	89.04	91.01	62.15	78.98	81.22	45.37	10.06	9.78	16.78
More Developed Countries									
Japan	75.89	61.04	123.40	62.35	23.58	25.16	13.54	37.46	98.23
UK	60.91	65.92	86.44	35.94	31.50	30.28	24.97	34.42	56.16
US	65.27	60.56	78.67	44.61	34.64	30.83	20.66	25.91	47.84
Italy	62.75	62.61	107.76	42.83	23.24	27.65	19.92	39.37	80.11
France	63.77	65.20	91.44	37.19	30.87	30.59	26.58	34.33	60.85
S.Korea	89.05	47.67	110.78	78.76	30.78	21.92	10.30	16.89	88.86
Singapore	79.30	47.77	103.89	72.63	32.18	22.68	6.67	15.59	81.22
Hong Kong	51.61	46.22	102.34	46.01	24.65	22.71	5.61	21.58	79.63
Less Developed Countries									
China	69.58	53.86	86.46	56.87	38.38	28.51	12.71	15.48	57.95
India	75.06	72.61	62.46	65.62	60.39	29.59	9.44	12.22	32.87
Côte d'Ivoire	88.91	92.20	56.59	81.37	82.95	39.75	7.54	9.24	16.84
Indonesia	83.14	61.30	73.20	71.74	48.93	30.27	11.40	12.37	42.94
Philippines	96.52	76.31	60.87	85.67	66.58	31.67	10.85	9.73	29.21
Cambodia	87.81	86.84	59.54	79.30	78.20	35.21	8.51	8.64	24.33
Thailand	89.34	50.76	83.90	79.78	35.53	29.12	9.56	15.23	54.78

Source: World Population Prospects and World Urbanization Prospects

In the past it was easier to grow GDP due to an expanding workforce. In the future we have to rely more on productivity gains to increase GDP at the same rate as in the past.

Appendix B, figure 2 | Impact of decreasing working population on GDP growth rates

Employment, productivity, and growth
Medium UN population scenario, best activity and unemployment rates, 2007–12; compound annual growth rate (CAGR), %; future 50 years assumes past productivity growth rates for next 50 years

■ Employment growth   ▢ Productivity growth

NOTE: Numbers may not sum due to rounding.

SOURCE: The Conference Board Total Economy Database; United Nations Population Division; International Labour Organisation; McKinsey Global Institute analysis
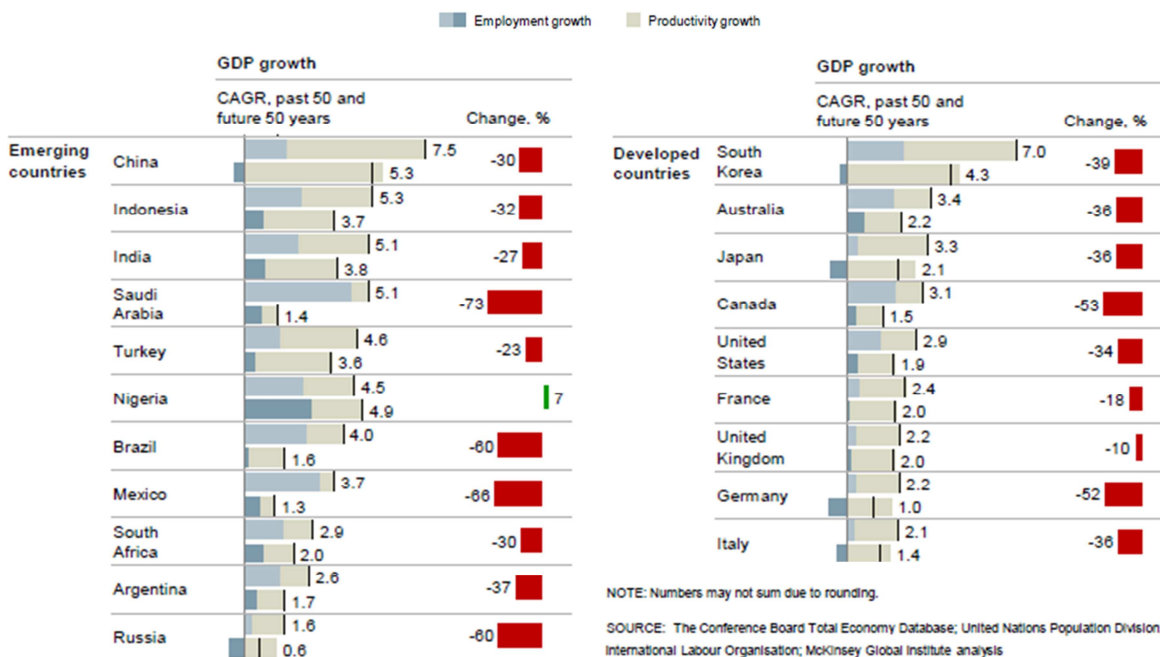
Source: McKinsey, 2013

Appendix C: country matrix

	Indicator	China	Brazil	Argentina	Japan	Russia	Poland	Germany	UK	Spain	France	India	Hungary	US	Italy	S. Africa	Netherlands	Turkey	Canada	Sweden
Macro (30%)	Time before pension pressure is felt	3	3	3	3	3	2	3	2	3	2	1	1	2	3	2	2	3	2	1
	Speed of aging	2	2	1	3	3	3	3	3	3	3	1	3	1	3	1	3	2	3	3
	Dependency ratio	2	1	2	3	1	1	2	2	2	3	1	1	2	2	2	1	1	1	3
	Labor participation rate	3	3	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2
	Immigration	3	3	3	2	2	3	2	2	1	2	1	2	2	1	3	2	2	1	1
		2.6	**2.4**	**2.2**	**2.6**	**2.2**	**2.2**	**2.4**	**2.2**	**2.2**	**2.4**	**1.2**	**1.8**	**1.8**	**2.0**	**2.0**	**2.2**	**1.8**	**1.8**	**2.0**
Government (30%)	Readiness to change?	3	1	1	2	1	2	3	3	2	2	1	2	3	1	1	3	1	3	2
	Government debt	1	2	1	3	2	1	1	2	2	2	1	2	2	3	1	2	1	1	1
	Current account	2	2	2	2	2	2	1	1	2	2	3	2	2	2	3	1	3	2	1
	Willingness to change	3	3	3	2	2	2	2	2	2	1	3	3	1	3	2	2	1	3	1
	Political pressure to change	3	3	2	2	2	2	2	1	1	1	2	1	2	1	2	1	2	1	1
		2.4	**2.2**	**1.8**	**2.2**	**1.8**	**1.8**	**1.8**	**1.8**	**1.8**	**1.6**	**2.0**	**2.0**	**2.0**	**2.0**	**1.8**	**1.8**	**1.6**	**2.0**	**1.2**
Pension system (40%)	DB or DC?	3	1	3	1	2	3	1	2	2	3	3	3	2	2	2	1	1	1	2
	Funded status of current scheme?	3	3	3	2	3	2	2	1	3	3	3	2	2	3	2	1	2	1	1
	Sustainability of current system?	3	3	2	3	3	3	3	2	3	3	3	2	2	3	2	1	2	2	1
	Integrity	1	2	2	2	1	2	2	3	1	1	2	2	2	1	2	3	3	2	3
	Pension expense as % GDP	3	3	2	1	3	1	2	1	2	1	1	1	1	1	2	2	3	1	1
	Flexibility?	2	2	2	1	1	2	2	3	1	1	3	2	3	1	1	2	1	2	2
		2.5	**2.3**	**2.3**	**1.7**	**2.2**	**2.2**	**2.0**	**2.0**	**2.0**	**2.0**	**2.5**	**2.0**	**2.0**	**1.8**	**1.8**	**1.7**	**2.0**	**1.5**	**1.7**
	Total score	**2.50**	**2.31**	**2.13**	**2.11**	**2.07**	**2.07**	**2.06**	**2.00**	**2.00**	**2.00**	**1.96**	**1.94**	**1.94**	**1.93**	**1.87**	**1.87**	**1.82**	**1.74**	**1.63**

In this country matrix we analyze countries which represent about 80% of global pension assets (Mercer, 2014). We have ranked three broad indicators for pension market opportunities in these countries. We assign weights of 30% to the macro environment, 30% to the government environment and 40% to the current pension system in place. In this ranking we base our rating on OECD, World Bank and Mercer data. We score each item in terms of commercial attractiveness where 3 is the highest score and 1 is the lowest. We do not look at this matrix as an indicator of relative country winners versus losers, but rather combine it with the winners and losers described above in order to find companies with the best exposure to high ranking countries. As said before, this country matrix is an additional layer on top of the trend layer. We simply expect the pension trends to play out fastest in countries which offer most room for development.

Appendix D: winners' and losers' geographic exposure

Winners/Losers	Insurance			Planning and ICT		Asset management		Geographic exposure				
	Nursing Home insurance	Life insurance	Health insurance	Financial planning	ICT integration	Traditional asset management	Multi-asset management capabilities	China, Singapore	Latin America	US, UK, Canada, Australia	EU, Japan	India, South Africa
Principal financial	X	X	X	X		X	X	X	X	X	X	X
Prudential PLC	X	X	X			X				X	X	
Manulife	X	X	X	X		X	X	X		X	X	
Sunlife		X	X	X		X		X		X	X	X
Aviva	X	X	X			X		X		X	X	
Legal & General	X	X	X			X	X			X	X	
Ping an		X	X			X		X				
China Life		X	X			X		X				
AIA		X	X	X		X		X				
Axa	X	X	X			X	X	X		X	X	X
Aegon	X	X	X	X		X	X			X	X	X
Mapfre	X	X							X		X	
BB Seguridade		X	X	X					X			
St. James				X		X	X			X		
Challenger				X		X	X			X		
Primerica				X						X		
Ameriprise				X						X		
CSG					X					X	X	X
Accenture					X					X	X	
IBM					X			X		X	X	X
China Pacific		X						X				
New China life		X						X				
Power financial		X								X	X	
Sanlam		X										X
Metlife		X						X	X	X		
Franklin resources						X		X	X	X	X	
T row price						X				X	X	
Legg mason						X				X		
Aberdeen						X		X		X		
Henderson						X			X	X	X	

Source: Robeco fundamental research