Global Pensions Underfunding

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April 2015

M-RCBG Associate Working Paper Series | No. 39

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FINAL DRAFT

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EXECUTIVE SUMMARY

Public pension systems around the world are struggling to meet their commitments to their members. Aging populations have put a severe strain on programs designed for different demographic times and, consequently, these systems often find themselves buckling under the pressure. Exacerbating the problem are rising government debt ratios in the wake of the global financial crisis, as well as poor investment returns which have negatively impacted funding.

In practice, countries differ widely in how efficiently and effectively they've managed their retirement programs. That point is driven home in this comprehensive report, *Global Pensions Underfunding,* which studies pension systems in 33 countries across five continents. The goal of the study was to identify the pressures and problems these countries face, as well as possible solutions based on academic research and approaches that some of the most progressive countries have employed.

To evaluate the pension systems of different countries, this study uses two fundamental metrics: *sustainability* (the burden that projected spending under a pension system places on public finances; high sustainability implies a low burden) and *adequacy* (the ability of a pension system to ensure beneficiaries an adequate level of retirement income, defined here as 60% of the average wage for all over 65-year-olds).

This study is committed to finding ways that countries could provide for their retired population without putting an unreasonable strain on public finances. What it found was that this feat requires improving both adequacy and sustainability simultaneously. We call the balance between adequacy and sustainability *efficiency*.

Overall, the study found that a number of countries provide and are able to sustain an adequate retirement commitment to their citizens. Many European countries, however, are likely to find sustainability an increasingly difficult challenge within their current economic frameworks. They include Austria and Hungary, which provide very generous pension benefits, and Italy and Greece, whose heavy debt loads will make it difficult for them to meet their long-term pension commitments.

In the case of Korea and India, the ease with which they sustain their pension systems is driven primarily by their meager pension commitments to citizens. Other countries rating similarly low on the pension adequacy scale are Mexico and China.

Several countries excel in their ability to both provide adequate pensions and finance them efficiently. They include the Netherlands, Switzerland, the UK and Sweden. Surprisingly, the US and Australia provide only modest pensions despite their considerable private retirement assets; this is due to their meager public pension commitments.

Table 1. Top and bottom scoring countries on sustainability and adequacy

	Sustainability Index		Adequacy Index	
	Country	**Score**	**Country**	**Score**
Top five	Korea	82	Luxembourg	97
	Australia	75	Russia	83
	India	74	Hungary	74
	Indonesia	72	Netherlands	74
	China	70	Austria	67
Bottom five	Italy	12	Germany	30
	Austria	11	China	22
	Greece	10	Mexico	20
	Hungary	9	Korea	4
	Belgium	9	India	2

Because Brazil is such an outlier, it is not included in the basic index; as a result, its results fall outside the basic 0-100 scale used for the other countries. Brazil scores 148 on adequacy and -46 on sustainability.

What Can Be Done?

Countries face a difficult balancing act in calibrating the sustainability and adequacy of their pension programs. Rather than merely trading off one for the other, they need to find ways to improve *both* if they are to optimize the efficiency of their retirement systems. Because of the varying dynamics of each system, there is no blanket prescription for achieving this level. Following, however, is a menu of potential solutions that countries could choose among, depending on their areas of greatest need:

Improving Sustainability

- *Raise the retirement age* to control spending on overgenerous pension systems. Relatively small increases can have a disproportionately large impact on sustainability.
- Introduce a *longevity coefficient* into the pension benefit calculations to limit the growth of pension expenditures (as life expectancy increases, the longevity coefficient reduces the member's monthly pension).
- Use *lifetime rather than final earnings* for benefit calculations to align payouts more closely with contributions the employee has made to the plan.
- *Incentivize people to retire later*. For example, Sweden allows employees to choose their own retirement age with no upper limit and adjusts the pension payment accordingly.

Improving Adequacy

- *Expand the scope of the public pension program* by increasing the share of population covered and/or the level of benefits to ensure sufficient income at retirement.
- Oblige people to provide for their retirement by *introducing compulsory or default enrollment* in a pension scheme with an adequate contribution rate.
- Ensure all employees *easy access to pension schemes that they can carry with them* as they change employers. The UK has introduced the National Employee Savings Trust (NEST), which gives employees who lack access to an employer-sponsored scheme a low-cost, portable retirement savings account with automatic enrollment.

Improving Efficiency

- *Ensure that both pension plan sponsor and beneficiaries share the pension risk* by considering new design approaches such as *notional defined contribution* (NDC) for pay-as-you-go schemes and *collective defined contribution* (CDC) plans for pre-funded plans. Under the NDC blueprint, contributions are recorded in notional accounts, to which a rate of return (typically GDP growth) is applied. CDC plans pool contributions into a collective, centrally administered investment fund rather than individual accounts.
- A*dvance fund of at least some of the pension spending*. Unlike typical pay-as-you-go plans, prefunded plans are funded concurrently with the employee's accrued

benefits so that monies are set aside well before retirement. Our study found that countries which have achieved the best balance of sustainability and adequacy have a combination of medium-level pay-as-you-go (PAYG) public provision (7-10% GDP) and varying levels of advance funding in an employment-related scheme.

- *Maximize returns on pension assets within the parameters of an appropriate level of risk*. For pension schemes where funds are managed collectively (such as in US State plans and the Netherlands) by professional managers, the key question is whether the funds are being invested in a way that will produce optimal returns for the desired level of risk. For schemes where employees have discretion over the investments, the default option should be an appropriate target date fund.
- *Control costs* as a way of maximizing net returns on pension assets. Plans like the U.S. Federal Retirement Trust's defined contribution (DC) program offer multiple low-fee, indexed investment opportunities to reduce costs.

Despite the many complexities and pitfalls of pension plan design, it's interesting to note that many of the countries that succeed in striking a good balance between adequacy and sustainability have undergone extensive pension reform relatively recently. The Netherlands, with the highest level of prefunded assets, is the forerunner in CDC design. Sweden and Denmark have introduced NDC and CDC schemes, the UK and Poland have redesigned and expanded their DC occupational pension systems. These countries have designed or re-tooled pension systems to reflect their current demographic profile, while incorporating best practices from other systems globally. They should serve as a beacon of encouragement for governments everywhere faced with inadequate pension programs in desperate need of change.

1. Introduction

In Brazil, military daughters can keep receiving their fathers' pensions even after he has died.[1][2] It is then hardly surprising that Brazil's extraordinarily generous public pension system is contributing to higher inflation, stretched public finances and lower growth potential. At the other extreme, in South Korea, only one third of people of retirement age

[1] http://www.ft.com/intl/cms/s/0/f4d72f5c-67b2-11e1-b4a1-00144feabdc0.html?siteedition=intl#axzz3GgPsQRhY
[2] FT 5.1.2015 "Brazil tries to fix nation's "sugar daddy" problem"

have pensions, and children are no longer keeping to the tradition of providing for their parents. Faced with the prospect of old age in poverty and humiliation, the suicide rate among elderly people in South Korea has tripled since 2000, making it one of the highest in the world.[3]

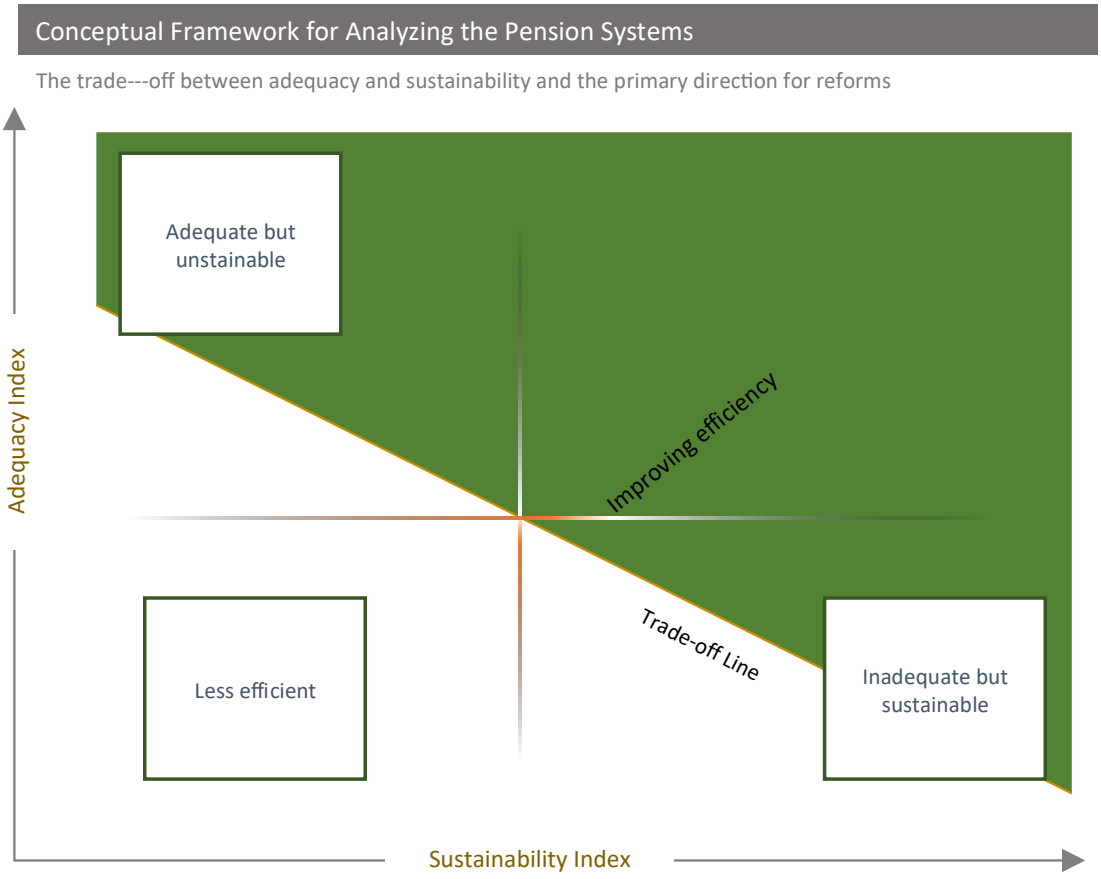
Brazil and Korea may be polar extremes in their approach to retirement planning, but they do have one thing in common. In both countries, the number of over 65-year-olds is expected rise by 300% by 2050, making the current system of pensions provision increasingly unfeasible. Both countries have recently introduced some reforms to address their problems, but much remains to be done.

In this report, we use two fundamental metrics to evaluate the pension systems of different countries: *sustainability* (the burden that projected spending under a pension system places on public finances; high sustainability implies a low burden) and *adequacy* (the ability of a pension system to ensure beneficiaries an adequate level of retirement income, defined here as 60% of the average wage for all over 65-year-olds). To return to our previous examples, the Brazilian system offers high adequacy and low sustainability, whereas Korea has low adequacy and high sustainability.

What we find is that building a strong retirement system requires focusing on both adequacy and sustainability simultaneously. Countries need to find a sound balance between the two metrics to create a pension system that provides adequate retirement income at an affordable cost to public finances. We call the balance between adequacy and sustainability *efficiency*. The trade-off line (Graphs 1 & 2) illustrates the inverse relationship between sustainability and adequacy that we observe in the countries in our study.

Graph 1. Conceptual Framework for Analyzing Pension Systems

[3] http://www.theguardian.com/world/2014/jan/24/south-korea-elderly-older-poverty



Countries in the upper left corner (like Brazil, Austria and Hungary) need to focus primarily on improving sustainability and those in the lower right corner (like China, India and Korea) on improving adequacy. Rather than simply trading adequacy for sustainability, however, countries should also aspire to make their systems more efficient, moving closer to the upper right-hand quadrant.[4] In this report, we identify reforms that countries can use to improve all three dimensions.

[4] This does not imply that all countries should aim for maximum sustainability and adequacy; the optimal spot for each country will be different, depending on other institutional arrangements such as provision of healthcare and the structure of home ownership.

Graph 2. Adequacy vs. Sustainability: The Tricky Trade-off

Using the sustainability/adequacy framework, we divided the pension schemes of countries into four categories:

Efficient

Led by the Netherlands, these countries promise and provide decent pensions to employees and have established a sustainable system to meet those obligations over time. Other countries within this category include Switzerland, the U.K., Denmark, Sweden, Poland, Estonia and the Czech and Slovak Republics. Interestingly, some of the former Eastern bloc countries are part of this group because they have a short retirement duration (15 to 20 years) due to early mortality.

Less Efficient

Germany and Spain are examples of countries that, due to the combination of unfavorable demographics and lack of advance funding, fail to provide sufficient pensions yet still face a sustainability problem. In fact, Germany, the cornerstone of the European Union, offers one of the lowest levels of adequacy of all the countries in this study![5] Germany offers sustainability similar to Denmark, but pensions that are much less generous, or adequacy similar to Australia, but with a far greater burden on public finances. Other countries in this group include Finland, Canada, Ireland and Japan. In the case of Japan, it's worth noting that aging demographics here are somewhat offset by a relatively high retirement age: 69.

Overgenerous

France and Belgium typify countries that not only have made generous public pension promises (defined as public spending in excess of that required to give all over 65-year-olds a pension equivalent to 60% of the average wage) but have made little advance provision for retirement funding, placing a high future burden on government finances. This category also includes Italy, Greece, Austria, Hungary, Russia, Luxembourg, Brazil and Slovenia. Brazil is the absolute outlier in the group, based on extreme generosity and low sustainability.

Inadequate

Countries in this bucket have public pension programs that put only a limited strain on public finances but provide benefits insufficient to meet the needs of retirees (defined as a pension equivalent to 60% of the employee's average wage for all over 65-year-olds). Members of this group include China, Mexico, India, Korea, Indonesia and, to a lesser extent, the U.S. and Australia. The US and Australia rank surprisingly low on adequacy despite their considerable private retirement assets. This is because their public pensions are far less generous than in countries such as Switzerland or the Netherlands. In fact, Australia has the lowest spending on public pensions (as a share of GDP) out of all the developed countries in our study!

[5] The OECD data that we have used as the basis for these calculations puts German private pension assets at 5% of GDP; Towers Watson calculates that private pension assets are worth 14% of GDP. Our calculations may slightly understate the level of private pension assets in Germany but this does not change our general conclusions; using the Towers Watson data, Germany would still belong to the "less efficient" category with an adequacy score lower than Spain or Japan.

Where to set the boundaries of the four groups is something of a judgment call. Finland, Ireland and Canada are all at the intersection of several categories. Unlike the other countries in the overgenerous category, Finland and Ireland have substantial prefunded pension assets. Due to the low retirement age (Finland) or the rapidly deteriorating support ratio (Ireland) they do not quite make it into the efficient category. Canada falls between the best "inadequate" and "efficient" countries in terms of public spending, but has lower private assets than either group. In the end we have included all three in the "inefficient" category, but relatively small changes could put them in a different category.

2. How much can we bear? Making pensions sustainable

In order to compare the sustainability of global pension schemes, we calculate the burden that the current pension system places on public finances.[6] We call this sustainability; by our definition, a scheme has high sustainability if it will require a low level of public expenditure in the future to provide the promised pension benefits.

Pension schemes can be financed on a fully funded basis, where monies are set aside in advance and invested to pay for future pensions, or on a pay-as-you-go (PAYG) basis, where current payroll taxes pay for current pension payments. Schemes can also be funded on a hybrid basis, through a mixture of partial advance funding and PAYG. The public expenditure on pensions that we use to calculate our sustainability measure can therefore be in the form of spending on benefits for PAYG schemes or annual contributions to pre-funded public schemes or a combination of the two. Our sustainability measure therefore differs from the funding status of a pre-funded scheme, although an underfunded public scheme does place a higher future burden on public finances than a fully funded one if the obligations are to be honored.[7]

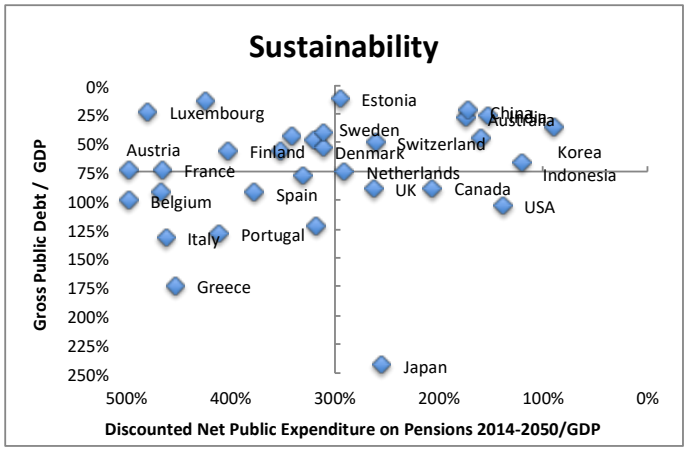
To calculate the sustainability of the pension schemes, we first compute the net level of public spending implicit in current pension arrangements. For this, we use discounted OECD projections of public spending on pensions. From these we subtract all the existing

[6] See Appendix 1 for a more detailed discussion of previous research on pension obligations and public finances

[7] For example, using our definition, a completely private, 100% defined contribution pension system with no state pension entitlement would be receive a high sustainability score, because each retiree would only be entitled to the funds that he himself had saved. At the other extreme, a completely public, 100% PAYG financed, final salary based, defined benefits scheme in a country with aging demographics is likely to place a heavy burden on public finances and receive a low sustainability score.

assets allocated to future pension expenditures to obtain the net public pensions obligation (see Appendix 2 for details on calculation methodology).

Graph 3: Gross Public Debt and Net Public Expenditure on Pensions



Source: OECD, IMF, author calculations. Axes cross at average level of country group.
Brazil would score 66% on gross public debt/GDP and 841% on net public expenditure; as it is such an outlier we have not included it in the graph

To complete our analysis of the sustainability of the pensions provision, we add the level of gross public debt/ GDP as reported by the IMF to the net pensions obligation (Graph 3). A country with high public debt, such as Japan or Italy, has less ability to take on debt to fulfill pension obligations, whereas a country like Estonia with very low debt plausibly could honor its obligations by increasing its debt level. We weight the net pensions obligation twice as heavily as the level of gross debt in reflection of the fact that public debt applies to many other public spending priorities in addition to pensions. We then combine the two outcomes and index them on a scale of 0 – 100 so that a higher sustainability score corresponds with lower debt and pension obligations (see Appendix 3 for more detailed calculations).[8]

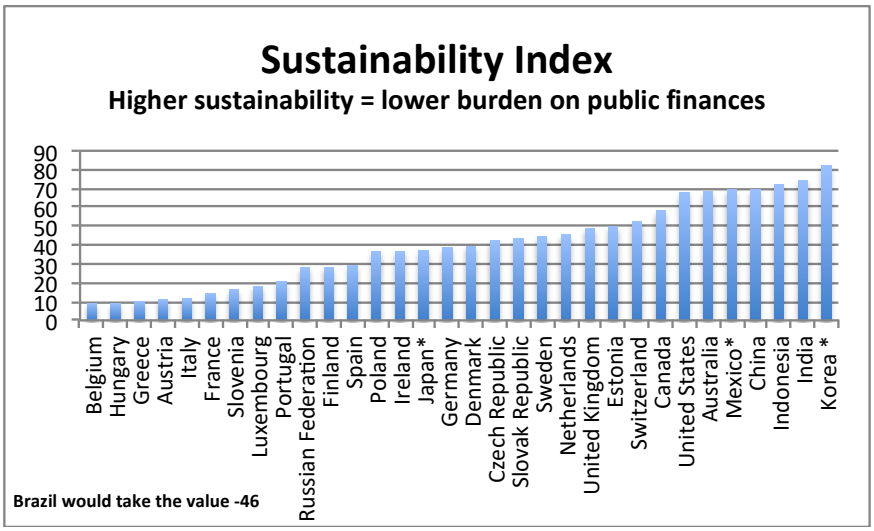
Countries with low initial debt levels and high spending needs, such as Luxembourg, may be able to take on more government debt to pay for pensions. However, countries with high debt levels and high spending needs, such as Greece, Hungary or Belgium, will not have this

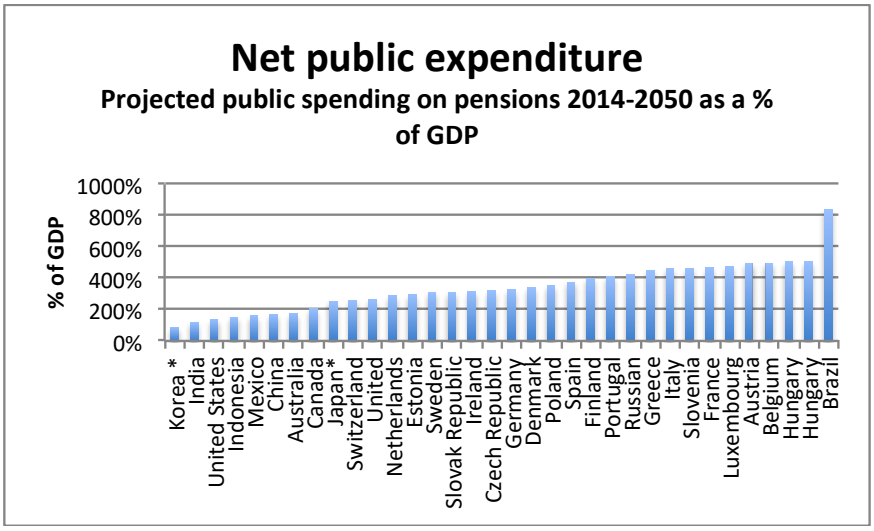
[8] See Appendix 3. For example, Canada has discounted net spending of 207% and gross public debt of 89%. To obtain the raw sustainability score for Canada, we would calculate 2/3*207+1/3*89= 167. When we have performed the same calculation for all the countries, we index them on a scale of 0 – 100 so that a higher sustainability score corresponds with lower debt and pension obligations (for example, France with a raw score of 343 would have a lower indexed sustainability score).

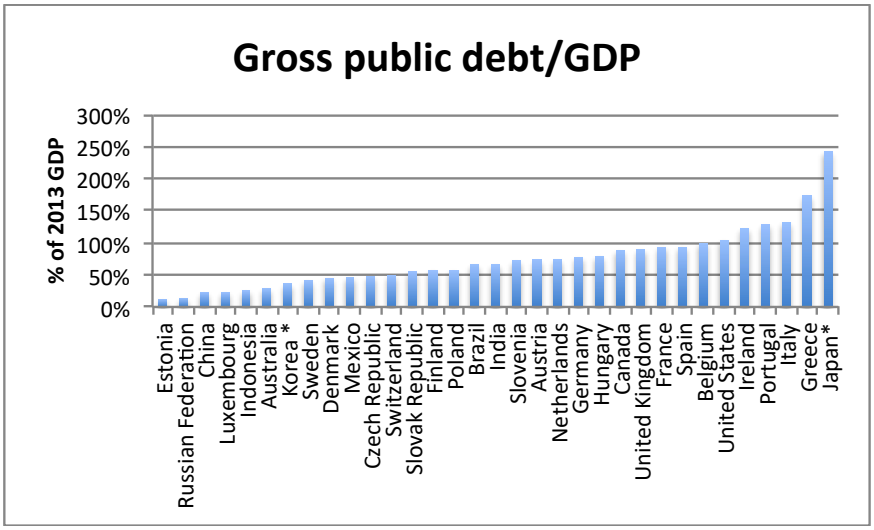
choice. These countries are likely to find their already stretched government finances come under pressure in the future.

Countries like China or Korea appear to have low public spending on pensions and low government debt. However, the pension schemes in these countries provide a very low level of replacement income. As population aging advances, policymakers will not be able to ignore an increasing share of senior citizens without sufficient retirement income. Making inadequate provision for retirement is also a risk to public finances in the longer run.

Graphs 4-6: Sustainability







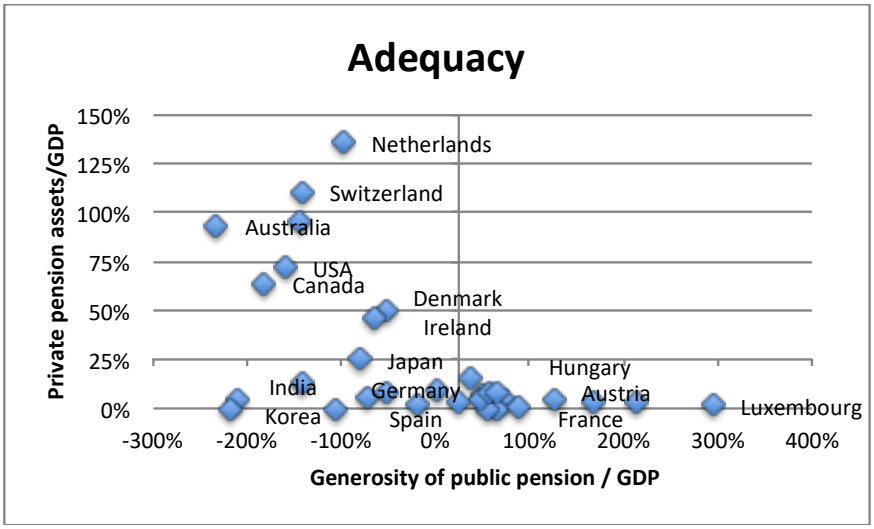
Source: OECD, IMF, UN population projections, author calculations

3. How Much is Enough – The Adequacy of Global Pension Schemes

A second question is the adequacy of pensions in different countries. Adequacy is a measure of how well current pension arrangements are likely to cover the income needs of current and future pensioners. This section, therefore, concentrates on whether current pension schemes are likely to provide future retirees with enough income.

Pensions can be provided by either the public sector, the private sector or a combination of the two. We therefore need to incorporate both public and private provision into our calculations. We can clearly see the division between European countries, which rely predominantly on public pensions provision and have little or no private pension assets, and Anglo-Saxon or Asian countries, which have considerably less generous public provision and far higher reliance on private pensions provision (graph 7).

Graph 7. Generosity of Public Pension Schemes and Private Pension Assets



Generosity = the difference between projected public spending on pensions under the current scheme and the amount needed to provide all over 65-year-olds with a pension worth 60% of the average wage. Expressed as a percentage of GDP.
Source: OECD, national sources, UN population projections, author calculations
Brazil is not shown on the chart as it is such an outlier: it scores 639% on public pension generosity and 3% on private assets

To study the adequacy of pensions provision in each country, we first calculate the generosity of public pension provision. By generosity, we mean the difference between the discounted public spending on pensions from 2014-50, based on OECD projections, and the amount that would be required to provide everybody over 65 with a pension worth 60% of the average income. Both these amounts are calculated as a share of GDP. A positive

generosity score means that the public spending on pensions will be higher than the amount needed to provide a 60% replacement rate to all over 65-year-olds, whereas a negative generosity score means that public spending will not be sufficient to provide this replacement rate.

We calculate the weighted average of the level of private pension savings and the public pension generosity score to obtain an overall indicator of the adequacy of pensions provision in each country. [9] We then convert this into an adequacy index on a scale of 0-100, so that a higher level of generosity and private assets corresponds with a higher adequacy score (see Appendices 4 and 5 for a more detailed description of the calculation methodology).[10]

With the exception of the Netherlands and Switzerland, the countries with the highest level of adequacy are European countries that have generous public pensions provision and little or no private pension funds (graphs 8-10). At the other end of the spectrum, the lowest scoring countries are mainly developing countries. These countries have meager public pensions provision and very little in the way of private pension savings.

Our measure of adequacy does not directly capture how equally pension savings are distributed among the population. Inequality is likely to be more of an issue in countries with high reliance on private pension assets rather than public pensions. Countries with mandatory occupational systems, such as Australia or the Netherlands, are likely to have a higher level of equality than countries such as the US, where employers are not obliged to offer workers an occupational pension scheme. As a working assumption, we presume that the distribution of pensions wealth is comparable to the overall level of income inequality in the countries in our survey.

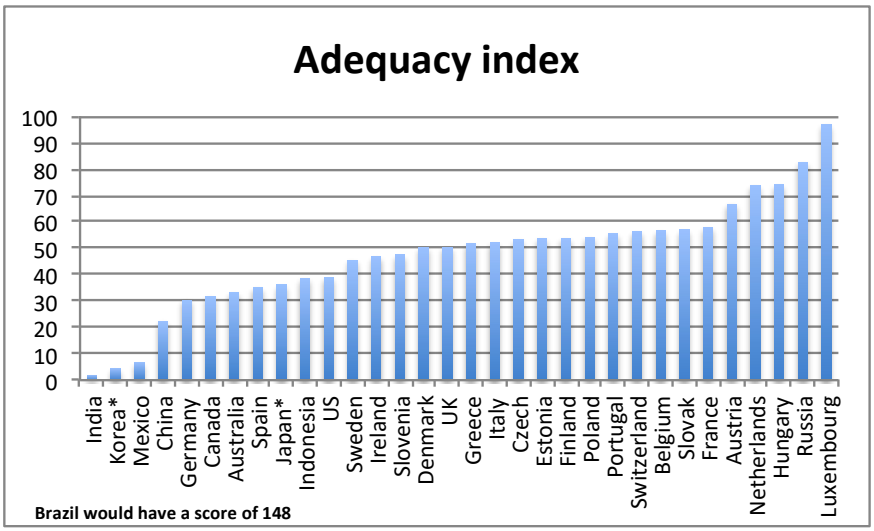
[9] We give a 1/3 weight to the generosity of the public pension and a 2/3 weight to private assets. The rationale for overweighting prefunded private assets is firstly, to compensate for the fact that we have used a uniform discount rate for all the countries, regardless of funding status and secondly, the private assets already exist whereas public promises are subject to a higher level of uncertainty. See Appendix 4 for more details on the calculation methodology.

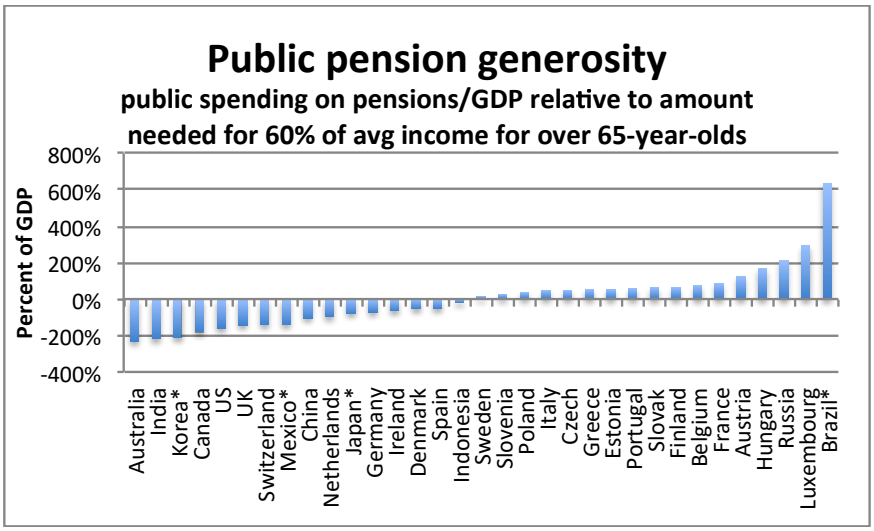
[10] For example, in Ireland, projected public spending on pensions is 326% of GDP, compared with our required estimate of 395%, making the generosity of the Irish public pension -65%. We use this and the private pension assets, worth 46% of GDP, to obtain a raw adequacy index of 9% (-65%/3+2*46%/3=9%). We perform this same calculation for all the countries in our sample then index them on a scale of 0-100, so that a higher level of generosity and private assets corresponds with a higher adequacy score. See Appendix 5 for more details.

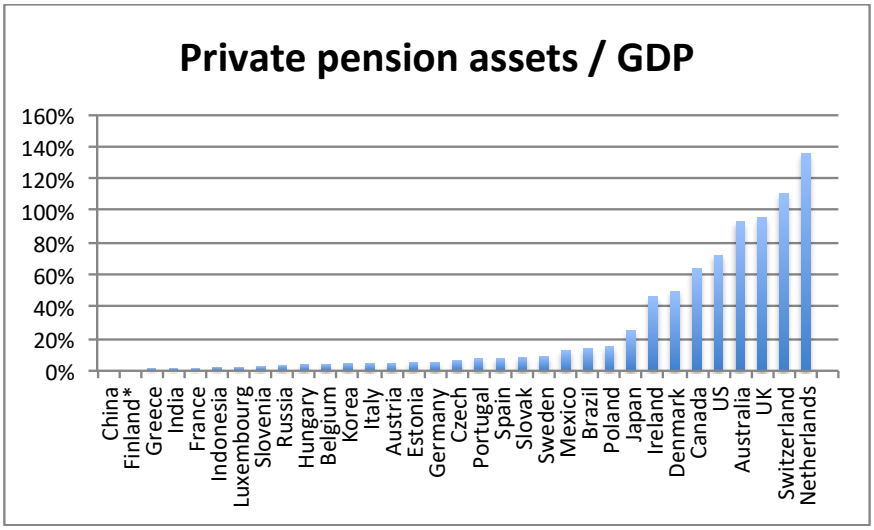
It is interesting to note that Australia, with private pension assets of about 100% of GDP and which is ranked one of the best pension systems in Mercer's global survey, receives one of the lowest adequacy scores in our calculations.[11] A key reason for this outcome is the fact that, at 3.6% of GDP, public spending on pensions in Australia is the lowest of all the developed countries in our study. By way of comparison, public spending on pensions is 4.8% of GDP in the USA, 6.6% in Switzerland and 6.8% in the Netherlands.[12] The high level of private assets in the Swiss (110% GDP) and Dutch (135% GDP) private occupational systems therefore complements a far more generous basic public pension, leading to much higher overall retirement income than in Australia. This illustrates that merely comparing the level of private pension assets of each country does not give us complete picture of the adequacy of pensions provision; we need to look at the system as a whole.

[11] Melbourne Mercer Global Pension Index, October 2013
[12] OECD Pensions at a Glance 2013, Table 6.7

Graphs 8-10. Adequacy of current pension schemes







Source: OECD Pensions at a Glance 2013, national sources, UN population projections, author calculations
* For Finland, we have reclassified the assets as public assets, as they are fully integrated into the public scheme.

Case 1. China: From "Take-as-You-Go" to Advance Funding?

On basis of our calculations, China appears to have very low government obligations related to pensions. However, rather than indicating a well-funded system, this is simply the sign of an inadequate system that is still in the early stages of development. The Chinese system suffers from insufficient coverage, lack of advance funding, low returns on the funds that do exist and insufficient separation of assets.

The idea of contributory pensions in China is relatively recent. Until 1997, employees of State-owned enterprises (SOEs) were not required to make contributions in order to receive a pension, and this is currently still the case for civil servants. The scheme for urban employees (UEPS) was established in 1997 and the scheme for rural employees was established in 2011. The UEPS is designed to be a hybrid scheme, where the employer contribution of 20% is used on a PAYG basis to fund current pension payments and the employee contribution of 8% is deposited into an individual account. However, due to the lack of advance funding, the employer contributions are not sufficient to fund current benefits. This has led to the local governments "borrowing" funds from the individual accounts. Therefore, the scheme is basically operating as an unfunded PAYG scheme, and the empty accounts are naturally eroding workers' trust in the whole pension system. Furthermore, civil servants enjoy very generous pension benefits without making any payroll contributions – essentially a "take-as-you-go" scheme that further erodes trust in the contributory system.[13]

Apart from the fact that the funds are not being accumulated as intended, the returns on Chinese retirement savings are too low to provide significant capital appreciation. Chinese capital markets are relatively underdeveloped and households are currently limited to investing most of their savings in government bonds or deposits yielding very low interest rates. Not only is it crucial to start accumulating funds to pay for future pensions, allowing the funds to be invested with a return-seeking mandate to enable capital appreciation is also a top priority.

The Chinese support ratio will deteriorate rapidly from its current strong level as the population ages. The current system is clearly unsustainable. In addition to establishing a clear separation of pension assets and seeking reasonable returns on them, reforms will also need to focus on raising the retirement age and limiting the excessively generous civil service pensions. Putting the system on a sustainable footing may require the government to recapitalize the current system and take on debt; fortunately China has a low debt/ GDP ratio which gives it some flexibility.

[13] Pozen, Robert C., 2013, "Tackling the Chinese Pension System", Paulson Policy Memorandum July 2013

Case 2. Sweden – Notional Accounts to reform a PAYG scheme

Notional accounts, or notional defined contribution, are an interesting approach for bringing a predominantly PAYG financed DB first and/or second pillar scheme onto a sustainable basis. The accounts are called "notional" because unlike in e.g. a US 401k scheme, the beneficiary does not have an actual investment account containing assets that are the property of the beneficiary. Rather, the notional account is a record of the contributions that the beneficiary has made to the system. A rate of return, usually based on GDP growth, is applied to these contributions. At the time of retirement this account balance is then annuitized, using longevity and other transformation coefficients, to provide the retirement income stream. Compared to a tradition DB scheme this shifts more risk to the beneficiary, while still providing a reasonable level of income security.

Sweden introduced notional accounts in 1994 to replace its PAYG defined benefit system. It used historical records to create notional accounts dating back to 1960. For people born between 1938 and 1953 there was a gradual transition into the new system, with benefits calculated on a mixed basis; people born after 1954 are entirely covered by the new system.[14]

Linking the payouts of the notional accounts to a measure of GDP growth introduces an automatic adjustment mechanism into a PAYG pension system that limits the upward pressure on public spending resulting from pension payments. E.g. in Sweden, public spending on pensions as a share of GDP is forecast to rise by only 0.6 percentage points from 9.7 to a peak of 10.2 % between 2015 and 2050, compared to the OECD average increase from of 2.2% from 9.5 to 11.7%.[15]

An interesting feature of the Swedish system is that it combines PAYG notional accounts for the first pillar with advance-funded private DC accounts for the second pillar. Of the 18.5 total percent pension contribution, 16% goes to the PAYG NDC system and 2.5% to the mandatory funded component. The returns on funded part of the pension contribution depend on market returns; the beneficiary is allowed to choose which private sector fund to invest the contributions in.[16] This may improve adequacy, as over the long run the expected return on asset markets should be higher than GDP growth.

Another interesting feature of the Swedish system is that there is no maximum retirement age, and there is a wide range of flexible options for older workers to gradually exit the labor force. Workers can freely combine full or part-time work with full or part-time annuities from the public system from the minimum pension age of 61. At 66, the effective retirement age in Sweden is one of the highest in our group of countries.

[14] Palmer, Edward, "The Swedish Pension Reform Model: Framework and Issues"
[15] OECD Projection of Public Expenditure on Pensions 2010-2060, chart 6.7
[16] Palmer, Edward " The Swedish Pension Reform Model; Framework and Issues" OECD

Case 3. The Netherlands –Advance Funding and Risk Sharing

The pension system in the Netherlands is built on the combination of a universal flat-rate pension and quasi-mandatory occupational pensions covering 95% of the working population. The universal pension is a typical PAYG system. The occupational pension system, on the other hand, is a fully funded collective defined contribution (CDC) plan.

Both employers and employees contribute to the occupational pension funds. The size of the relative contribution varies widely by industry and company. The funds are clearly separated from company assets and are subject to external oversight. About 90 percent of occupational pension schemes are still classified as defined benefit, but employers have shifted more risk to employees by linking payments to career average rather than final pay and through the choice of indexing method. The schemes also contain an important element of collectivism and solidarity. There are no individual accounts, and there is no direct link between the earnings accrued in any particular year and future benefits. The replacement rate is somewhat higher for low-earners than high earners, and the effects of market downturns have least effect on the beneficiaries who are closest to retirement. The requirement to cut benefits if the funding ratio falls below the minimum level is also a good mechanism for upholding intergenerational equity.

The occupational plans are subject to stringent advance funding requirements and have to maintain a funding ratio of at least 105 percent of liabilities. If the funding ratio falls below this level, the plans have three years in which to raise the ratio through higher contributions. If after this they are still below the minimum then benefits are cut. Dutch pensions were cut in 2013 due to the fall in funding ratios after the financial crisis.[17]

A key advantage of CDC is that for beneficiaries it provides better investment returns and income security compared to individual DC, yet for employers it is comparable to a DC scheme.[18] Although the beneficiaries bear the investment and longevity risk, as in individual DC, they bear them collectively rather than individually. Longevity risk is diversified across the pool of participants and investment risk is diversified over time. As the investment pool contains individuals in different phases of the life cycle, the collective fund can maintain a higher investment rate over time than an individual scheme, as it does not need to lower the risk level as an individual's investment horizon falls. Combined with lower fees thanks to centralized professional management, this can lead to significantly higher long-run returns. If the funding position of the scheme becomes unsustainable, benefit payments are cut; sponsors do not bear any additional risk after the initial contribution. Denmark has also introduced a CDC scheme for occupational pensions, and the UK is currently preparing legislation to introduce CDC plans within the next couple of years.[19]

[17] Financial Times 5.27.2013 "Yawning deficits force Dutch pension funds to cut payouts" http://on.ft.com/1vGdhzX
[18] Turner, John A. and Nari Rhee, August 2013,"Lessons for Private Sector Retirement Security from Australia, Canada and the Netherlands" National Institute for Retirement Security Issue Brief
[19] Financial Times 6.23.2014, "Q&A: Steve Webb on Pensions" http://on.ft.com/1rptOlz

Case 4. UK – Opt-out coverage under NEST

The UK NEST (National Employers Savings Trust) is an interesting model for introducing a centralized occupational retirement scheme. The Pensions Act of 2008 established that all employers would be obliged to provide eligible employees with access to a workplace retirement scheme. NEST is a centralized fund management scheme for employers that do not provide their own corporate pension schemes for their employees.[20]

The scheme is being phased in gradually, with smaller companies being given more time to prepare. By 2018, employers of all sizes will have to automatically enroll all eligible employees in a workplace retirement scheme with a minimum total contribution rate of 8%. Of this amount, employers will have to pay a minimum contribution of 3%. Most employees over 22 years of age and earning over 10,000 GBP per year will be eligible for automatic enrollment.

NEST cleverly utilizes behavioral insights to "nudge" employees into the desired outcome while preserving freedom of choice. Although employers will be obliged to automatically enroll employees, they will have the ability to opt out of the scheme if they do so within one month of being enrolled. Employee contributions are automatically deposited into appropriate retirement date funds, but employees retain the freedom to choose from a selection of other funds if they wish. A key feature of NEST is that costs are kept low in order to maximize returns. NEST levies a one-off charge of 1.8 percent on initial contributions and a 0.3 percent annual management fee on assets.

Initially employees were obliged to use at least three-quarters of the accumulated savings to purchase an annuity. Beneficiaries with serious health conditions were relieved of the obligation to purchase an annuity. From April 2015 the annuitization requirements will be relaxed, and employees over the age of 55 will have more freedom in how to take their money out.[21]

NEST is essentially a centralized defined contribution scheme. Through automatic enrollment, low cost professional asset management and forced annuitization, it is an efficient model for providing retirement security. However, employees currently bear investment risk individually. The UK is currently studying plans to introduce Dutch style collective defined contribution schemes, possibly as early as 2016.[22] By pooling investment and longevity risk, collective pensions could improve investment returns and provide even better retirement security than under the current NEST model as they would be able to maintain a higher investment rate than a purely individual scheme.

[20] http://www.nestpensions.org.uk/schemeweb/NestWeb/public/whatIsNEST/contents/pension-reform.html
[21] https://www.nestpensions.org.uk/schemeweb/NestWeb/public/members/contents/retirement.html
[22] http://www.ft.com/intl/cms/s/0/e5c29ee8-ea37-11e3-afb3-00144feabdc0.html?siteedition=intl#axzz3DlAES1J6, FT 6/6/2014, "What are proposed collective pension plans?"

Case 5. The USA: Good Aggregate Numbers Mask Underfunding and Inequality

The pensions system in the US is highly fragmented, comprising government-provided Social Security, corporate or state sponsored DB pension plans and 401(k) and other DC plans and private savings. The overall level of private pension savings is high, but about 50% of the population does not have access to an employer-sponsored plan, has little in the way of private savings and has to rely on Social Security. The relatively good overall numbers therefore mask a high level of disparity, with low-income earners typically having a very low level of retirement income. Key challenges are putting the existing DB schemes and Social Security on a sustainable footing, increasing private saving (particularly among lower income groups) and improving the efficiency of DC plans.

Unlike the occupational pension funds in the Netherlands, US state DB plans are not subject to stringent externally enforced requirements regarding advance funding and separation of assets. The high level of disparity is also present in state pension plans; while many state plans are reasonably well funded, some are virtually insolvent.[23] While corporate pension funds are subject to more stringent funding requirements, the average funding ratio for these is 76%, i.e. they are also less than fully funded.[24] Introducing strictly enforced funding requirements combined with a sustainability provision, like in the Netherlands, would put defined benefit state pension plans on a more sustainable basis.

Corporations have increasingly been moving away from DB plans to offering employees DC plans, typically through 401(k) matching. Households unambiguously own the assets in 401(k) and other private savings. However, due to the highly individualized, voluntary basis of these savings, households carry all the investment and longevity risk and there is no collective risk sharing or pooling across households. US households have relatively low levels of household assets and retirement savings.[25] It is also questionable whether households have the financial literacy to make optimal investment decisions in a cost-efficient way.

Social Security's expenditures currently exceed its revenues and it has been drawing its trust fund down since 2010. At the current rate, without reform the trust fund will be depleted in 2033.[26] Benefits are earnings-related, but capped at a fairly low level. While the US enjoys favorable demographics relative to other advanced economies, Social Security is unsustainable on the current basis without an increase in contributions or a cut in benefits. As Social Security is particularly important for lower income households that do not have access to employer-sponsored schemes, it is likely that the solution will be a combination of more means-testing, higher payroll tax contributions and benefit changes.

[23] "The Arc and the Covenants" JP Morgan Eye on the Market Special Publication, 2014
[24] http://www.blackrock.com/corporate/en-ch/literature/whitepaper/corporate-pension-funding-update.pdf
[25] See Appendix 3, also Rhee, Nari, 2013 "The Retirement Savings Crisis: Is it Worse than we Think?" The National Institute for Retirement Security
[26] http://www.ssa.gov/oact/trsum/

4. What can we do? – Solutions

Countries face a difficult balancing act in calibrating the sustainability and adequacy of their pensions provision. Cutting the generosity of pensions provision improves sustainability, but usually at the cost of adequacy. On the other hand, inadequate pensions provision is also a risk for sustainability, as a large share of the population retiring in poverty will probably lead to calls for government assistance. Rather than merely trading off adequacy for sustainability we also need to find ways to improve the efficiency of the pension system, improving both measures at once.

The recipe for each country will of necessity be different, reflecting the divergent existing systems. Our aim here is not to provide a blanket prescription, but rather a menu of potential solutions for countries to choose from. The measures that each country needs to prioritize depends on its primary area of weakness:

1. **Measures to improve sustainability**. These are the primary focus for the countries in the "overgenerous" group. A top priority is to raise the retirement age and calibrate pensions to better reflect the increase in life expectancy to bring the system onto a more sustainable basis and also improve intergenerational equity. People who retire early must expect to receive a substantially lower pension than those who retire later.

2. **Measures to improve efficiency.** These are of particular interest for countries in the less efficient group, although all countries can benefit from these measures. Countries should make sure there is a link between pension payouts and scheme sustainability and both retirees and scheme sponsors should share in the risks of pension provision. It is also important to make sure the scheme is cost efficient, making optimal use of prefunded assets and pension contributions.

3. **Measures to improve adequacy**. These are of particular interest to countries in the "inadequate" group. For these countries, increasing pensions coverage and contributions are key steps for improving adequacy. The best way to do this is to ensure that the entire population has access to an occupational pension scheme

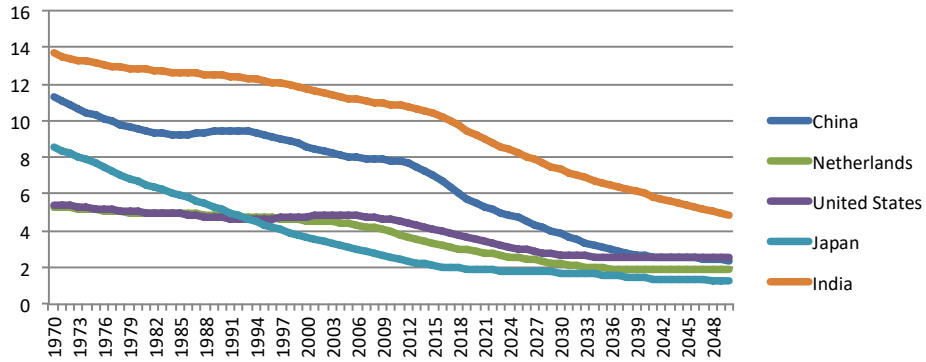
with a contribution rate that is high enough to provide sufficient retirement income, preferably with mandatory enrollment.

4.1 Improving sustainability: if you live longer, you need to work longer

A key reason that pension systems are under so much strain is that Government pension schemes in most western countries were initially introduced on a predominantly pay-as-you-go (PAYG) basis. In a pure PAYG scheme, current payroll taxes pay for current pension payments. If the share of the population receiving pensions remains stable, this is a perfectly reasonable way to pay for pensions. It is also just about the only way to initiate pensions provision on a short time horizon. In funded schemes, retirees save and invest money in advance, then draw their savings down during retirement. However, obliging everybody to save for their pension in advance would mean that it would take decades before anybody was able to receive a pension. This is why most "old" pension schemes are at least partly funded on a PAYG basis, although many of these schemes also have some level of advance funding.

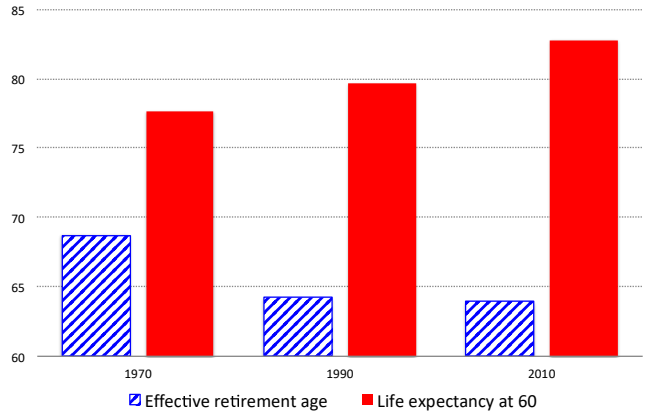
However, the logic of PAYG breaks down severely when the demographic profile changes. The "baby boom" generation is far larger than subsequent generations, and this means that the share of the population in retirement is steadily increasing. Combined with increases in life expectancy, this implies that the old-age support ratio (i.e. the ratio of working age population relative to the population over 65) has declined precipitously (graph 11). Put in plain English, this means that there are fewer people to pay for the pensions and more people receiving them. Furthermore, at the same time as life expectancy has risen, the retirement age has fallen and the time spent in retirement has increased (graph 12).

Graph 11. Old-age Support Ratios Declining all over the World



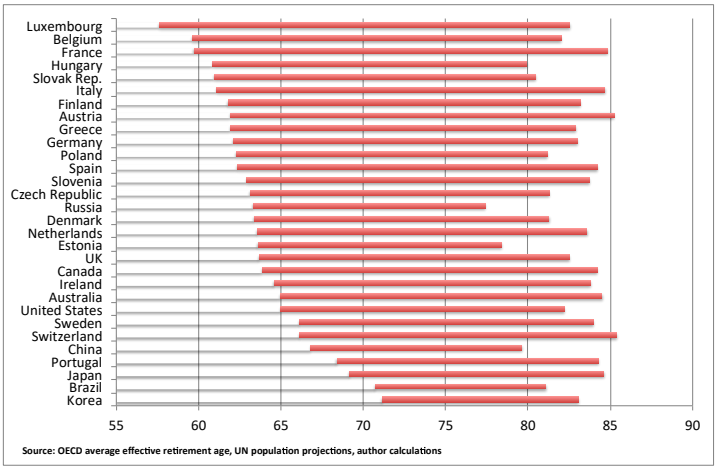
Source: OECD Pensions at a Glance 2013

Graph 12. Effective Retirement Age and Life Expectancy 1970 - 2010



Source: OECD data on effective retirement age, UN population projections, author calculations

Graph 13. Expected years in retirement and effective retirement age



Source: OECD average effective retirement age, UN population projections, author calculations

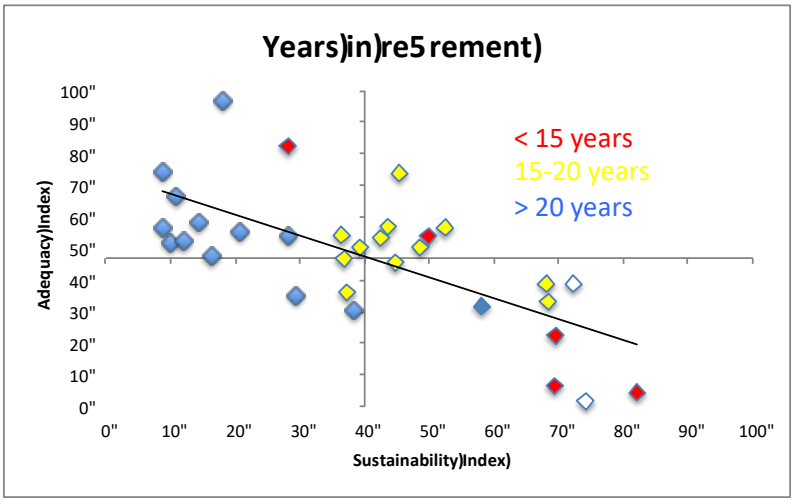
The problem is further compounded by the fact that many pension schemes are "defined benefit" (DB), meaning that the pension payout is fixed and depends on the employee's contribution history, with little or no link to the sustainability of scheme finances. The math is simple, the conclusions are inescapable. If pension payouts are fixed and the number of retirees is increasing, this means that the working population will have to pay ever higher amounts to provide the pensions. At some point, the burden on the working population will become intolerable and pensions will be cut. In most OECD countries, the pensions burden is forecast to peak between 2030 - 2040. Without reform, younger generations will have paid for the excessively generous pensions of previous generations, yet receive only meager payouts themselves.

Early retirement is a particularly large problem in many European countries (Graph 13). For example France has one of the lowest retirement ages and the highest life expectancies, leading to an expected retirement period of 25 years. We can see from graph 14 that the countries that in the countries in our "efficient" group, the average duration of retirement is a maximum of 20 years. In contrast, the countries in the "overgenerous" group (with the exception of Russia) all have retirement spans of over 20 years.[27] For the countries in this group, the obvious conclusion is that they should raise the retirement age in order to improve the sustainability of the pension system.

The good news is, that raising the retirement age is an extremely powerful tool for improving the sustainability of pension scheme finances and relatively small increases have a very large effect on the sustainability. We have calculated the impact on gross pensions expenditure of raising the retirement age by 5 years for some of the countries in our survey.[28] For all the countries in this sample, the reduction is around 100% of GDP, or in other words, very significant. Raising the retirement age in keeping with the increase in life expectancy appears to be a very obvious solution to the retirement crisis.

[27] (Estonia and Russia are the exceptions in each group: due to low life expectancy, the average span of retirement both is about 14 years).
[28] See Appendix 6

Graph 14: Years in retirement in different country categories



Source: OECD, UN population projections, author calculations
Blank squares: data for Indonesia and India not available

The bad news is, that raising the retirement age is typically highly unpopular, and most reform programs aim for a very gradual increase. Furthermore, in many countries, the effective retirement age is clearly lower than the official retirement age.[29] Radical reforms are usually only enacted in extreme crisis situation, such as e.g. Italy during the Eurozone debt crisis.[30]

While there is a general awareness that the retirement age will have to rise, recent reforms in France and Germany have actually been going in the opposite direction and undoing previous increases to the retirement age.[31][32] In the long run, the retirement age will inevitably rise (the downward trend in retirement age already appears to have turned in most countries). In the next four sections, we discuss some more subtle approaches that policymakers can use in the short run to reform pension benefits so that they better reflect the increase in life expectancy.

[29] OECD Pensions at a Glance 2013 Chart 3.8
[30] WSJ 6.5.2013, "Italy's Reforms are Bearing Fruit", http://online.wsj.com/news/articles/SB10001424127887324063304578525231668975390
[31] FT 4.28.14 "Germany faces a growing band of critics over pension reform"
[32] FT 8.28.13 "France avoids radical overhaul in pension reforms"

4.1.1. Use longevity coefficients to adjust benefits for changes in life expectancy

One way of dealing with the increase in life expectancy is to introduce a longevity coefficient into the pension benefit calculation.[33] This means that the size of the pension payout depends on average life expectancy at the time of retirement. For example, if individuals A and B have the same contribution history, but average life expectancy when A retires is higher than when B retires, using a longevity coefficient will mean that A will receive a lower monthly pension than B. Without the longevity correction, A would have received a higher total pension payout than B because A is expected to receive the monthly pension for a longer period of time. For example, Finland and Italy already use longevity coefficients to calculate pension benefits.

4.1.2 Use lifetime rather than final earnings for benefit calculation

Longevity coefficients alone will not bring pension schemes onto a sustainable basis if the underlying benefit calculation is excessively generous. Traditionally, pension benefits were calculated on the basis of earnings in the last years before retirement. For most individuals, earnings at the end of their working life are considerably higher than at the beginning of their working life, yet pension contributions are made on the basis of lifetime earnings. Calculating the pension benefit on the basis of final income therefore introduces an upward bias into the benefit calculation. An increasing number of countries now calculate benefits on the basis of lifetime earnings rather than final salary earnings. This aligns the benefits more closely with the contributions that the individual has made to the scheme. It also typically results in a lower pension than using final salary.

4.1.3. Use market incentives to encourage people to work longer

Finland and the UK have both experimented with offering a higher pensions accrual rate in an advanced age range, e.g. 63-68, in order to incentivize people to retire later. However, these attempts are currently being scaled back as they have not been particularly successful.[34] One problem is the increasing disparity between white and blue collar-

[33] http://www.etk.fi/en/service/calculation_model/1450/calculation_model
[34] Kangas, Olli, 2014 "Increasing the effective retirement age: the 2017 pension reform" European Commission ESPN Flash Report

workers. For example in the US, the labor force participation rate among workers over 62 with a professional or higher degree is three times that of workers with the lowest level of education; the situation is similar in Europe.[35] The main beneficiaries of the higher accrual rate were the highly educated, who would probably have worked longer anyway, while the impact on the retirement age of unskilled workers, who often hold physically demanding jobs and may justifiably want to retire earlier, was negligible.[36]

An alternative approach is to allow individuals retire whenever they like, but to adjust the value of the subsequent pension to fully reflect the actuarially fair rate for retirement at that age. The rationale for this is that an official retirement age creates a reference point that both employers and employees will begin to target.[37] Furthermore, allowing people to choose their own retirement age may also make the necessary increase more palatable. For example, Sweden, which has one of the highest effective retirement ages in our sample, gives people full flexibility to retire any time after the age of 61 with no upper age limit. Retirees can also choose to initially draw only a partial pension and are not penalized for simultaneously drawing a pension and working. [38]

4.2 Improving efficiency: design pension system to optimize adequacy and sustainability

A key question in pension system design is how to optimize the trade-off between adequacy and sustainability or, in our framework, move up to the right along the "improving efficiency" line. We see two main issues that countries need to address. Firstly, it is important to design the system so that there is a link between benefit payments and the long-term sustainability of the system. This means that both sponsors and beneficiaries need to carry some level of pension risk. Secondly, it is important to design the system to maximize the impact for the funds that are spent on it – in other words, to get good value for money. Here, appropriate investment strategies, low cost structures and efficient regulation are key.

[35] Gary Burtless, Brookings Institution, quoted in Age Invaders – The Economist 4.26.13
[36] Based on a conversation with Bank of Finland Governor Erkki Liikanen
[37] Kahneman, Daniel & Amos Tversky, 2011, " Appendix B: Choices, Values and Frames" in Thinking Fast and Slow
[38] http://www.pensionsmyndigheten.se/DecideForYourselfWhenToRetire_en.html

4.2.1 Burden sharing – link payouts to sustainability

A significant part of the current pensions crisis relates to the way in which the risks of pension financing are shared. In traditional defined benefit schemes, the risks are all borne by the plan sponsor. Cutting current pensions is extremely difficult, if not impossible in most countries. When pension plan finances suffered a blow following the 2000 financial crisis, many plan sponsors (for example, corporate schemes in the US and the UK) closed their defined benefit schemes and switched to defined contribution, where the beneficiary bears all the risk. Swapping a sustainability problem for an adequacy problem does not solve the pensions problem; the interesting question is how to improve both simultaneously and move "further up to the right" in our sustainability and adequacy matrix.

Two extremely interesting approaches for improving both sustainability and adequacy are notional defined contribution (NDC) and collective defined contribution (CDC). A key factor in these is that both the beneficiary and the sponsor share in the risks of the pension scheme. In a NDC scheme, contributions are recorded in notional accounts, to which a rate of return (typically GDP growth) is applied. The balance accrued in the account is then converted into an income stream on retirement (see case 2 for an example of how Sweden uses notional accounts). By relating the contributions to GDP growth, notional accounts prevent the pensions burden from outstripping the economy's capacity to pay for them. NDC is typically used for reforming PAYG financed systems.

A comparable approach for funded systems is CDC. Here the scheme is advance funded, as in traditional DC, but the contributions are pooled into a collective, centrally administered investment fund rather than individual accounts. The beneficiaries bear market and longevity risk collectively rather than individually. As the investment pool contains individuals in different phases of the life cycle, the collective fund can maintain a higher investment rate over time than an individual scheme and thus deliver better returns over the long run. Benefit payments are calculated on the basis of lifetime contributions and annuitized on retirement. However, if the financial status of the scheme subsequently deteriorates, benefits can be cut. CDC is therefore likely to deliver better adequacy than pure DC while still remaining sustainable. For example New Brunswick reformed its state

pension scheme along the lines of the Dutch CDC model.[39] Case 3 describes how the Netherlands uses CDC.

Many of the countries in the "efficient" group have pension schemes where payments depend on scheme sustainability. The Netherlands and Denmark have CDC schemes where payouts can be adjusted if solvency limits are breached. Sweden has a NDC scheme pension benefits depend on GDP growth. Most of the other countries in the group have basic government pensions complemented by occupational DC schemes. By contrast, most of the countries in the "overgenerous" group have DB schemes where the plan sponsor bears all the risk.

4.2.2. Better value for money – get the most out of your spending on pensions

Intuitively, advance funding at least some of pensions spending should be a sensible strategy to minimize the burden on both current and future generations. In a PAYG system, the implicit rate of return is nominal GDP growth.[40] Returns on risky assets should exceed nominal GDP growth, so a prefunded system that invests in risky assets should need lower contributions to produce the same level of benefits in the longer run.

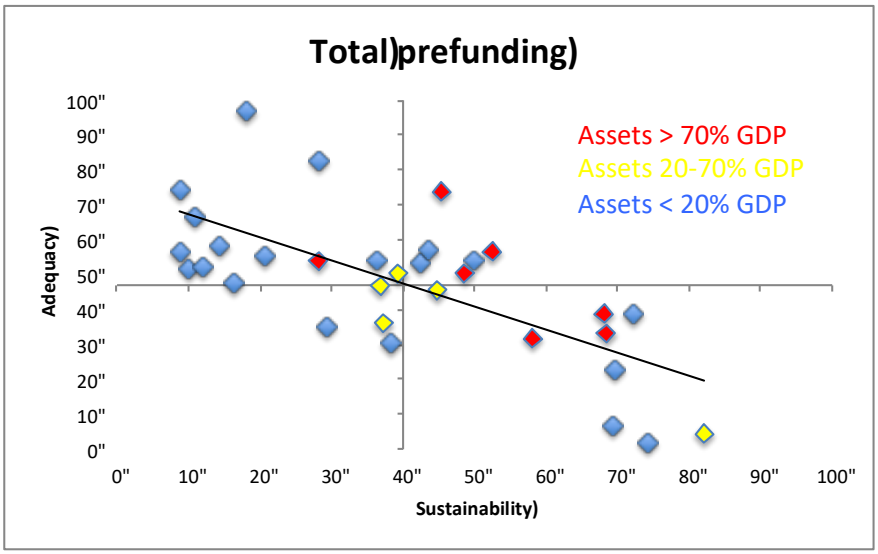
Looking at the total level of prefunding (public and private assets) of the different pension schemes gives some support to this hypothesis. In our calculations, the overgenerous schemes have very low levels of prefunding, whereas most of the "efficient" countries have funding levels of at least 20% or in many cases over 70%.[41]

It is interesting to note that the USA, Australia and Canada (and, to a lesser extent, Korea) have fairly low adequacy scores despite having some of the highest levels of prefunded pension assets. This is because government spending on pensions in all these countries is very low. By way of comparison, the Netherlands and Switzerland have both higher prefunded assets in occupational schemes and higher state pensions. This underscores the

[39] Leech, Jim & Jacquie McNish, 2013, "The Third Rail: Confronting our Pension Failures", published by Signal M&S
[40] In NDC systems, the rate of return for notional accounts is usually linked to nominal GDP growth.
[41] We have used the same discount rate for all countries in our calculations, as we wanted to avoid making our results too sensitive to the choice of discount rate. However, this means that countries such as Finland or Canada do not receive full credit for their considerable pensions assets – this is one reason for including them in the "less efficient" category rather than the over-generous / inadequate category. Another reason that Finland and Canada do not make the efficient category is that they are both in the highest "length of retirement period" category, i.e. they have relatively low retirement ages.

fact that merely looking at the level of pensions assets in isolation does not give us a complete picture, we need to look at the pension system as a whole.

Graph 15: Total prefunded assets in different country categories



Source: OECD, UN Population projections, author calculations

4.2.3 Maximize returns on funded assets

To reap the full benefits of advance funding, scheme sponsors should seek maximum returns on these assets within the constraints of an appropriate level of risk. For pension schemes where funds are managed collectively (such as US state pension funds, Dutch occupational pensions) by professional managers, the key question is whether the funds are being invested in a way that will produce the optimal returns for the desired risk level. We assume that professional institutional investors are able to obtain the best pricing for their investments.

In some cases, collectively managed pension funds (e.g. US Social Security, China, Japan) are constrained to investing the funds in domestic government bonds. This is sub-optimal for two reasons. Firstly, constraining investments to the government bonds of any country means that the expected return on investment is unnecessarily low. This means that the country is not reaping the full benefits of advance funding its pension obligations. Secondly, investing pension funds in domestic government bonds creates a circularity of funding that

is not much different to a pure PAYG scheme.[42] For example, if the US decided to invest the Social Security trust fund on international equity markets instead of in US government bonds, the Treasury would have to issue the debt previously held by the trust fund to other market participants and US net government debt would rise.

One of the benefits of compulsory/ quasi-compulsory schemes is that, through collective risk-sharing and pooling, it may be possible to obtain superior results relative to fully individual schemes. For example, collective schemes are able to share investment and longevity risk across cohorts. This means that they can maintain a higher risk level over the economic cycle than purely individual schemes and achieve better returns (see cases 3 and 4 for more on collective schemes).

4.2.4 Keep costs low and use sensible default portfolios for retail-based schemes

For systems where households have to make the investment decision (such as US 401k, Australian Superannuation Guarantee), the question is not only how the funds are allocated, but also how high the fees levied on these instruments are. Keeping costs low is an important part of maximizing net returns on pension assets. A recent report showed that charges had eaten up a large share of returns on European retail pensions savings, making the returns on pension savings considerably lower than those on market benchmark indices.[43] Likewise, the Australian Superannuation Guarantee, where employees make their own investment decisions, has been criticized for its heavy fee load.[44]

Collective, professionally managed schemes are more likely to be cost efficient than those where households are free to make their own investment decisions. Retail investment products are usually priced at a premium compared to identical institutional investment vehicles. Part of this can be explained by the fact that institutional investors benefit from bulk discounts. However, retail also investors tend to invest too much in higher cost active funds, which depresses returns.[45]

[42] Ponds, Eduard, Clara Severinson & Juan Yermo, May 2011, "Funding in Public Sector Pension Plans – International Evidence" OECD Working Papers on Finance, Insurance and Private Pensions No. 8
[43] "Pension Savings: The Real Return" 2014 edition, www.betterfinance.eu
[44] http://www.abc.net.au/pm/content/2014/s4031386.htm ABC news 6/23/2014
[45] Brown & Weisbenner, "401(k) Investment Options, Portfolio Choice and Retirement Wealth" NBER Retirement Research Center, December 2005

Another question is whether households have the necessary financial skills to build an efficient portfolio for themselves. Although households claim to want to make their own investment choices, in practice, most people are very passive investors.[46] For example in Sweden, households can choose their own investment vehicle for the 2.5% of the pensions contribution that is deposited in an individual account. In practice, a large number of households opt for the default fund.[47] For these reasons, an optimal pension system should automatically channel most pension contributions into target date funds or other low cost default funds with a suitable risk/return profile, leaving only very limited discretion for the retail investor.

4.2.5. Stringent, well-enforced funding requirements

For advance funding to work the way it is intended, it needs stringent funding requirements, which are subject to external supervision and enforcement. A problem with some funded schemes is that the funding requirements are either not stringent enough or they are not effectively enforced. For example, in the United States, state pension schemes are allowed to determine their own discount rates and the states essentially are responsible for their own supervision. By setting unrealistically high discount rates, the schemes understate their liabilities and the funding needs. As a result, many state pension schemes are significantly underfunded, implying either that they will be unable to fully honor their pension promises or that the states will face pressure to raise taxes in the future.[48] We can contrast this with the Dutch pension system, where the funds are subject to strict, externally determined funding requirements, similar to insurance companies, and supervised by two independent entities.

It is also important for the pension assets to be clearly separated from sponsor assets. Even if the existing assets are clearly separated from sponsor assets, an underfunded scheme is still dependent on the health of the sponsor to the extent that the sponsor needs to make additional contributions to fund the pensions. When the scheme sponsor is a government, may be some ambiguity regarding whether the scheme assets are strictly ring fenced for

[46] Mitchell, Mottola, Utkus & Yamaguchi " The Inattentive Participant: Portfolio Trading Behavior in 401(k) Plans", Pension Research Council Working Paper 2006-2
[47] Investment and Pensions Europe 9.12. 2001, "One in five Swedes makes active PPM Choice" http://www.ipe.com/one-in-five-swedes-makes-active-ppm-choice/4384.fullarticle
[48] Healey, Thomas J., Carl Hess & Kevin Nicholson, 2012, "Underfunded Public Pensions in the United States" M-RCBG Faculty Working Paper No. 2012-08

pensions or whether they could be used for other public purposes. Many countries (e.g. Sweden, Estonia, Finland, Japan) subtract assets in public pension funds from their gross government debt ratios when reporting net debt. Introducing a system of individual accounts for the funded part of the pensions contribution, like in Sweden, can be an interesting way of establishing a clear separation of assets for a partially funded public scheme.

4.3 Improving adequacy: increase the scope of the pension scheme

The two main reasons that the countries in our "inadequate" group have insufficient provision for retirement income are that the share of population covered by occupational pension schemes is low or the level of contributions to pension schemes is insufficient to provide enough income at retirement. For example, the share of employees covered by occupational pension plans is about 50% in the US, 40% in Canada and 30% in Korea.[49] In Australia, there is broad coverage under the Superannuation Guarantee and private pension assets are worth close to 100% of GDP. However, the mandatory contribution rate at 9% is not particularly high by international standards, particularly taking into account that public spending on pensions is the lowest of all the developed countries in our survey. By contrast, virtually all the countries in our "overgenerous" and "efficient" groups have mandatory/quasi mandatory participation in occupational pension schemes.

The problems related to an aging society also affect the developing world. China, with a rapidly deteriorating support ratio, has introduced schemes for both urban and rural employees, but these suffer from serious problems related to integrity and separation of assets (see case 5). India's National Pension Scheme has historically only been open to government employees, since 2009 it is also open to all citizens on a voluntary basis.[50] Both countries need do further work to introduce national pension systems with broad coverage.

[49] http://www.theconstellation.ca/img_upload/0354dceb942b6ce6abdb2535de03bf3f/Occupatinal_Pension_Plans_in_Canada.pdf

[50] http://www.hdfcpension.com/national-pension-scheme/

4.3.1 Oblige people to provide for their retirement

Saving for retirement is an area in which households notoriously make sub-optimal choices. If left to their own devices, people tend to procrastinate and make insufficient provision for retirement. There is therefore a strong case for obliging (or at a very minimum strongly persuading) people to prepare for retirement by introducing compulsory or default enrollment in a pension scheme with an adequate contribution rate.

Another interesting question is whether households should be forced to annuitize all or part of their pensions in order to prevent the risk of outliving their retirement savings. This question is only really relevant for DC systems, as under DB systems benefits are annuitized automatically. Intuitively, obliging households to convert part of their savings into an annuity seems a sensible idea. Compulsory annuitization should remove the "adverse selection" premium from annuities and lower the cost. It would also prevent people becoming a burden on society if they miscalculated their spending needs. Policymakers are also studying this option. For example, under NEST, most employees have been obliged to annuitize 75% of their pensions pot, although the requirements are currently being relaxed.[51] Australia is currently considering whether to introduce compulsory annuitization.[52] The US Treasury also recently amended its rules to make it easier for retirees to use assets in their retirement plans to purchase deferred annuities.[53]

4.3.2. Ensure easy access to low-cost retirement accounts

In countries that want to expand pensions coverage, addressing adequacy will also entail making sure that all employees have easy access to an occupational pension scheme that they can carry with them as they change employers. Ideally, enrollment should be mandatory, or at the very least employers should be obliged to offer their employees access to a scheme on an opt-out basis. Providing a pension scheme as a default option, even with the ability to opt out, is an effective way for increasing coverage even without mandatory

[51] http://www.nestpensions.org.uk/schemeweb/NestWeb/public/NESTforSavers/contents/taking-your-pot-as-cash.html
[52] http://www.professionalpensions.com/professional-pensions/news/2355860/australia-consults-on-introduction-of-compulsory-annuitisation
[53] Pozen, Robert C. "How Not to Outlive Your Retirement Savings" Brookings Institute Opinion, October 14th, 2014

enrollment.[54] For example, the UK NEST is an interesting model for a well-designed opt-out occupational pension scheme (see Case 4) that provides low-cost, centralized investment administration to all employees.

President Obama's initiative to introduce myRA accounts from the end of 2014 is a step in the right direction. These accounts will give employees who lack access to an employer-sponsored scheme such as 401(k) a low-cost, portable retirement savings account, with automatic deposit from their paychecks. A drawback of the myRA plan is that the funds will be invested in government bonds, which will not give savers a very good rate of return. Furthermore, employees will have to actively sign up (rather than being automatically signed up with an option to opt out) and employers will not be under any obligation to offer employees these accounts.[55]

4.3.3. Aim for a sufficient level of pensions provision, but not more

While there is a strong case for obliging people to save for their retirement, either through a private or a public scheme, exactly what level of retirement income we should be aiming for is a more difficult question. In these calculations, we have used a uniform replacement rate of 60%, in keeping with the current OECD average. In practice, of course, the target level of retirement income will vary by country. For example, we would expect people who have to pay for their own healthcare to need to save more for retirement than those who live in countries with National Health systems.

Further expanding a retirement scheme that already has a good balance between adequacy and sustainability may even be counterproductive. Obliging households to save more for retirement may lead to them saving less in other areas. In fact, it does look like households may already be adjusting their savings behavior in response to how well the pension system is funded. Dutch households, with the highest level of pensions prefunding, have extremely high levels of mortgage debt. In Italy, with virtually no advance pensions funding, households have very low levels of leverage and substantial investments in real estate (see

[54] Beshears, John, James Choi, David Laibson, and Brigitte Madrian (2008). "The Importance of Default Options for Retirement Saving Outcomes: Evidence from the United States" In Stephen J. Kay and Tapen Sinha, editors, Lessons from Pension Reform in the Americas, pp. 59-87. Oxford : Oxford University Press

[55] http://www.whitehouse.gov/blog/2014/02/11/myra-helping-millions-americans-save-retirement

Appendix 7). Compulsory retirement systems should be designed to provide an adequate level of retirement income, but no more.

6. Conclusions

In this paper, we develop a framework for analyzing the adequacy and sustainability of pensions provision in 33 countries. Using a consistent quantitative methodology, we are able to assign the countries to four groups; overgenerous, inadequate, efficient and less efficient. Countries in the different groups have different priorities in their pension reform needs. We identify the primary focus that reform efforts should take in each country group:

1. Improving sustainability: this is of particular interest for countries in our "overgenerous" group: Belgium, Greece, Italy, France, Austria, Hungary, Russia, Luxembourg, Brazil and Slovenia. The primary focus in these countries should be on raising the retirement age and other methods to adjust pensions to reflect the increase in life expectancy.

2. Improving efficiency: these measures are of interest to all countries, but particularly those in the "less efficient" group: Ireland, Japan, Germany, Spain, Canada and Finland. These countries need to focus on getting a better trade-off between sustainability and adequacy, by establishing a clearer link between benefit payments and scheme sustainability, increasing advance funding and/or improving the returns on existing funds.

3. Improving sustainability: these measures are of particular interest to countries in the "inadequate" group: USA, Australia, Indonesia, China, Mexico, India and Korea. These countries need to focus on expanding the scope of their schemes by increasing coverage and contributions.

Countries in the "efficient" group (the Netherlands, Switzerland, Denmark, Sweden, Poland, the UK, Estonia, the Czech Republic and the Slovak Republic) are currently achieving a good trade-off between sustainability and adequacy. Their main priority should be to continue to develop their schemes and to maintain this current good situation.

There are plenty of reasons to be concerned about the outlook for income security in retirement. Many of the countries with high pensions liabilities are also the countries with high government debt. Despite the current calm on the markets, the European debt crisis is clearly not yet over. Both PIGS and economic heavyweights France and Germany have significant pension liabilities to add to their government debt; more structural and labor market reforms will be needed to put the system on a sustainable and equitable basis. Likewise, Japan has high government debt and future retirement spending needs. In the US, half of employees lack an occupational pension scheme, and other household assets are also relatively low.

Interestingly, most of the countries in the "efficient" group are countries that have relatively recently undergone extensive pensions reform. These countries have been able to "redesign" the pension system to reflect the current demographic profile and incorporate available best practices. This gives us room for optimism.

In Europe, raising the retirement age in line with life expectancy would rapidly put the pension system on a far more sustainable basis. This will also require labor market reforms to make it easier for people to extend their working lives. The retirement age has started to creep up in recent years, and the awareness among the population that the retirement age will have to rise appears to be increasing. In their reform efforts to date, countries have also produced many interesting solutions to improve the sustainability and equity of pensions provision, such as notional defined accounts for PAYG systems, CDC for funded systems, using longevity coefficients to calculate entitlements etc. There are many different options for improving the level of saving for retirement, from automatic enrollment in voluntary schemes, obliging employers to offer enrollment to mandating enrollment in pension schemes. However, governments will have to play an active role in tackling the challenges of population aging, both by actively encouraging saving and by making sure that the money is directed into appropriate savings vehicles. When it is a question of their own retirement, most people cannot be trusted to make the best choices for themselves

APPENDIX 1 - Previous research on the impact of pension obligations on public finances

Much of previous research has concentrated on the impact of pension obligations on public finances. Although public pension obligations differ from tradable government debt in some respects, we can consider them a form of contingent government liability.[56] The OECD, the World Bank, the IMF and the EU are all engaged in a project to incorporate implicit and contingent liabilities into national accounts reporting, but it is at an early stage and only so far eight countries report data on liabilities through insurance, pensions and social security systems.[57] Several previous studies have attempted calculate the implicit liability embedded in pension promises and incorporate this into an expanded measure of government debt or an adjusted measure of the fiscal stance.[58][59][60][61] These have mostly concentrated on European countries, and do not relate the estimate of the public pensions burden to a measure of the adequacy of public pensions provision. Mercer[62] conducts a study of retirement income systems in 20 countries, using both quantitative and qualitative factors (including the level of public debt) to assess the adequacy, sustainability and integrity of the pension systems.

We can consider public pension commitments a form of contingent liability. While pension commitments are not totally comparable to tradable government debt – for example, we can consider pension reform equivalent to "defaulting" on pension obligations, but the reaction on financial markets is very different compared to that of defaulting on tradable debt - adding an estimate of pension spending to traditional measures of government debt gives a more complete level of government commitments. Making the cost of pension promises explicit also lowers the incentive to attempt to improve short-term government

[56] Franco, Daniele, Maria Rosaria Marino & Stefania Zotteri, 2005 "Pension Expenditure Projections, Pension Liabilities and European Union Fiscal Rules" SSRN
[57] So far Australia, Belgium, Canada, Iceland, Ireland, New Zealand, Sweden and the United States are the only countries for which this data is available in the IMF and World Bank Joint Public Sector Statistics Database http://databank.worldbank.org/data/views/reports/tableview.aspx There is no easily available data available on the underlying assumptions used in these calculations.
[58] Ponds, Eduard, Clara Severinson & Juan Yermo, May 2011, "Funding in Public Sector Pension Plans – International Evidence" OECD Working Papers on Finance, Insurance and Private Pensions No. 8
[59] Muller, Christop, Bernd Raffelhusen & Olaf Weddige, 2009 "Pension Obligations of Government Employer Pension Schemes and Social Security Pension Schemes Established in EU Countries" Research Center for Generational Contracts, Freiburg University
[60] Soto, Mauricio, Benedict Clemens & Frank Eich, 2011, "A Fiscal Indicator for Assessing First and Second Pillar Pension Reforms" IMF Staff Discussion Note 12/4/2011
[61] Fredriksen, N.K. (2001) "Fiscal Sustainability in the OECD. A Simple Method and Some Preliminary Results" Finansministeriet, Working Paper No. 3 2001
[62] Melbourne Mercer Global Pension Index, October 2013

finances by e.g. compensating for lower salaries through generous pension promises or diverting pension funds to plug budget holes.[63]

[63] Franco, Daniele, Maria Rosaria Marino & Stefania Zotteri, 2005 "Pension Expenditure Projections, Pension Liabilities and European Union Fiscal Rules" SSRN

APPENDIX 2. Calculations for Public Pension Liability

We use OECD data on 2013 nominal GDP and OECD growth forecasts for 2014, 2015 and trend growth thereafter to calculate nominal GDP from 2013-2050. We then use OECD projections for spending on pensions as a percentage of nominal GDP (Source: OECD Pensions at a Glance 2013, table 6.7, Projections of expenditure on public pensions) and apply these percentages to the nominal GDP forecasts to obtain estimates of nominal public spending on pensions. These calculations incorporate any changes to future pensions that are included in current legislation. The OECD does not provide forecasts for Japan, so we use IMF estimates (we are grateful to the authors for kindly providing us with the data).[64] We discount the spending at an annual rate of 4.5 percent, then subtract public pension assets and compare the net aggregate discounted liability to 2013 nominal GDP. We use primarily OECD estimates of public pension assets, but in some case complement this data with national sources.

Projected Public Spending on Pensions 2013 - 2050

	Projected public pension expenditure % 2013 GDP	Public Pension Assets / % 2013 GDP	Net unfunded liability % 2013 GDP		Projected public pension expenditure % 2013 GDP	Public Pension Assets / % 2013 GDP	Net unfunded liability % 2013 GDP
Brazil	841%	0%	841%	Ireland	326%	9%	318%
Hungary	507%	0%	507%	Czech Republ	321%	0%	321%
Belgium	503%	5%	498%	Slovak Repub	311%	0%	311%
Austria	497%	0%	497%	Estonia	295%	0%	295%
Luxembourg	479%	0%	479%	Netherlands	290%	0%	290%
Finland	477%	86%	392%	Japan	278%	28%	250%
France	472%	4%	467%	United Kingdo	272%	6%	267%
Slovenia	465%	0%	465%	Switzerland	261%	0%	261%
Italy	462%	0%	462%	Canada	218%	14%	204%
Greece	453%	0%	453%	Australia~	180%	6%	174%
Russian Fede	429%	4%	424%	China	173%	2%	172%
Portugal	416%	6%	411%	United States*	164%	16%	148%
Spain	384%	7%	377%	Mexico	160%	0%	160%
Poland	353%	1%	353%	Indonesia	153%	0%	153%
Denmark	342%	33%	308%	India	121%	0%	121%
Sweden	336%	31%	305%	Korea	117%	24%	93%
Germany	330%	0%	330%				

Source: OECD spending and GDP projections, some assets data from national authorities and Towers Watson, author calculations

We use spending forecasts to 2050 because this covers the period when the spending on pensions/ GDP is at its peak. By 2050 the level of spending on retirement has stabilized or

[64] Kashiwase Kenichiro, Masahiro Nozaki and Kiichi Tokuoka, 2012, "Pension Reforms in Japan" IMF Working Paper 12/285

even fallen in most countries, as the impact of the large "baby boom" generation has dissipated.

These kinds of calculations are notoriously sensitive to the choice of discount rate. Theoretically, purely PAYG pension liabilities should only be discounted to reflect future inflation, as there are no related asset returns to take into account. For a purely PAYG system, a discount rate of 4.5 percent is therefore too high, and for these countries the calculations understate the level of pension liabilities. On the other hand, using different discount rates for partly funded and PAYG systems would risk making the results too much a function of the discount rate. Not only would we have to use a different discount rate for funded and unfunded schemes, we would also have to adjust the discount rate to account for how high the level of funding is, leading to multiple discount rates. For this reason, and in view of the multiple uncertainties involved in this type of calculation, we have chosen to use the same discount rate for all the countries for both public and overall pension liabilities. We perform sensitivity analysis to gauge how the level of the discount rate affects the projections of net public liability. Predictably, the discount rate acts as a scaling factor, with the order of the countries remaining the same.

Projected net liabilities at different discount rates

Projected net liabilities / 2013 GDP

	3.50%	4.50%	5.50%		3.50%	4.50%	5.50%
Brazil	1058%	841%	677%	Slovak Repub	376%	311%	261%
Hungary	619%	507%	420%	Denmark	375%	308%	255%
Belgium	605%	498%	414%	Sweden	372%	305%	252%
Austria	596%	497%	420%	Estonia	356%	295%	248%
Luxembourg	587%	479%	396%	Netherlands	353%	290%	242%
France	562%	467%	393%	United Kingdo	324%	267%	222%
Slovenia	567%	465%	387%	Switzerland	316%	261%	218%
Italy	555%	462%	390%	Japan	303%	250%	209%
Greece	547%	453%	381%	Canada	249%	204%	168%
Russian Fede	518%	424%	351%	Australia~	214%	174%	142%
Portugal	492%	411%	346%	China	215%	172%	139%
Finland	488%	392%	316%	Mexico	199%	160%	131%
Spain	459%	377%	313%	Indonesia	196%	153%	121%
Poland	422%	353%	298%	United States'	180%	148%	122%
Germany	394%	330%	280%	India	151%	121%	99%
Czech Republ	389%	321%	268%	Korea	124%	93%	70%
Ireland	387%	318%	264%				

APPENDIX 3. Calculating the Sustainability Index

In order to calculate our sustainability index, we calculate a weighted average of the net unfunded public liability and gross government debt, both expressed as percentages of GDP. We then scale this result so the outcomes are between 0 and 100, with a higher number representing a higher level of sustainability, i.e. a lower burden on public finances. Because Brazil is such an outlier, we have not included it within the basic index scale; as a result, Brazil gets a negative sustainability score of -46.

Calculating the sustainability index

	Net public expenditure	Gross public debt	**Sustaina-bility 66/33**	**Sustaina-bility index**	Sustaina-bility 50/50	Sustaina-bility index 50/50
Korea *	89%	37%	**72%**	**82**	63%	84
Australia	175%	29%	**126%**	**75**	102%	75
India	121%	67%	**103%**	**74**	94%	77
Indonesia	153%	26%	**111%**	**72**	90%	78
China	172%	22%	**122%**	**70**	97%	76
Mexico*	160%	46%	**122%**	**69**	103%	74
United States	139%	105%	**128%**	**68**	122%	70
Canada	207%	89%	**167%**	**58**	148%	63
Switzerland	261%	49%	**190%**	**52**	155%	61
Estonia	295%	11%	**201%**	**50**	153%	62
United Kingdom	263%	90%	**205%**	**49**	177%	56
Netherlands	290%	75%	**219%**	**45**	183%	54
Sweden	311%	41%	**221%**	**45**	176%	56
Slovak Republic	311%	55%	**226%**	**44**	183%	54
Czech Republic	321%	48%	**230%**	**43**	184%	54
Denmark	342%	45%	**243%**	**39**	193%	52
Germany	330%	78%	**246%**	**38**	204%	49
Japan*	255%	243%	**251%**	**37**	249%	38
Ireland	318%	123%	**253%**	**37**	220%	45
Poland	353%	57%	**254%**	**36**	205%	49
Spain	378%	94%	**283%**	**29**	236%	41
Finland	402%	57%	**287%**	**28**	230%	43
Russian Federation	424%	13%	**287%**	**28**	219%	45
Portugal	411%	129%	**317%**	**21**	270%	33
Luxembourg	479%	23%	**327%**	**18**	251%	37
Slovenia	465%	73%	**335%**	**16**	269%	33
France	467%	94%	**343%**	**14**	281%	30
Italy	462%	133%	**352%**	**12**	297%	26
Austria	497%	74%	**356%**	**11**	286%	29
Greece	453%	174%	**360%**	**10**	314%	22
Hungary	507%	79%	**364%**	**9**	293%	27
Belgium	498%	100%	**365%**	**9**	299%	25
Brazil*	841%	66%	**583%**	**-46**	454%	-13

Source: OECD Pensions at a Glance 2013, UN population projections, IMF data on public debt, author calculations

We have used a 2/3 weight for the unfunded public liability and a 1/3 weight for gross public debt, in reflection of the fact that public debt covers many more expenditure items than just pensions liabilities. The choice of weights is somewhat arbitrary, but e.g. using a 50/50 weighting (see table) did not significantly change our results.

APPENDIX 4 – Calculation Methodology for Generosity of Public Pension

In order to calculate the generosity of the public pension, we compare the projected gross public spending on pensions with the gross level of spending that would be required to provide all over 65-year-olds with a pension worth 60% of the average wage.

In order to calculate the required spending on pensions, we use OECD data on average wages. We assume that wages will increase at the same rate as the GDP deflator in the OECD long-run projections. We use demographic projections from the UN World Population Prospects[65] to calculate how many people will be receiving a pension (we assume that pensions are paid to everybody over 65 years of age) and we assume that the average pension is 60% of the average wage. We then discount this payment stream at the nominal annual rate of 4.5 percent. This way we are able to obtain an estimate of the aggregate amount of spending on retirement income. When it is necessary to convert funds from one currency to another, we do this using market exchange rates. By comparing the payment stream and assets in each country to its own GDP in dollars, we avoid the problems related to exchange rate fluctuations that could otherwise distort the comparison.

Generosity of Public Pension Provision

	Gross public spending	Gross required spending	Public pension generosity		Gross public spending	Gross required spending	Public pension generosity
Brazil*	841%	202%	639%	Sweden	336%	333%	2%
Luxembourg	479%	184%	295%	Indonesia	153%	173%	-20%
Russia	429%	214%	214%	Spain	384%	435%	-51%
Hungary	507%	339%	168%	Denmark	342%	395%	-53%
Austria	497%	371%	126%	Ireland	326%	391%	-65%
France	472%	384%	88%	Germany	330%	402%	-72%
Belgium	503%	430%	73%	Japan*	278%	358%	-80%
Finland	477%	411%	66%	Netherlands	290%	387%	-97%
Slovak	311%	245%	66%	China	173%	278%	-104%
Portugal	416%	357%	59%	Mexico*	20%	161%	-141%
Estonia	295%	240%	56%	Switzerland	261%	402%	-141%
Greece	453%	398%	55%	UK	272%	417%	-144%
Czech	321%	270%	51%	US	164%	324%	-159%
Italy	462%	415%	47%	Canada	218%	399%	-181%
Poland	353%	316%	38%	Korea*	117%	328%	-210%
Slovenia	465%	440%	26%	India	121%	338%	-216%
				Australia	180%	412%	-232%

* Calcs based on actual retirement age of 70
Source: OECD data, UN population projections, author calculations

[65] http://esa.un.org/wpp/

For Japan, Korea, Mexico and Brazil we assume that pensions are paid to all over 70-year-olds, in keeping with the actual effective retirement age in these countries. Doing the calculations on the basis of a retirement age of 65 would significantly increase the required level of spending for these two countries: for Japan, the required spending would rise to 457% of GDP (from 358% in our calculations) and for Korea it would rise to 453% (from 328% in our calculations).

As with the projections of public expenditure, the results are very sensitive to the choice of discount rate, so we have used a uniform discount rate of 4.5 percent across the board. This means that countries with a substantial level of advance funding may not get full credit for the higher returns they should be able to earn on these funds. However, using a different discount rate for funded schemes, particularly if we account for the fact that the level of advance funding varies widely, would risk making the outcomes excessively dependent on the choice of discount rate.

APPENDIX 5 – Calculating the adequacy index

In order to calculate the adequacy index, we calculate the weighted average of the generosity of the public pension (see Appendix 3) and the existing private pension assets, using a 1/3 weight for the public pension and a 2/3 weight for pre-funded private pension assets. We use a higher weighting for existing private pension assets both to compensate for the fact that we have used the same discount rate for all the countries regardless of funding status, and to reflect the greater degree of certainty relating to current assets relative to future promises of public spending. We then index the result on a scale of 0 – 100 to obtain our adequacy index. Again, we have not included Brazil in the basic group as it is such an outlier. Due to its extremely generous system, Brazil receives an adequacy score of 165.

Calculating the adequacy index

	Public pension generosity/ GDP	Private assets/GDP	Adequacy	Adequacy index
Brazil*	639%	14%	222%	165
Luxembourg	295%	2%	100%	97
Russia	214%	3%	74%	83
Hungary	168%	4%	58%	74
Netherlands	-97%	136%	58%	74
Austria	126%	5%	45%	67
France	88%	0%	29%	58
Slovak	66%	8%	28%	57
Belgium	73%	4%	27%	57
Switzerland	-141%	111%	27%	56
Portugal	59%	8%	25%	55
Poland	38%	15%	23%	54
Finland	66%	0%	22%	54
Estonia	56%	5%	22%	54
Czech	51%	6%	21%	53
Italy	47%	5%	19%	52
Greece	55%	0%	18%	52
UK	-144%	96%	16%	50
Denmark	-53%	50%	16%	50
Slovenia	26%	3%	11%	48
Ireland	-65%	46%	9%	47
Sweden	2%	9%	7%	46
US	-159%	72%	-5%	39
Indonesia	-20%	2%	-5%	39
Japan*	-80%	25%	-10%	36
Spain	-51%	8%	-12%	35
Australia	-232%	93%	-15%	33
Canada	-181%	64%	-18%	32
Germany	-72%	5%	-20%	30
China	-104%	0%	-35%	22
Mexico*	-141%	13%	-38%	20
Korea*	-210%	4%	-67%	4
India	-216%	0%	-72%	2

Source: OECD Pensions at a Glance 2013, UN population projections,
IMF data on public debt, author calculations

APPENDIX 6 – The Impact of Raising the Retirement Age from 65 to 70

For a few countries, we calculated the difference between the gross expenditure that would be required to provide a replacement rate of 60% of average income if we raised the retirement age assumption from 65 to 75. As can be seen from the table below, the change is quite dramatic. The reduction in the gross pensions obligation is about 100% of GDP for all the countries, which represents a 25-30% reduction in the overall level of required expenditure per GDP.

Total required expenditure to provide 60% of the average wage if pension age is 65 or 70

	Gross debt 2013	Expenditure if pension age > 65	Expenditure if pension age >70	Difference if pension age is 70	Effective retirement age 2012
Australia	29%	412%	303%	-109%	64.9
China	22%	278%	177%	-100%	66.8
France	94%	384%	289%	-95%	59.7
Italy	133%	415%	313%	-102%	61.1
Netherlands	75%	387%	285%	-102%	63.6
USA	105%	324%	234%	-89%	65
Germany	78%	402%	303%	-99%	62.1
Japan*	243%	457%	358%	-100%	69.1
Korea*	37%	453%	328%	-125%	71.1
Finland	57%	411%	307%	-104%	61.8

Source: OECD Pensions at a Glance 2013, UN population projections, IMF data on gross debt, OECD data on effective retirement age (male), author calculations

* In our final calculations we use the expenditures according to the over 70 column for Japan and Korea, in keeping with their effective retirement age.

Raising the retirement age is an extremely powerful tool for reducing the pensions obligation. It is also noteworthy that in most of the European countries in the chart, the effective retirement age is closer to 60 than to 65, giving even more potential for reducing the burden by extending people's working lives.

APPENDIX 7 - Household Assets and Retirement Savings

The assets used in our calculations refer only to those assets that are specifically earmarked for retirement savings, by e.g. being put into tax-deferred retirement accounts. However, households also have other assets that they can draw down in retirement if necessary, such as private savings, property etc.

Based on OECD data on household assets, it looks like housholds may be incorporating the state of the pension system into their saving and consumption decisions. Four out of the five countries we have taken a closer look at have household assets worth about 500% of GDP; the exception is the US, with household assets worth only 300% of GDP (chart 1). Households in the Netherlands, with a well-funded system, are taking on a lot of debt, even more than the US (chart 2). On the other hand, households in France and Italy appear to be compensating for the low level of pensions funding by accumulating non-financial assets, mainly dwellings, which they finance with a very conservative amount of debt (chart 3).

This means that e.g. Italian and French households have additional assets which they can use to finance their retirement. However, these are in illiquid form and probably provide lower returns (and certainly far poorer diversification) than a portfolio of financial assets.

Chart 1

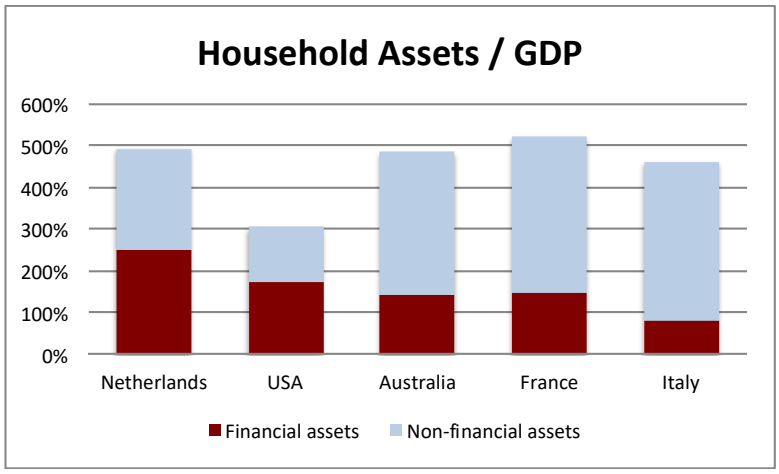


Chart 2

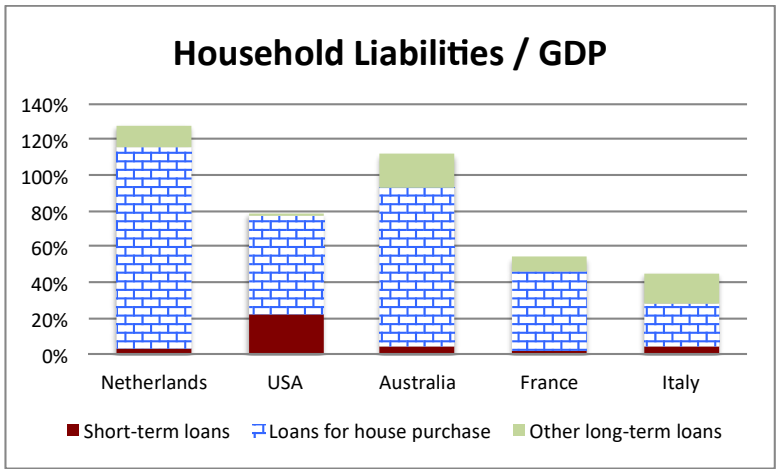
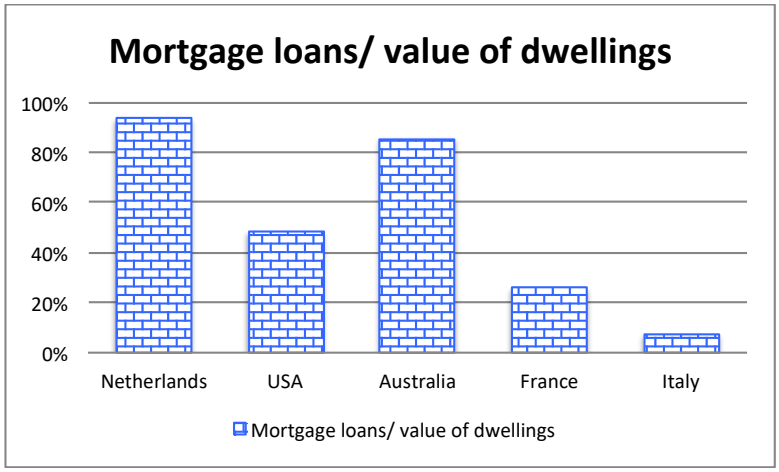


Chart 3



Source for all graphs: Household Assets data from OECD.Stat

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