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Retirement Income Adequacy Indicator

Allianz

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Introduction

1 Allianz (2014a)
2 EU Commission (2014a)

The pension reform process in Western Europe has been emerging during recent decades as a result of demographic changes and their effects on future fiscal budgets. Many parametric reforms within the first pillar of old age provisioning systems will in future leave people with lower retirement income relative to pre-retirement income compared with today's pensioners. In many countries governments have introduced incentives to foster funded occupational and private pension plans to compensate for decreasing replacement rates. As we move from pay-as-you-go to funded systems in Western Europe, emerging economies in Eastern Europe have adopted more radical reforms, even mandatory funded pension arrangements on a defined contribution (DC) basis in some countries. In emerging Asia, the introduction of formalized systems for old age provisioning has become a key political goal after the erosion of family-based structures. In the U.S., the retirement income landscape is changing drastically, as it moves from defined benefit (DB) to DC plans, with less generous social security income due in the future.

Allianz International Pensions previously created the Pension Sustainability Index (PSI) following the pressure on public pension systems due to aging demographics and deteriorating government finances. The PSI combines the various characteristics of pension systems with the factors that influence them to help track and evaluate policy changes made in different countries around the world.[1]

As structures change, policymakers face the difficult task of balancing sustainability and adequacy. As the EU Commission stated in its White paper on adequacy "...the higher sustainability of public pension expenditure in view of population ageing has been achieved in a partial trade off with the level and security of adequacy."[2] In future, pensioners' income mix will differ: the previously dominant first pillar (state pensions) will give way to the funded elements; defined benefit will move towards defined contribution schemes and family support structures towards more formalized public ones (as is the case of Asia), raising the question whether today's employees will receive an adequate retirement income to maintain their standard of living when they retire or risk an income shortfall, or even poverty. Generating an adequate retirement income has become a major future challenge following the recent financial crisis, increasing volatile markets and low yield investment environment.

This study explores the topic and looks at the flip side of reforms in the first pillar of pension systems, which basically all lead to decreasing benefit levels. To address this issue, we have built a Retirement Income Adequacy (RIA) Indicator. This is based on a wider approach towards retirement income, as it takes more sources of income and factors influencing expenditure needs into account. We have ranked countries according to their potential to provide adequate retirement income. The ranking helps foster discussion about the approaches towards generating an adequate income and about policy measures in place in various countries.

Key results

- The RIA ranks 49 countries according to their potential to provide adequate retirement income. It examines relevant elements of public and private pension schemes and non-pension factors that influence the financial well-being of retirees.

- As an overall picture the RIA indicator ranks pension systems with mature funded pillars in developed countries at the top: The Netherlands are clearly leading the list followed by Denmark and Norway.

- The Netherlands, Denmark, Switzerland, the U.S. and Sweden show very high scores for their funded pillars besides a high to moderate level for their public pension, moreover do they show strengths in the additional factors, non-pension wealth, low spending needs for health and good progress with respect to an extended working life.

- At the bottom end of the spectrum there are mainly developing countries which do not yet have comprehensive pension systems. Indonesia and India are scoring worst mainly because they have a low coverage of their working age population, an underdeveloped funded pillar and in addition they face high out-of-pocket health expenditures which weigh heavily on the elderly's budgets.

- Although Austria' s funded pillar is underdeveloped and they still have low retirement ages and a long period of time spent in retirement the country gets a high score or even the highest for its first pillar and makes it into the top group. The situation of the elderly might worsen if reforms are put on the agenda to make the system more sustainable as compensating elements are not yet adequately in place.

- Contrasting adequacy and sustainability, RIA's first pillar vs PSI, the study shows countries as New Zealand, the Netherlands, Norway and Finland which seem to be sustainable and be able to provide an adequate retirement income. In 8 countries (Spain, Brazil, Malta, France, Italy, Japan, Cyprus and Slovenia) the pension system seems to provide an adequate pension level but were ranked unsustainable in the PSI. In such cases pension reforms may be put on the agenda (again).

- Integrating the funded pension pillar into the comparison RIA versus PSI, countries with major funded pillars move up on the adequacy ranking: Denmark, Switzerland, the U.S. and the UK can all be seen as broadly providing an adequate income. Australia also moves up in the adequacy ranking as well as Chile, Ireland, Hong Kong, Malaysia, Mexico and Singapore.

- Not just diversification of retirement assets are needed but integrated pension systems become increasingly important where the different elements are designed according to the role they need to have in the overall retirement income system.

Basic idea of the indicator

Previous research by academics, institutions and business has concentrated on single income sources. More income sources, however, need to be included to determine whether a retiree will have enough retirement income to live on adequately. Some countries provide detailed studies,[3] which combine all sources of retirement income, i.e. public pensions, occupational, private pension plans, private savings and housing, and try to analyze the financial status with respect to households' retirement readiness. This approach offers a complete picture of the household's financial situation, prior to retirement. Survey data may be available on a country basis to allow a deeper insight into the situation of various socio-economic groups. Applying such an approach for one country can reveal vulnerable groups, which might help policymakers shape policies aimed at enhancing retirement income security.

It is not easy to find comparable detailed data to provide an international comparison, so we have adopted a simpler approach on a macro-level,[4] ranking countries according to their potential to provide adequate retirement income. This examines relevant elements of public and private pension schemes and non-pension factors that influence the financial well-being of retirees. To this purpose, 49 countries have been analyzed according to a range of parameters shown in figure 1 and 2. Each single characteristic is scored from 1 – least adequate – to 10 – most adequate – then combined to sub-indicators to arrive at an overall measure (RIA index) for a country ranking on retirement income adequacy.[5]

The ranking can help identify best practices in policymaking regarding pension systems and foster discussion on the role of different pillars in total retirement income;[6] the different elements need to be built upon and complement each other in a consistent way.

3 In the US the Center for Retirement Research at Boston College developed the NRRI (National Retirement Risk Index) in 2006 to analyze the retirement preparedness of American households. They included different income sources available at retirement. The index "measures the percentage of working-age households who are at risk of being financially unprepared for retirement at age 65." EBRI developed the Retirement Readiness Rating already in 2003; on the basis of administrative data on all retirement schemes as well as social Security records and housing wealth the rating comes up with the percentage of people who are at risk to short fall of retirement income; VanDerhei; Copeland (2010). The PPI (Pensions Policy Institute, 2010) analysed for the UK "the roles different sources of income and assets could play in helping pensioners to meet their needs in retirement" and included housing wealth and financial assets, as well as an analysis of pensioners' need during retirement. In the Netherlands, a study was conducted at the University of Leiden together with NETSPAR (Knoef, M. et al. (2014)) that analyses the adequacy of retirement income of Dutch pensioners using a comprehensive approach. They include pension benefits as well as private savings and housing wealth and base their study on administrative data. The Organisation for Economic Co-operation and Development (OECD) is working on a project on behalf of the European Commission to compare the adequacy of retirement income for various countries on a comparable basis. Results for 6 countries have been published in: OECD (2014b).

4 Aggregate data information from the European Commission (EU), International Labor Organisation (ILO), International Monetary Fund (IMF), OECD, World Bank, Asian Development Bank (ADB) as well as national statistics are used for the sub-indicators.

5 It is important to note that the RIA uses an intervallic scale to determine the ranking since we use quantitative data as well as qualitative elements. Since the index does not have a cardinal order or a metric value, results cannot be used for calculations. Moreover minor differences in the ranking score cannot fully differentiate between countries.

6 For more details see Appendix A on Construction of the indicator in detail

7 See Bajtelsmit, V. et. al. (2013)

8 See Knoef et al. (2014); Allianz (2013a); Binswanger, J. and Daniel Schunk (2009); Biggs, A. G. (2009);

9 See Allianz (2013a), Defining Adequacy p. 36; Binswanger, J. and Daniel Schunk (2009); Biggs, A. G. (2009);

10 See Knoef et al. (2014); Hurd, Rohwedder (2008); Burnett et al. (2014) or PPI (2010)

11 See Biggs, Stringstead A.G. (2008); Grech, A.G. (2013)

ADDRESSING ADEQUACY

A key question arises in research addressing adequacy: what is adequate? Retirement income adequacy is a relative measure. There is no "one-size-fits-all" approach as it is highly dependent on the purpose and the stakeholder using it, as a paper by the Society of Actuaries points out.[7]

Adequacy can either be defined in terms of a social standard, such as the poverty line,[8] as a certain percentage of pre-retirement income or within the lifecycle framework, in which case it often implies maintaining a certain standard of living.[9] It might even be more appropriate to align adequacy to the special expenditure needs of elderly people.[10]

Adequacy used to be measured by replacement rates, with retirement income as a certain percentage of pre-retirement income. The problem is how to define the two income terms? There is wide academic discussion and no consensus as to which pre-retirement income should be taken.[11] The discussion about which retirement income should be taken should also be discussed more intensely. In continental Europe, for example, the first pillar was used to target maintaining a certain standard of living and the replacement rate was focused on the first pillar benefits. Now these measures fit only partially as the structure of old age provisioning systems change from defined benefit to defined contribution and additional means increase in importance. All pillars, public pensions, occupational funded DB and DC schemes and individual pension schemes are complementary and provide the necessary retirement income. A wider approach is necessary.

Figure 1: Retirement income adequacy – Sub-indicator "Pension system"

Sub-indicators	criteria	valuation	weights
Pillar I	• Replacement rate • Coverage • Adjustment mechanism	• Percent • Percent • Discretionary	45 %
Pillar II/III	• Enforcement: mandatory/voluntary/autoenrollment • Coverage • Pension assets as % of GDP • Employer contributions • Payout option: annuitization/lump sum etc	• Discretionary • Percent • Percent • Percent • Discretionary	25 %

Figure 2: Retirement income adequacy – Sub-indicator "other factors"

Sub-indicators	criteria	valuation	weights
Non pension wealth	• Financial assets ex pensions ex liquidity • Home ownership • Gini coefficient	• as % of GDP • Percent • Percent	15 %
Spending needs	• Health system: out-of pocket expenses	• Percent	5 %
Transition from work	• Effective retirement age • Time spent in retirement • Early retirement incentives	• Years • Years • Discretionary	10 %

RIA country ranking: overall results

The Retirement Income Adequacy (RIA) indicator ranks countries according to their potential to provide adequate retirement income. The 49 countries included differ widely according to their pension systems, the stages of pension system development, as well as their social and economic background. We are aware that such a comparison has its shortcomings but the RIA index does not claim to give an absolute judgement on the respective systems; rather it wants to show and discuss outcomes that might serve as examples for further development in other countries.

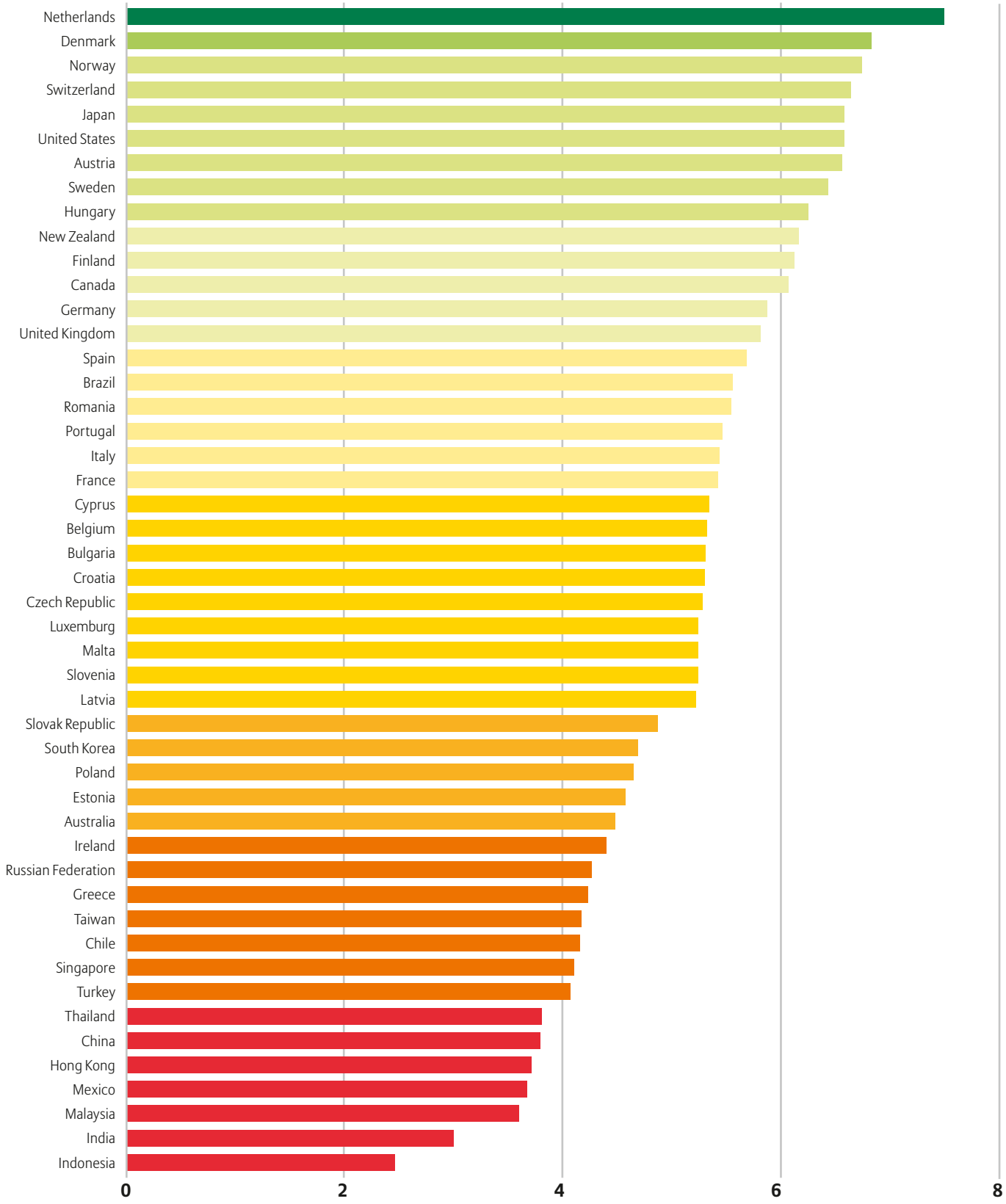
In general, pension systems with mature funded pillars in developed countries come at the top of the rankings (*see figure 3*). The Netherlands clearly lead the list, followed by Denmark, Norway, Switzerland, Japan, the U.S. and Austria, with negligible differences between the latter six. Sweden follows close behind. The Netherlands, Denmark, Switzerland, the U.S. and Sweden score highly for their funded pillars and score at a high to moderate level for their public pension. They additionally show strengths in the additional factors, namely non-pension wealth, low spending needs for health and good progress with respect to an extended working life.[12] Austria, on the other hand, gets a high score for its first pillar, making it into the top group. However, its funded pillar is under-developed and they still have low retirement ages and a long time spent in retirement.

At the other end of the spectrum, we find developing countries without comprehensive pension systems. Indonesia and India score the worst, mainly because they have a low coverage of their working age population, an underdeveloped funded pillar and additionally face high out of pocket health expenditures, which weigh heavily on the elderly's budgets. Malaysia scores a bit better because it can build on a mandatory funded pillar. The downside is that they can draw on this pension pot early so that future retirees might run out of money. Mexico is in a similar situation but its system is still relatively young, with only a small amount accumulated; it seems to compensate by staying longer in the workforce than people in most of the countries analyzed.

In between come many countries with differing systems and pre-conditions: countries with a strong first pillar, which are not complemented enough by other resources, such as Brazil or Spain; and countries with developed funded pension systems. Canada and the UK complement their pension pot by non-financial wealth, while retirees' budgets get an easing effect from the health expenditure side, placing these countries in the upper third of the country list. On the other hand, Chile and Singapore, both with strong funded systems, miss out on additional factors, leaving them in the lower third of the countries under review. To gain a better overview of systems and countries at similar stages of development, we will discuss the country results in further detail on a regional level with a sub-indicator discussion.

12 See the results of the sub-indicators in the section for the various regions and the overall sub-indicator ranking in the appendix.

Figure 3: Retirement Income Adequacy (RIA) Ranking



Scale from 1 to 10 – 1 least adequate (red), 10 most adequate (green)

Source: Allianz International Pensions 2015

Regional results with sub-indicator discussion

Many parametric reforms within the first pillar of old age provisioning systems have been introduced worldwide to ease the financial burden of social security systems. The main reforms have been directed at increasing retirement ages and lowering benefit levels. These reforms will leave people with lower public pensions relative to pre-retirement income in future compared with today's pensioners. Therefore, in many countries governments have introduced incentives to foster funded occupational and private pension plans to compensate for decreasing replacement rates. The future retirement income mix will be composed of different income sources, with more weight than these have today. It is questionable whether the support measures in the first and second pillars will be sufficient; that is, whether the support measures offered by politicians and providers of pension products are designed so that future pensioners can expect an adequate old-age pension. This has become more questionable following the financial crises of the last decade, increasing volatile markets and the recent low yield investment environment.

We have marked the ranking and tables with the sub-indicators in these regional views using a color coding. Colors vary between green and red, indicating differing levels of readiness to deliver an adequate retirement income. Countries with the same color score very closely with respect to the (sub-)indicator. Since the index does not have a cardinal order or a metric value, the scores cannot show absolute differences and the results cannot be used for calculations. Moreover, minor differences in the score and the ranking cannot fully differentiate between countries, which is why we used the color coding for orientation.

WESTERN EUROPE AND NORTH AMERICA

The development of markets in Western Europe and North America vary due to their different policy approaches to the role of state pensions. In some countries, such as the UK or Ireland, state pensions were designed to prevent poverty among the elderly. Other countries, like Germany or Italy, aimed to keep people living in retirement at a comparable standard to their years in the workplace. Therefore, some countries already have a long tradition of funded schemes and have based their old age provisioning system on a more balanced multi-pillar set-up and now benefit from their already comprehensive pension systems. Based on this, it is not surprising that countries with mature funded pension pillars lead the ranking, namely the Netherlands, Denmark, Switzerland, the U.S. and Sweden. (*see Tab.1*)

These countries also rank among the top ten in the sub-indicator "Pillar II/III". In this respect the UK joins the group of top ten but scores relatively low on the first pillar. In contrast to the Netherlands, Denmark, the U.S. and Sweden score only moderately on the first pillar but show strengths in the additional factors, such as non-pension wealth and low spending needs for health. With this broader approach it is likely that countries might be able to provide adequate financial support in retirement.

As already noted in the overall results, Austria receives a high score for its first pillar and makes it into the top group, although their funded pillar is underdeveloped. In addition Austria still has low retirement ages and a long period of time spent in retirement. If reforms are necessary in

the public pension system, massive accompanying measures will have to be implemented to maintain a comparable standard of living enjoyed by retirees today.

Spain, Italy, France, Luxembourg and Malta are in a similar situation, with a relatively high ranking for the first pillar but scoring badly in the sub-indicator "pillar II/III". For Spain and Italy this might become problematic in the future as recent reforms with cuts in benefits unfold without compensation from other sources. In the other countries, compensating elements will only be problematic if reforms in the first pillar come up on the political agenda and lead to benefit cuts.

Table 1: RIA Ranking with sub-indicators – Western Europe and North America

	Overall ranking	Pillar I	Pillar II / III	Non pension wealth	Spending needs	Transition from work
Netherlands	1	6	2	24	1	10
Denmark	2	20	3	11	4	16
Norway	3	9	12	18	5	11
Switzerland	4	18	1	31	30	21
United States	6	23	5	16	7	12
Austria	7	1	36	22	16	47
Sweden	8	24	7	3	17	20
Finland	11	14	13	10	18	42
Canada	12	25	9	12	19	32
Germany	13	11	20	39	9	35
United Kingdom	14	35	6	36	2	17
Spain	15	3	41	17	25	41
Portugal	18	15	37	9	35	8
Italy	19	12	39	6	27	48
France	20	13	38	23	3	49
Belgium	23	26	26	4	20	38
Luxemburg	27	7	40	33	12	44
Malta	28	8	44	32	13	45
Ireland	36	40	16	37	23	19
Greece	38	22	48	30	33	43

Note: the numbers refer to overall ranks of (sub-)indicators

Source: Allianz International Pensions 2015

13 The "Riester Rente" in particular was designed to compensate for the decrease in benefit levels

Germany is ranked in the middle of Western European countries and in the top thirteen overall. Broad coverage and a moderate replacement rate provide a relatively solid base. In the longer run, though, decreasing benefit levels need to be compensated. For this purpose, Germany has introduced voluntary arrangements.[13] This set-up only receives a medium score. A low home-ownership rate increases the risk of high spending for home rentals, which takes up a major part of the household budget. Pension entitlements are likely to be smaller than necessary for an adequate replacement rate as there still is a relatively early transition into retirement before statutory retirement.

Ireland and Greece are at the low end of this regional view and also rank in the lower third of the overall ranking. Greece faced drastic reforms during the last couple of years following the International Monetary Fund's (IMF) and European Central Bank's (ECB) austerity packages. At the same time, the state's tied financial situation did not allow it to build up compensating schemes. When reform measures unfold and replacement rates decrease in coming years, Greece's elderly will be at major risk of poverty, particularly as Greece still needs to keep an eye on its pension system because of rapid aging, long years spent in retirement and an early labor force exit. These developments might increase pension expenditures, which should be capped when reaching a certain level. Exceeding this will trigger calls for further reform. Ireland on the other hand builds on a pension design with a lean public pillar but the funded schemes complementing the elderly's retirement income suffered severely during the financial crisis. Moreover, the funded system is on a voluntary basis, which usually cannot provide the wide coverage needed in the event of poverty.

EASTERN EUROPE

Apart from Hungary, most of the Central and Eastern European (CEE) countries come in at the middle of the overall RIA ranking. Basically all countries have undergone major transition processes in the last two decades: the formerly centrally planned economies with monolithic pension systems had to change their generous pension systems from the end of the 1990s to the mid 2000's. A wave of structural pension reforms was carried out throughout the region following the World Bank's proposal of a multi-pillar system with funded pillars.

Hungary (in 1998) and Poland (in 1999) were the first countries to implement mandatory, privately-managed pension systems, which were financed by diverting part of the social security contributions into individual savings accounts. With the notable exception of Slovenia and Czech Republic, this model was implemented in several other CEE countries.

A second wave of pension reforms was introduced across the region after last decade's global financial and economic crisis. There was a slowdown in the implementing process, contribution rates to mandatory funded pension systems were reduced and in some countries the mandatory character of the funded system removed. The two forerunners of the 1990's reform wave, Hungary and Poland, went especially far. Between 2010 and 2011, Hungary shut down its second-pillar and

nationalized the assets accumulated there. It widened the entitlements from the first pillar, helping Hungary to come first in the CEE comparison.

Poland switched in 2013 from mandatory to voluntary participation in the second-pillar and transferred 51% of the pension assets back to the (unfunded) state pension system. The savings process has been heavily undermined. As the measures were taken following a worsening of government finances it is as yet uncertain how far the first pillar can compensate this reversal for future retirees. Replacement rates are too low for people who have to build on that public pension pot alone. As the first pillar sub-indicator weighs high, Poland gets a low score for the pension system, with its additional factors scoring better but not enough to compensate. (*see Tab. 2*)

Latvia and Estonia were forced to take consolidating steps and reduce contribution rates to their mandatory funded pension systems. This hindered asset accumulation and only a small pension pot is available. At the same time reductions in replacement rates have put future retirees in an unfavorable financial situation. The NDC pension calculation in Latvia, for example, helps ease the financial pressure on public finances but leaves retirees with small benefit levels, which need to

Table 2: RIA Ranking with sub-indicators – Selected Countries in Eastern Europe

	Overall ranking	Pillar I	Pillar II / III	Non pension wealth	Spending needs	Transition from work
Hungary	9	2	49	2	31	22
Romania	17	19	30	8	26	7
Lithuania	21	29	18	13	32	18
Cyprus	22	16	33	5	44	23
Bulgaria	24	31	22	7	42	5
Croatia	25	32	17	27	10	24
Czech Rep	26	21	28	19	11	33
Slovenia	29	17	45	20	14	39
Latvia	30	27	21	34	40	9
Slovakia	31	30	29	21	28	36
Poland	33	33	32	29	29	25
Estonia	34	37	19	26	21	13
Russia	37	34	42	41	36	14
Turkey	42	28	46	49	24	37

Note: the numbers refer to overall ranks of (sub-)indicators

Source: Allianz International Pensions 2015

be complemented. As a result, these countries rank in the lower half of the ranking. Lithuania on the other hand did not tap into the pension pot. Together with Croatia it has the largest pension assets compared with GDP in the region, giving some support to the retirement income sources of future retirees.

At the end of 2014, Bulgaria made attempts to tap into the assets of the mandatory pension fund. But as it was introduced only recently, there isn't a big pension pot available and the replacement rate from the first pillar is still relatively high. One problem is the high out-of pocket health expenditure which Bulgarians have to deal with but as home-ownership rates are high they have some relief from rental costs. In most CEE countries the home-ownership rate is high, which eases the financial situation (included in the sub-indicator "non-pension wealth"). The Czech Republic ranks in the middle of the CEE countries and overall. The replacement rate is relatively high and due to the increase of the retirement age will even increase slightly. The funded pillar though is underdeveloped and a recently introduced new funded scheme will close again in 2016. Low health expenses and an additional non-pension savings pot support Czech's retirement income sources.

In ten of fourteen CEE countries the sub-indicator "Transition from work" is in green to yellow zones, showing that in this respect there are no or only minor problems. This is mainly due to a shorter time spent in retirement; in most countries the life expectancy at age 65 is still considerably lower than in western European countries, although due to increase in the coming decades.

Turkey, at the low end of the ranking, is an emerging country that needs to tackle the coverage of a large informal workforce.[14] It still has some way to go to build a comprehensive old age provisioning system, although the government has started a program to improve the situation of the elderly. Although Turkey's population is still quite young, it is expected to age fast. By 2050, Turkey will enter the state of an super-aged countries, which means that more than 21% of the population will be 65 years or older. Today it just surpasses the level of 7% to become an aged country. It will have to put the issue of aging on its political agenda soon.

The RIA ranking of most CEE countries shows an alarming state. The latest reform (reversals) in CEE happened at the same time as pension reforms changed relevant state pension parameters, further limiting its generosity. And the diminished pension pots may subsequently be unable to complement the low level of public pensions they were designed to bolster. This could increase the risk of retirees not receiving an adequate retirement income or even falling below the poverty level. Additional retirement income is therefore even more essential for future retirees to maintain their living standards. But in most countries it will be a major task to regain trust in saving for old age and set up the proper incentive structures.

14 Allianz (2014c)

15 See ADB (2012)
16 Allianz (2013b)

ASIA

The financial protection of the elderly in Asia varies considerably across countries. Emerging Asian countries are undergoing fast modernization and urbanization due to strong economic growth. Traditional family and informal support systems are losing importance or have even broken down. Unlike in Europe, comprehensive pension systems in most of Asia still require further development. Increased coverage of the pension system remains a challenge as social protection schemes have historically been weak and fragmented and have failed to keep pace with economic growth.[15] Finding a solution to the challenge is becoming more urgent as Asia is aging fast, the number of people above the age of 60 is increasing fast and there is not much time left to establish a working comprehensive old age provisioning system. Therefore, many Asian governments have introduced a variety of funded pensions implemented or extended formal social protection systems towards a multi-pillar approach.

As this is only a recent development, emerging Asian countries, including India, Indonesia, Thailand and China, are still facing low coverage, although they have made huge efforts to increase coverage during the last 15 years. Not surprisingly, emerging Asian countries are among the ten lowest-ranked countries in the overall RIA comparison, with India and Indonesia ranking worst in the Asian RIA. India has introduced a New Pension System but the major challenge is still to broaden coverage,[16] particularly for the country's large informal workforce and in remote rural

Table 3: RIA Ranking with sub-indicators – Selected Countries in Asia

	Overall ranking	Pillar I	Pillar II / III	Non pension wealth	Spending needs	Transition from work
Japan	5	10	14	25	6	6
South Korea	32	36	27	35	41	2
Taiwan	39	41	25	1	45	28
Singapore	41	45	10	14	48	31
Thailand	43	38	31	38	15	46
China	44	39	43	15	38	15
Hong Kong	45	42	15	47	46	29
Malaysia	47	49	11	42	39	40
India	48	43	34	40	49	27
Indonesia	49	46	47	44	47	30

Note: the numbers refer to overall ranks of (sub-)indicators

Source: Allianz International Pensions 2015

areas, as a recent study by the OECD points out.[17] Indonesia is implementing a new system this year, which also will address the low coverage. Moreover, it has to tackle ill-suited features in the current system as the possibility of early withdrawal and lump sum payments leave the elderly with longevity risk.[18]

Retirement resources can be improved when people have fall-back options. In the case of the four Asian countries, the second and third pillars are still in their infancy or don't even exist yet and cannot compensate for the weak first pillar. Accordingly, they rank low on the sub-indicators. (*see Tab. 3*) Moreover, as economies are just emerging, people in India, Indonesia and Thailand do not have large amounts of non-pension wealth or their wealth is disparately spread. Against this background, they also receive low scores for this sub-indicator. An underdeveloped health system with high out-of pocket expenses (apart from Thailand) adds to the tied financial situation of the elderly in these countries.

Malaysia, Hong Kong and Singapore complete the list of low-ranked countries. People in these countries have to rely on their own accumulated assets. In this sub-indicator (pillar II/III) the three countries rank first among Asian countries and in the top third in the overall RIA. But it depends on the set-up of the schemes whether they are able to deliver a fair amount of income to live on adequately. In Malaysia, for example, people can withdraw money from their pension pot at the early age of 55, leaving the elderly with the risk of running out of money at an older age. Singapore ranks slightly better: it has introduced mandatory annuitization and has widened the asset pot assigned to retirement. At the age of 55, Singaporeans have to set aside the Retirement Sum from their Ordinary and Special savings accounts, which is used to buy an annuity providing lifelong payments from age 65. Moreover, the country gained a higher score in non-pension wealth as the home-ownership rate is high and the mandatory saving to the CPF helps build a broader asset base.

Japan is the best-ranked country in Asia. Good coverage plus a moderate replacement rate puts Japan in a favorable position in terms of adequacy compared with all the other countries under review. Low out of pocket health expenditure and the elderly's strong participation in the workforce provide some relief for the elderly's potentially tied budgets. It is questionable whether this situation is sustainable over the long term: the PSI indicates that Japan needs further reforms as it has the world's oldest population and an increasing number of elderly,[19] placing pressure on pension expenditures amid high public debt and low economic growth.

LATIN AMERICA AND OCEANIA

The Retirement income adequacy in South America, Australia and New Zealand varies from country to country, as do their diverse pension landscapes. They ranked among the best and the worst (*Fig. 3*) in an overall comparison of the 49 countries included in this study.

New Zealand comes in tenth in the overall comparison and first in this regional view (*see Tab. 4*). It scores well on pillar one due to the broad coverage of the New Zealand population with its

17 See Fall, F. and Bloch, D. (2014)
18 See Fall, F. and Bloch, D. (2014)
19 See Allianz (2014a)

residentially based flat rate pension component. They also have low out-of-pocket health expenses and leave the workforce late. Brazil ranks in the top third of countries overall due to the high replacement rate of the first pillar, which has a high weight in our index (*see Appendix on the Indicator in detail*). As in Japan, Brazil performs badly in the Allianz PSI. This indicates that reforms might get on to the political agenda as Brazil is aging fast and the pension system might not be able to alleviate the increasing financial burden on the current system.[20] If benefit levels decrease due to upcoming reforms, Brazil's elderly will not have compensating income sources in place to cushion the cutbacks as scores for the funded pillars, non-pension wealth, spending needs and transition from work are low. Brazil would need to introduce a radical new structure in its old age provisioning system and align it to an aging population, as many countries particularly in Western Europe have already done.

If we just take the funded pillar sub-indicator, Australia would come in at fourth place but when adding the other elements – low ranking on the public pension and on non-pension wealth, medium rankings for spending needs and work participation, it seems that Australia does not have enough compensating factors. The funded pillar might not be adequate, particularly when people take the lump sum option and do not transform their assets into an income stream for the retirement phase.

The other two countries in this regional view, namely Chile and Mexico, are also built on a funded pillar. The system was introduced in Chile in the 1980s; accordingly, it has a considerable amount of available assets. People rely on their accumulated resources and as they draw on their assets relatively late – the effective retirement age for men is 67 – time spent in retirement is shorter than in most countries under review and assets are likely to last throughout retirement. The situation in Mexico is similar, except the mandatory, funded DC system started later – about 15 years ago – and there are not as many available assets as percentage of GDP as in Chile.

20 See Allianz (2014a). As marked by an OECD study Brazil linked the minimum pension to the federal minimum wage to improve the situation for the elderly. But this measure seems to be one of the major drivers of pension spending. Further reforms might be expected. See Fall, F. and Bloch, D. (2014),

Table 4: RIA Ranking with sub-indicators – Selected Countries in Latin America and Oceania

	Overall ranking	Pillar I	Pillar II / III	Non pension wealth	Spending needs	Transition from work
New Zealand	10	5	24	48	8	4
Brazil	16	4	35	43	34	34
Australia	35	44	4	45	22	26
Chile	40	47	8	46	37	3
Mexico	46	48	23	28	43	1

Note: the numbers refer to overall ranks of (sub-)indicators

Source: Allianz International Pensions 2015

Adequacy versus Sustainability

21 Allianz (2014a)

22 The PSI separated the countries into nine groups, with more nuances to discuss sustainability issues in detail but for this contrasting exercise we combine them into three groups to gain an easier overview. See Allianz (2014a).

As already noted, today's pension policy challenge is to balance financial sustainability and the retirement income adequacy of (future) retirees. In previous studies, Allianz International Pensions followed the development of pension reforms introduced due to aging demographics and deteriorating government finances. The Pension Sustainability Index (PSI) focused mainly on the first pillar,[21] with the various characteristics of pension systems and the factors that influence them. The PSI was updated in 2014 and will be compared to the first pillar adequacy in this chapter. Allianz wanted to look at the flip side of reforms as the main reform route reduced the generosity of first pillar pension. In some cases, we have already contrasted the two indicators in this study but want to provide a more detailed overview in this chapter.

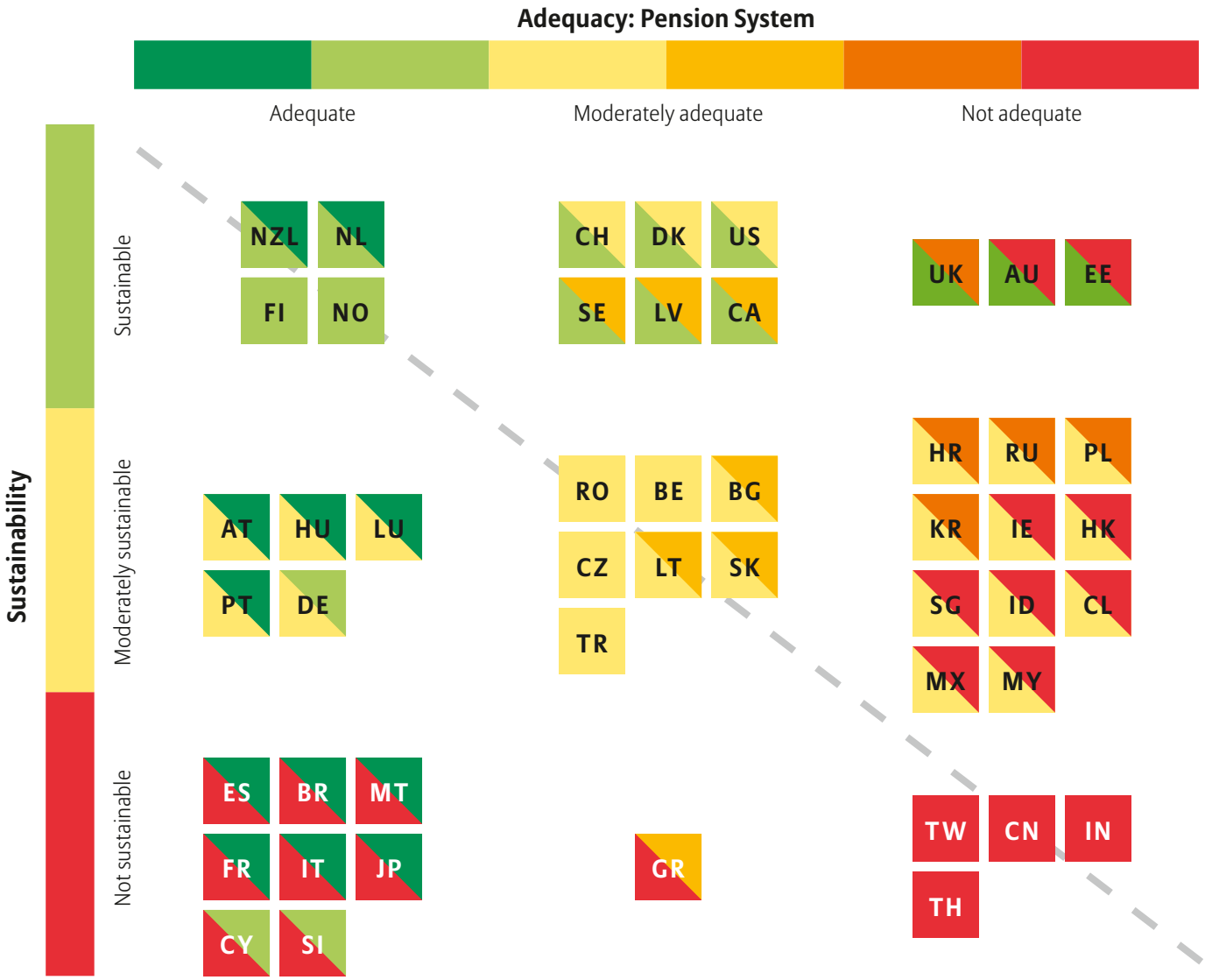
For comparison we contrast the PSI with the sub-indicator "Pillar I". In Figure 4 we cluster the countries into three groups according to their PSI ranking:[22] "green" indicates that the first pillar pension system is scored sustainable in the long run according to the factors we included in the PSI; "yellow" shows countries that might need to make reforms to make the public pension system sustainable; while the "red" countries definitely will need pension reforms, either in generating comprehensive systems and coverage or in implementing reforms in the existing first pillar to cope with aging demographics and fiscal pressure. Within each group (green, yellow and red) we rank the countries according to their RIA sub-indicator score. We can see a country pattern varying between sustainable and adequate (green upper left) to not sustainable and not adequate (red lower right).

The public pension systems of New Zealand, the Netherlands, Norway and Finland seem to be particularly sustainable and able to provide an adequate retirement income. They all have good coverage and deliver a moderate level of basic income. There are 8 countries (Spain, Brazil, Malta, France, Italy, Japan, Cyprus and Slovenia) where the pension system seem to provide an adequate pension level but were ranked unsustainable in the PSI.

All European countries, except for Slovenia, have already introduced major reforms. Italy significantly accelerated its phasing in of reforms as a reaction to the looming debt crisis and deteriorating credibility, However, the country still has to monitor the effects of significant population aging amid substantial fiscal pressure. As already noted in the regional chapter for Asia, Japan has a very old population and a very high sovereign debt level. Considering these factors, the pension system seems to be too expensive, making the need for reform an ongoing concern. Although Brazil is still a young country it is aging fast and the country has to put the resultant challenges on the political agenda. In the long run, it will have to reform the high replacement rate of its pension system and early retirement options.

The situation could be eased in the case of additional options. If a country has already implemented a broad funded system, future retirees will be able to draw an income stream from the accumulated assets. This is also an important topic in countries that rank low in the ranking of the sub-indicator "Pillar I". Australia, for example, is a country that ranked at the top of the sustainability analysis but low in the RIA "Pillar I" results (upper right in figure 4). We also need to expand the view for Chile, Denmark, Ireland, Hong Kong, Mexico, Malaysia, Singapore, Switzerland, the U.S. and the UK. In all countries the funded pillar is supposed to contribute a considerable part of or the entire retirement income.

Figure 4: First pillar systems put to the test: Adequacy versus Sustainability



Source: Allianz International Pensions 2015

In figure 5 we integrated the funded pension scheme sub-indicator of our RIA into the comparison. The adequacy component now consists of the total pension system, making up 70% weighting in our indicator (*see the appendix on construction*). In this comparison, countries with major funded pillars move up in the adequacy ranking: Denmark, Switzerland and the U.S. can all be seen as broadly providing an adequate income.[23] Australia and the UK also move up in the adequacy ranking, as well as Chile, Ireland, Hong Kong, Malaysia, Mexico, Singapore and Croatia but remain in the middle rankings of the RIA. This is because features of the funded pillar have options, which are not favorable for drawing a life-long income stream. Examples are lump sum payments in Ireland, Hong Kong and Australia and/or early withdrawals in Malaysia and Singapore. In some countries accumulated assets are low because the system is still too young, such as in Mexico.

Countries with a strong ranking according to the sub-indicator "Pillar I" are moving in the opposite direction. In the cases of Brazil, France, Italy, Malta, Slovenia and Spain this might become a problem in the long run as they are ranked as more or less unsustainable in the PSI and reforms are necessary here to ease the long-term burden on public finances. In these instances, accompanying measures will have to be introduced to compensate for the first pillar's probably decreasing benefit levels.

The situation in Austria, Hungary, Luxembourg and Portugal is not quite as urgent: their rankings in the PSI indicate only medium pressure to reform. They will need to build strong additional pillars in the event of further reform.

23 It should be noted at this point again that the RIA can only give an average view as it is based on macro data. There can be problems with vulnerable groups, which need to be examined in detail via survey data. There is for example a discussion in the U.S. about the retirement crisis, although a recent study suggests that all elements of the system are okay but need some readjustment; see, Munnell, A. (2015)

Figure 5: Pension pillars put to the test: Adequacy versus Sustainability

Source: Allianz International Pensions 2015

Conclusions

Retirement systems vary drastically across countries. Varying cultural and market specifics mean that countries have different policy approaches to the first pillar – poverty prevention versus retaining living standards – and therefore to the supplementary pillars. But since the 1990s pension systems have been by and large moving in the same direction: sharing risk among governments, companies and individuals in a more balanced way.

This means that the different pillars are increasingly dependent on each other. If a country's public pension system provides a minimum income stream, the funded schemes must generate a higher additional income flow than would be necessary within a more generous system, and vice versa.

Countries that have already built a more balanced multi-pillar system rank at the top of the RIA indicator and it is highly likely that such a system can provide an adequate retirement income. Countries with just one strong pillar – either first pillar or funded pillar – hardly make it to the top. Indeed it is the result of the multi-pillar approach in the RIA but it should indicate the risks included in such a one-sided approach. In the case of a strong first pillar the system might not be financially sustainable, as the pension reform processes in a lot of countries have shown. Compensating measures need to be in place or strengthened. And in an aging society this process has to be monitored continuously. On the other hand the financial crises of the last decades have shown the risks associated with funded systems and that appropriate product designs have to be in place.

A broader view is necessary to gain an idea of the adequacy of elderly retirement income in a country. Moreover, such an approach has to take into account the general situation of the elderly with their special expenditure needs, working possibilities and arrangements, as we mentioned in our RIA approach. Diversification of retirement assets are necessary. An integrated system becomes increasingly important where the different elements are designed according to the role they need to play in the overall system. Particularly countries whose different pillars have developed independently over time will need to rethink the role of their various system elements and adjust accordingly

Appendix A: Construction of the indicator in detail

24 See OECD (2013a)

The indicator comprises two bundles of data: on the one hand pension system characteristics and on the other hand non-pension system criteria. People increasingly have to build on non-pension wealth and take certain expenditures into account that may arise during retirement.

The indicator is built on easily accessible data for international comparisons. It aims to include different income sources. Aggregate data information from the European Commission (EU), International Labor Organisation (ILO), International Monetary Fund (IMF), Organisation for Economic Co-operation and Development (OECD), Worldbank, Asian Development Bank (ADB), as well as national statistics are used for the sub-indicators. The RIA includes 49 countries and focuses on country rankings. We score from 1 – least adequate – to 10 – most adequate – for each characteristic and combine them to sub-indicators, which aggregate to the RIA index. It is important to note that the RIA uses an intervallic scale to determine the ranking since we use quantitative data as well as qualitative elements. Since the index does not have a cardinal order or a metric value, results cannot be used for calculations. Moreover minor differences in the ranking score cannot fully differentiate between countries.

PENSION SYSTEM CRITERIA

Pension system characteristics are the main elements in the RIA; the different pillars of the old age provisioning systems provide the main source of income for the majority of people. Therefore this sub-indicator set gets the larger weighting with 70%. In fact, 70% is often used as a rule of thumb for replacement rates when entering retirement. When looking at different income sources, it reflects the part from the formal pension system; all other sources are complementary. When the OECD analysed the elderly's income sources it found a variation from the 80% income from the pension system in some European countries to 40% in Australia and Canada, or even less than 20% in Chile.[24] On average 70% is deemed appropriate. In most countries pensions from the first pillar are the main source of retirement income, therefore this part has a weighting of 45% in the overall RIA and the funded part 25%.

FIRST PILLAR

- The **replacement rate** – the ratio of retirement income to pre-retirement income – is widely used for evaluating the adequacy of pensions. We include this in our main sub-indicator together with the share of people covered by the social security system in a country. With these factors we basically take a forward-looking approach on retirement readiness.
  There is a debate about which pre-retirement income should be used and what level is adequate; we think the replacement rate has some practical advantages and is available on a broader scale. Moreover in our comparison we can basically ignore these difficulties as we measure the level in countries relative to other countries and score around the mean value.

- It is necessary to include the **coverage rate**, particularly when comparing those countries building comprehensive retirement systems. In emerging Asian countries, for example, where the system is limited to a part of the population (ABD). There, pension systems cover

mainly the urban population, while the rural population and informal workers who make up a large part of the working population in many countries are left out. We combine these two features to make a kind of 'provision level'.[25] Therefore, if for example a replacement rate in a country is high but only a few people receive benefits, the system might only deliver a moderate to low 'provision level'. This level is not fixed or set as a norm in our RIA index, instead country levels score around the mean value of all countries included in the study.

- The **adjustment of pensions** is another factor influencing the longer-term adequacy of pension provision. If pensions are adjusted according to inflation, the pensioner will receive a constant income in real terms but will not participate in the economy's development. On the other hand, if pensions are adjusted according to wage increases, retirees participate in the development of the overall economy and the gap between a retiree's pension and the workers' wages will hardly widen. The retiree will keep a higher income for the time spent in retirement. Thus, wage adjustment gets a higher score in this indicator as a CPI adjustment. Combinations of the two are scored in between, and the discretionary adjustment score even lower.

SECOND AND THIRD PILLAR

With the reform wave in the first pillar leading to decreasing benefit levels, countries introduced or strengthened their second pillar schemes or introduced incentives for individual savings. Income from these schemes will increasingly complement the retirement income of future retirees. The systems are diverse and have developed differently over time, making information on the replacement rate for a country comparison not easily accessible. The information can basically only have been derived from survey data, particularly for those countries in which the system is based on a voluntary participation. Therefore, other features of the second and third pillar are used for the RIA indicator, which have some influence on the coverage and on the potential to generate an adequate income. Features included in the sub-indicator for the second and third pillar are:

- **Coverage:** The participation in a pension scheme is the prerequisite to receiving some kind of benefit from a scheme other than social security. Although it does not say anything about the amount received, the information gives an indication as to how many people may potentially receive an additional retirement income. The information is more easily accessible than the benefit level. Usually statistics show how many members are part of a pension scheme, or similar information. We used OECD data (OECD 2013a) and data from national supervisory authorities. The coverage rates of the different countries score around the mean value on a scale of 1 to 10.

- **Enforcement:** The main driver of coverage is whether the scheme is mandatory or not.[26] Therefore we included this as additional information. The discretionary information: mandatory, quasi mandatory, voluntary with auto-enrolment, voluntary or none is reflected on the scale, with mandatory getting the highest score and "none" the lowest.

- **Employers' contributions:** Contributions from the employer or from the state in the form of some kind of tax relief of incentives usually foster the employee's savings process and help

25 See ABD (2010).

26 As the OECD noted in its Pension outlook 2014, compulsion is the most effective policy in achieving high and uniformly distributed levels of coverage; see OECD (2014b)

build up assets for retirement more rapidly and consistently. Therefore we included employers' contributions as a feature. The respective data are available as percentage of wages in many cases for the main pension scheme. Higher contribution rates received higher scores; where only information on flat rate contribution were available we placed them in the middle score area. Tax incentives are more difficult to grasp. Moreover, as there is a discussion as to whether tax incentives increase savings or simply lead to a substitution effect with other savings products we do not include such a feature at this point.[27] It will be covered via the sub-indicator "non-pension wealth".

- **Pension assets** as % of GDP: pension assets as a percentage of GDP are used as an indicator for market maturity. Countries with a long history of funded pensions have large accumulated volumes. They can generate additional retirement income, complementing first pillar pensions to a significant degree. The assets we used combine pension fund assets, pension insurance and government buffer funds, which exist for example in Japan, Korea or Norway.
  This measure, however, does not reveal anything about the distribution of these assets and whether they cover many employees or just a few. Our approach can only indicate the potential of the overall system. Analysis of detailed data is needed to gain information about cohorts and specific subgroups of the population, which is not the purpose of this cross-country analysis.

- **Pay-out option:** In the decumulation process, an important issue is whether an income stream is generated during the pay-out phase. If a retiree gets a lump sum, he might spend it otherwise and will not be able to complement the social security benefit with any additional income, apart from if the accumulated assets have to be annuitized, which guarantees an income stream over the lifetime. The possibility of early withdrawals also diminishes the potential pension pot. One can argue whether annuitization is always the best option. Taking a lump sum and paying down debt or mortgage might also be good usage of the accumulated assets. This can only be decided in individual cases. By and large it seems to be preferable to have an additional income stream over a longer period of time. In our context "annuitization" scores higher than taking a "lump sum".

27 See a short overview of this discussion in European Central Bank (2009).

28 See chapter on basic idea of the indicator on page 5

29 These aspects can be taken care of in a more detailed approach based on survey data or detailed recordings of social security entitlements; see i.e. CRR (2006)

NON-PENSION SYSTEM CRITERIA

Although the different pillars of the old age provisioning system provide the main source of income for many people, there are other sources that supplement retirement income. When looking at the adequacy of retirement income, you increasingly need to include other income sources, wealth factors and other criteria relevant for a decent standard of living. Some countries already have detailed studies, which try to analyze the financial status with respect to their retirement readiness. These studies try to incorporate as many relevant income sources as possible, for example, social security pension, occupational pension plans, insurance contracts, non-pension wealth and housing wealth.[28] In our RIA indicator analysis we included some of the relevant criteria to provide a complete picture of adequacy. You need to include additional aspects, especially for a country comparison, as countries have set up different frameworks. For that reason we look at non-pension wealth, spending requirements and parameters concerning the transition from work to retirement.

PRIVATE NON-PENSION WEALTH

- **Non-pension financial wealth:** Households have built up other sources of wealth beside pension wealth, from which they can generate income. Therefore, we integrated household wealth into the indicator. As we already scored the funded elements of pension systems we cannot use total financial wealth as a criterion. As there are other motives for saving, for example precautionary saving, we did not include term and sight accounts as they are categorized in the fund of flow statistics of national statistics offices or central banks. Here we used assets of private households invested in capital market products, bonds, shares, mutual funds. It is necessary to relate them to GDP for the country comparison. Financial wealth (excluding pension/insurance and liquidity/assets held in bank accounts) as percentage of GDP of the different countries score around the mean value on a scale of 1 to 10.

- **Home ownership:** Residential wealth in particular makes up a huge portion of that total wealth that households can count on at retirement. On the one hand, households can save rental payments as soon as there is no more mortgage payments. On the other hand, people might draw reverse mortgages or sell their homes and generate an income stream this way. We have to use a proxy for this criterion as there is no data available on housing wealth for such a large range of countries. Therefore, we took home ownership as a percentage of the total number of households. We used Eurostat and national statistical offices as data sources. This proxy scores around the mean value on a scale of 1 to 10.

- **Gini Coefficient:** One difficulty in the macro-approach in our RIA index was being unable to differentiate between different population groups. We are aware that the measures we included reflect an average picture. People with lower income levels are more reliant on public pensions; in voluntary systems they might not be covered as broadly as people in the upper income ranges and they are less able to save money for their old age.[29] The RIA includes the most common and widely used distribution measure, the Gini coefficient, as a proxy for the

inequality of wealth distribution. In a country with a high Gini coefficient, people in the middle to lower income classes are more likely to fall short of the additional financial means that can supplement retirement income. Thus a high coefficient scores low and vice versa, with the values scoring around the mean on a scale of 1 to 10.

SPENDING NEEDS

In the replacement rate approach experts use an agreed upon level of around 70%. There has been a range of discussions as to whether this is a correct benchmark. Usually a retiree does not have to save for retirement anymore and does not pay social security contributions. Additionally, he does not have work related expenses so that, by and large, the retiree should be able to adequately live on a lower income level. The drop in consumption has also been referred to as the retirement consumption puzzle.[30] Survey data from some European countries suggest that there is no decline. A retiree might even face more expenses. We do not take the new leisure possibilities into account, such as more travelling but an important issue is how people cover health insurance expenses.

Out-of-pocket expenses in the health system: Some argue that, dependent on the legal set-up of the health insurance system, people in some countries have to dig deep into their pockets to get an adequate health coverage. This is one reason why experts suggest differing replacement levels.[31] Although it is difficult to grasp and predict how much burden will be put on households with regards to out of pocket payments there is some evidence that these payments might rise faster than wages.[32] With people living longer, and health systems also changing towards securing "necessary" expenses, people have to increasingly pay more out of pocket for minor illnesses and medication. The WHO, the world health organization, and ILO, international labour organization, provide these measures for a wide range of countries. We include out of pocket payment as a percentage of total private expenses.[33] These expenses can diminish spending potential considerably. The values score around the mean on a scale of 1 to 10, with the low value relating to a high score and vice versa.

TRANSITION FROM WORK

If you analyse the mix of retirement income of today's people of age 60 and over, you find a considerable amount of income comes from their employment, although this differs widely between countries. In Korea, for example, 63% of elderly income comes from their work, compared with just 6% in France.[34] Extending the years spent in the workforce directly affects the pension entitlement in the first pillar or the ability to save longer for retirement. These aspects have to be taken into account when analyzing the potential to achieve an adequate retirement income. We do this by including 3 factors:

- **Effective retirement age:** In recent decades, governments have introduced ways to leave the workforce early. With aging societies and the increasing burden on public finances, these options had to be reduced as people received pension payments for increasing periods of time. Nevertheless, in a lot of countries it is still possible to retire early; the pension pot will simply be smaller. Countries with a high effective retirement age, for example Mexico, Korea or Japan

30 See a short overview of this discussion in European Central Bank (2009). The role of raising children on the parents' consumption behavior and necessary retirement income level is discussed in Biggs (2009). And to see the discussion about a somewhat different view at adequacy aims at putting adequate consumption level in focus; see Binswanger, Schunk (2009). The OECD compared six countries with respect to retirement preparedness and discussed the main issues in measuring it in OECD (2014b)

31 Health care costs were included in the National Retirement Risk Index of the Center for Retirement research at Boston College. They showed that the necessary replacement rate should be at 92% instead of 70%. See "Munnell, Soto, Webb, Golub-Sass, Muldoon (2008).

32 McGarry, Skinner(2008)

33 Specifics on health systems are not included as every country has certain forms of social security provision for social health protection; see ILO (2014)

34 OECD (2013a)

score highest. Countries with early retirement opportunities and low effective retirement ages score low, as is the case for France or Thailand.

- **Early retirement:** In some countries there are still options for early retirement, although in a lot of countries retirees have to take reductions into account, which diminish their retirement income for their lifetime. This affects people differently, depending on the regulation. So we include five options: actuarily fair reductions; some fixed reduction below the actuarily fair value; just the reduction, which is the effect of less years of contribution, and the situation where people can receive the maximum possible pension entitlement before the legal retirement age because they fulfill the requirement for the contribution period. The latter is the most suitable for the retiree and scores highest in the RIA index. It should be noted that this contradicts the provider's perspective, with the government mostly underlining the problem of financial sustainability.

- **Time spent in retirement:** For countries with strong funded pillars and where people have to draw their income stream from their accumulated assets, the time spent in retirement is an important feature, particularly in view of increasing longevity. The time span varies between roughly 12 to 13 years in Mexico, Korea and Russia to around 22 in Belgium, France, Italy, Luxemburg and Hong Kong. The values score around the mean on a scale of 1 to 10, with the short period relating to a high score and vice versa.

35 There is another indicator for a country comparison, which includes this factor and measures it as percent of the elderly living in households with their adult children; see Jackson, Howe, Nakashima (2013).

BOX: FAMILY SUPPORT

In emerging markets the elderly have traditionally relied on family support. But with industrialization and urbanization, traditional family structures have started to change. Moreover, decreasing fertility rates have led to smaller families, thereby placing a greater burden on fewer shoulders. Governments need to step in and introduce more formalized support systems. But in a lot of emerging countries this has started only recently. In these countries family support remains an important safety net. We are aware that this aspect should be taken into account when constructing the indicator. But missing data and a clear definition on how to measure family support means we did not include this factor, also because we wanted to look at the formalized provisioning system and conditions.[35] Including it would mean weighing this factor against the safety net in developed countries. We tried that and found that the factor would not vary much across countries, therefore adding no additional input.

We have marked the ranking and tables with the sub-indicators with a color coding. Colors vary between green and red, indicating differing levels of readiness to deliver an adequate income. Countries with the same color score very closely with respect to the (sub-)indicator. As the index does not have a cardinal order or a metric value, the scores cannot show absolute differences and the results cannot be used for calculations. Moreover, minor differences in the score and thus the ranking cannot fully differentiate between countries. Therefore we used the color coding for orientation.

Appendix B: RIA – Total and sub-indicator scores

Overall		Pillar I		Pillar II/III		Non pension wealth		Spending needs		Transition from work	
NL	7.52	AT	9.2	CH	9.9	TW	8.4	NL	10.0	MX	9.6
DK	6.86	HU	8.6	NL	9.7	HU	8.4	UK	10.0	KR	8.8
NO	6.76	ES	7.4	DK	9.5	SE	8.2	FR	10.0	CL	8.8
CH	6.67	BR	7.4	AU	9.0	BE	8.0	DK	9.0	NZL	8.4
JP	6.62	NZL	7.0	US	8.8	IT	7.6	NO	9.0	BG	7.6
US	6.61	LU	6.8	UK	8.0	CY	7.6	JP	9.0	JP	7.6
AT	6.59	MT	6.8	SE	7.9	BG	7.4	US	9.0	RO	7.2
SE	6.46	NL	6.6	CL	7.8	RO	7.4	NZL	9.0	PT	7.2
HU	6.28	NO	6.6	CA	7.5	PT	7.2	DE	9.0	LV	7.2
NZL	6.18	JP	6.6	SG	7.4	FI	7.0	HR	9.0	NL	6.8
FI	6.16	DE	6.6	MY	7.0	DK	7.0	CZ	9.0	NO	6.8
CA	6.10	IT	6.6	NO	6.7	CA	7.0	LU	9.0	US	6.8
DE	5.90	FR	6.6	FI	6.6	LT	7.0	MT	9.0	EE	6.8
UK	5.84	FI	6.0	JP	6.0	SG	6.8	SI	9.0	RU	6.8
ES	5.71	PT	6.0	HK	5.9	CN	6.8	TH	9.0	CN	6.8
BR	5.58	CY	6.0	IE	5.6	US	6.8	AT	8.0	DK	6.4
RO	5.57	SI	6.0	HR	5.6	ES	6.8	SE	8.0	UK	6.4
PT	5.49	CH	5.4	LT	5.5	NO	6.6	FI	8.0	LT	6.4
IT	5.49	RO	5.4	EE	5.0	CZ	6.6	CA	8.0	IE	6.4
FR	5.47	DK	5.2	DE	5.0	SI	6.6	BE	8.0	SE	6.0
LT	5.44	CZ	5.2	BG	5.0	SK	6.6	EE	8.0	CH	6.0
CY	5.36	GR	5.2	LV	5.0	AT	6.4	AU	8.0	HU	6.0
BE	5.35	US	5.0	MX	4.9	FR	6.4	IE	8.0	CY	6.0
BG	5.33	SE	5.0	NZL	4.7	NL	6.2	TR	8.0	HR	6.0
HR	5.32	CA	5.0	TW	4.4	JP	6.2	ES	7.0	PL	6.0
CZ	5.30	BE	5.0	BE	4.2	EE	6.2	RO	7.0	AU	6.0

Overall		Pillar I		Pillar II/III		Non pension wealth		Spending needs		Transition from work	
LU	5.27	LV	5.0	CZ	4.0	HR	6.0	IT	7.0	IN	6.0
MT	5.27	TR	5.0	SK	3.9	MX	6.0	SK	7.0	TW	5.6
SI	5.27	LT	4.6	RO	3.8	PL	6.0	PL	7.0	HK	5.6
LV	5.25	SK	4.6	KR	3.5	GR	6.0	CH	6.0	ID	5.6
SK	4.88	BG	4.6	TH	3.4	CH	5.8	HU	6.0	SG	5.6
KR	4.70	HR	4.4	PL	3.4	MT	5.8	LT	6.0	CA	5.2
PL	4.68	PL	4.4	CY	3.3	LU	5.8	GR	6.0	CZ	5.2
EE	4.61	RU	4.4	IN	3.2	LV	5.6	BR	5.0	BR	5.2
AU	4.50	UK	4.2	BR	3.1	KR	5.6	PT	5.0	DE	4.8
IE	4.43	KR	4.2	AT	3.1	UK	5.4	RU	5.0	SK	4.8
RU	4.27	EE	3.0	PT	2.9	IE	5.4	CL	5.0	TR	4.8
GR	4.25	TH	3.0	FR	2.9	TH	5.4	CN	5.0	BE	4.4
TW	4.20	CN	2.8	IT	2.8	DE	5.0	MY	5.0	SI	4.4
CL	4.17	IE	2.6	SI	2.7	IN	5.0	LV	4.0	MY	4.4
SG	4.12	TW	2.6	ES	2.4	RU	5.0	KR	4.0	ES	4.0
TR	4.10	HK	2.2	RU	2.4	MY	4.8	BG	3.0	FI	3.6
TH	3.82	IN	1.8	CN	2.3	BR	4.6	MX	3.0	GR	3.6
CN	3.80	AU	1.4	LU	2.1	ID	4.6	CY	2.0	LU	3.6
HK	3.73	SG	1.4	MT	2.1	AU	4.2	TW	2.0	MT	3.6
MX	3.68	ID	1.4	TR	2.1	CL	4.2	HK	2.0	TH	3.6
MY	3.62	CL	1.0	ID	2.0	HK	4.0	ID	2.0	AT	3.2
IN	3.01	MX	1.0	GR	1.4	NZL	3.8	SG	1.0	IT	3.2
ID	2.48	MY	1.0	HU	1.0	TR	3.0	IN	1.0	FR	3.2

Abbreviations

(Country Codes according to ISO 3166-1-alpha-2)

ADB ..... Asian Development Bank
AT ..... Austria
AU ..... Australia
BE ..... Belgium
BG ..... Bulgaria
BR ..... Brazil
CA ..... Canada
CEE ..... Central and eastern Europe
CH ..... Switzerland
CL ..... Chile
CN ..... China
CZ ..... Czech Republic
CY ..... Cyprus
DB ..... Defined benefit
DC ..... Defined contribution
DE ..... Germany
DK ..... Denmark
EC ..... European Commission
ECB ..... European Central Bank
EE ..... Estonia
ES ..... Spain
FI ..... Finland
FR ..... France
GDP ..... Gross domestic product
GR ..... Greece
HK ..... Hong Kong
HR ..... Croatia
HU ..... Hungary
IE ..... Ireland
ILO ..... International labor Organization
IN ..... India
ID ..... Indonesia
IDB ..... Inter-American Development Bank
IT ..... Italy
JP ..... Japan
KR ..... South Korea
LT ..... Lithuania
LU ..... Luxemburg
LV ..... Latvia
MT ..... Malta
MX ..... Mexico
MY ..... Malaysia
NDC ..... Notional defined contribution
NL ..... Netherlands
NO ..... Norway
NZ ..... New Zealand
NZA ..... New Zealand Superannuation
OECD ..... Organization for Economic Co-operation and Development
PAYG ..... Pay-as-you-go
PL ..... Poland
PPI ..... Pension Policy Institute
PSI ..... Pension Sustainability Index
PT ..... Portugal
RIA ..... Retirement Income Adequacy
RU ..... Russian Federation
RO ..... Romania
SE ..... Sweden
SG ..... Singapore
SI ..... Slovenia
SK ..... Slovak Republic
TH ..... Thailand
TR ..... Turkey
TW ..... Taiwan
UK ..... United Kingdom
UN ..... United Nations
US ..... United States

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