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Pension Sustainability Index – Underlying methodology and data requirements

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CONTENTS

03 Introduction: Building a Pension Sustainability Index for Africa

04 Part I: The PSI methodology

- 04 The case for a composite indicator
- 05 The theoretical framework: 4 dimensions...
- 06 ...16 parameters to reflect both the present and future....
- 06 Sub-component 1 : Demographics
- 07 Sub-component 2: Public finances
- 08 Sub-component 3: Pension system design
- 09 Sub-component 4: Reform momentum
- 10 ...combined into 1 single indicator: the case of South Africa

11 Part II: Applying the PSI methodology: prerequisites

- 11 A composite indicator is only as good as the data it is made of
- 12 Cross-country comparison requires harmonization

13 Conclusion

14 Reference list

16 Selected publications

Introduction

Building a Pension Sustainability Index for Africa

In his 2013 book *Poor Numbers: How We Are Misled by African Development Statistics and What to Do About it*, economic historian Morten Jerven claimed that one of the most urgent challenges in African economic development is to improve statistical capacity. This is painfully and particularly true for pensions in Africa.

Yet like populations elsewhere, African societies are entering into a process of aging that raises the question how to cope with the double-edged sword of longer lives.

According to the latest UN World Population report, the number of persons aged 60 years and older is expected to rise by 64% per cent in Africa in the coming 15 years. As urbanization is increasing in most African countries, family structures are changing and elderly people are likely to live more independently than in the past. Designing old-age provisioning schemes to provide an adequate safety net for the elderly and to encourage workers to plan and save for their retirement is crucial. At the same time, setting up a system that is financially sustainable in the long run is of paramount importance for governments of emerging economies.

While the concept of “financial sustainability” might seem easy to grasp, assessing it in a quantitative way to allow cross-country comparisons is quite challenging.

To provide a sense of direction, Allianz has developed a composite indicator – the Pension Sustainability Index (PSI) – to assess the financial sustainability of old-age provisioning schemes around the world. Combining a pension system’s various characteristics with the factors that influence them, the PSI provides an indication of a country’s need for reforms and helps to identify best practice pension policies.

While the PSI has been expanded since its inception to include more than 50 countries around the world, the African presence in the index remains extremely light, mainly because of a lack of quality data to be fed into the index. Expanding the PSI methodology to more African countries would be beneficial not only to policy- and decision makers in these countries, but it would also contribute to the global debate on pensions by bringing new insights from an underrepresented part of the world.

This report aims to explain the methodology and data behind Allianz’ Pension Sustainability Index and provide an opportunity for countries wishing to be included to better understand the data and the effort necessary for such an undertaking.

Part I

The PSI methodology

1 See breakout box

THE CASE FOR A COMPOSITE INDICATOR

The financial sustainability of public pensions came to prominence in the mid-nineties with a World Bank wake-up call. Observing the world's rapid aging, the institution warned of a looming old-age crisis, likely to manifest itself in two ways: a significant increase in old-age poverty in countries with no existing old-age provisioning scheme and the financial collapse of existing pay-as-you-go pension schemes.

Emphasizing the importance of income security in old age, the World Bank invited policymakers and experts to rethink pension systems' design along several criteria. One of them was financial sustainability, that is ensuring that a pension system remains affordable and financially sound in the long run.

Yet defining the concept of sustainability hardly makes it more tangible. The question is how to effectively measure the financial sustainability of a pension system and monitor its evolution?

Sustainability may seem so evasive because it is a multi-dimensional concept. The same factor can affect it differently depending on the context. For instance, a retirement age of 62 has a smaller effect on sustainability in a country where life expectancy at retirement age is 15 years compared to a country where it is 25.

Similarly, a pension scheme with a retirement age of 62 can be sustainable for some time. But if life expectancy improves rapidly over the same period of time, it may hardly be sustainable in the longer run.

It is in this context that Allianz developed a composite indicator¹ including 16 different variables in an effort to provide an objective measure of the sustainability of any pension system worldwide, factoring in the specificities of each system and of each country to provide a reform pressure gauge. This index can indicate societies where reforms are most likely or most needed.

Constructing a composite indicator is a multi-step process which includes:

- developing a theoretical framework
- selecting variables
- normalizing, weighting and aggregating data into one final indicator

This three-step process has been carefully observed during the inception of the PSI and is explained in more detail in the following three sections.

BREAKOUT BOX

The Allianz Pension Sustainability Index was developed by Dr. Renate Finke, Senior Economist, in cooperation with Brigitte Miksa, head of International Pensions and Chief Executive Editor of PROJECTM.

It was initially called the Pension Reform Pressure Gauge and was published for the first time in 2004 with a focus on Central and Eastern European countries. The composite indicator was further developed over the following five years and progressively extended to more than 50 countries.

In 2015, the Pension Sustainability Index was complemented by a new composite indicator focusing on the ability of old-age provisioning schemes to generate adequate retirement incomes, called the Allianz Retirement Income Adequacy Index.

2 OECD, Handbook on Constructing Composite Indicators, Methodology and User Guide, 2008, p.22, <https://www.oecd.org/std/42495745.pdf>

3 World Bank, Averting the Old-Age Crisis, 1994, <http://documents.worldbank.org/curated/en/973571468174557899/pdf/multi-page.pdf>

THE THEORETICAL FRAMEWORK: 4 DIMENSIONS...

“A sound theoretical framework is the starting point in constructing composite indicators,” the OECD states in its handbook on the construction of composite indicators. “The framework should define the phenomenon that is to be measured including its sub-components. It should also select individual indicators and weights that reflect their relative importance and the dimensions of the overall composite.”²

Allianz developed the Pension Sustainability Index on the basis of the World Bank pension analysis framework³. In it, the World Bank identifies three dimensions likely to negatively impact the financial sustainability of pension systems:

- Rapid aging due to lower fertility rates and increasing life expectancies
- Strained public finances
- “Flaws” in the design of pension systems

These three dimensions – demographic change, public finances and pension system design – make up the basis of the Pension Sustainability Index, along with a fourth dimension added by Allianz: reform momentum, which factors in the likelihood of reforms being implemented shortly.

Although identifying the main drivers of financial sustainability of public pension schemes is a critical step in the construction of a composite indicator, it is far from being the end of the process. Indeed, how to come up with one single indicator for demographic pressure or fiscal leeway for instance? How to aggregate data with different measurement units?

Several variables have thus been carefully selected for each sub-indicator in order to account for all aspects of each dimension. As these variables have different measurement units, the value of each variable of each sub-group needs to be normalized using a scale ranging from 1 (the worst score) to 10 (best). It is then possible to aggregate the data into one single score for each sub-group ranging from 1 to 10. The scores’ mean for each dimension provides the final pension sustainability score. The data selection, normalization, weighting and aggregation is explained in detail in the following sections.

...16 PARAMETERS TO REFLECT BOTH PRESENT AND FUTURE....

The PSI includes 16 different variables divided into the four sub-components discussed above. As the PSI is forward-looking, the 16 variables have been carefully selected to reflect the current state of a pension system, but also to describe how it will likely evolve. Data availability, quality and timeliness have also played a significant role in the selection process.

SUB-COMPONENT 1: DEMOGRAPHICS

The demographics sub-component is made up of three indicators described below. They evolved from the concept of the old-age dependency ratio (OAD), that is the share of population aged 65 and older versus the share of those aged between 15 and 64. The old-age dependency ratio gives a clear indication of a country's demographic profile. A country with a young population may be in a more comfortable position today, but a rapidly aging society may be left with little time to implement reforms.

- **The 2010 old-age dependency ratio (weight: 0.2):** the OAD ratio takes into account the starting level of the aging process in a country. A younger demographic profile may put a country in a more comfortable position today. However, as pension systems are heavily influenced by future demographic developments, the current OAD ratio receives a smaller weight than the 2050 old-age dependency ratio.

Table 1: Projection variants in terms of assumptions for fertility, mortality and international migration

PROJECT VARIANT	ASSUMPTIONS		
	Fertility	Mortality	International migration
Low fertility	Low	Normal	Normal
Medium fertility	Medium	Normal	Normal
High fertility	High	Normal	Normal
Constant-fertility	Constant as of 2010-2015	Normal	Normal
Instant-replacement-fertility	Instant-replacement as of 2015-2020	Normal	Normal
Constant-mortality	Medium	Constant as of 2010-2015	Normal
No change	Constant as of 2010-2015	Constant as of 2010-2015	Normal
Zero-migration	Medium	Normal	Zero as of 2015-2020

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, Methodology of the United Nations Population Estimates and Projections. ESA/P/WP.242.

4 Except for Taiwan which is not included in the S&P report. As a general rule, data from international sources is complemented when necessary with carefully selected data from national sources.

- **The 2050 old-age dependency ratio (weight: 0.4):** The future OAD ratio measures the absolute level of the burden of aging on a pension system. For countries whose public pension system is fully funded (and not financed on a pay-as-you-go basis), the 2050 OAD is corrected by an adjustment factor of 0,8 as demographic pressure is of lower significance to them.
- **Change in OAD 2010 vs. 2050 (weight: 0.4):** The change in the OAD (calculated as the relative difference between both indicators) is included to take into account the speed of aging. Societies which are aging rapidly have a shorter time to adapt, putting stronger pressure on them to reform their pension systems.

The Allianz Pension Sustainability Index uses the population projections published and updated by the United Nations every two years to calculate the demographic score of each country. The population projections are made using a set of different assumptions on different fertility, mortality and international migration scenarios. Allianz Pension Sustainability Index uses the medium fertility projection variant.

SUB COMPONENT 2: PUBLIC FINANCES

Four indicators have been included in the public finances sub-component to gauge the pressure the publicly managed part of the pension system has on public finances, as well as the fiscal leeway:

- **Current public pension expenditures (% of GDP – weight: 0.4) and expected change in public pension expenditures (+40 year horizon – in p.p. - weight: 0.2):** Current and projected pension expenditures make up the bulk of the sub-indicator “Public finances”, as they are a key measure of the pressure exerted by the publicly managed part of the pension system on public finances. Current pension expenditures receive a higher weight as pension reforms are more likely to be triggered by the current situation, rather than by bleak predictions about the future.
- **General government debt (% of GDP – weight: 0.3):** Fiscal debt is factored in to take into account how far public finances can be stretched to address increasing old-age expenditures. It receives a relatively high weight as fiscal crises often trigger profound reforms.
- **Distance to social assistance level (weight: 0.1):** The distance to social assistance (calculated as the difference between a replacement rate of 50% and the current replacement rate from all the mandatory schemes) captures the possible need for additional resources to be spent by the government to tackle the problem of old-age poverty – in case the replacement rate is too low. As the effect of an increase in old-age poverty represents only a secondary aspect when looking at the financial sustainability of the first pillar, it receives a relatively small weight.

The public pension spending figures and projections are taken from the Standard and Poor’s biennial *Global Aging Report*⁴. The general government debt data comes from the IMF World Economic Outlook Database.

SUB-COMPONENT 3: PENSION SYSTEM DESIGN

A pension system can remain sustainable only if it has been designed to cope with changes over time. A very generous system (offering large pension benefits and/or the possibility to retire at a relatively young age) can be financially sustainable as long as the population is young (the number of beneficiaries is low compared to the number of contributors), for instance. But if the population ages fast and the number of retirees increases as well while contributions do not keep pace with these changes, such a system can rapidly become unsustainable.

Other parameters of a pension system can also greatly influence its financial sustainability, even if everything else remains equal. This is true for indexation rules. Whether public pension benefits are indexed to inflation, wage growth, or both or not indexed at all has a significant impact on public pension spending. Allianz has selected five indicators to best capture the complexities of all pension systems and assess how well each one of them can cope with expected changes, such as aging, and time.

- **Retirement age (legal, including scheduled increases, and effective – weights: 0.15 each):** As populations age, the retirement age and its evolution is a crucial indicator of long-term financial sustainability. As various early-retirement options are in place in many countries, both the legal and the effective retirement ages are factored in the calculation of the index and together account for a third of the sub-indicator's score.
- **Gross replacement rate (1st pillar only – weight: 0.3):** The replacement rate of the first pillar is a key indicator of the generosity of a public pension scheme. The higher the replacement rate, the higher the pressure on public finances, the lower the country's PSI score. Given the importance of this indicator, it has been assigned a relatively large weight.
- **Coverage of the workforce (weight: 0.3):** A low coverage rate can significantly and negatively impact public finances. Indeed, if individuals are not incentivized to save for retirement during their working life, they are likely to need financial assistance once they are too old to work, which may further strain the public budget.
- **Reserve fund assets (weight: 0.05):** Public pension schemes are sometimes partially funded, which means that reserve assets have been set aside and provide a safety cushion. Reserves are only a short-term solution though, that's why a relatively low weight has been assigned to this variable.
- **Pension fund assets (weight: 0.05):** The amount of pension fund assets is an indicator of the development of the second and/or third pillar(s). Well-developed second and third pillars mean less pressure on the first pillar and greater room to reduce the replacement rate of the first pillar if necessary.

The gross replacement rate estimates come from the OECD biennial report Pensions at a Glance. Pension fund assets and reserve fund assets' estimates also come from the OECD. Data for the retirement age and the coverage of the workforce comes from different sources including the OECD, the EU commission, the US Social Security Administration and national sources.

SUB-COMPONENT 4: REFORM MOMENTUM

As mentioned above, the Pension Sustainability Index aims to be forward-looking, taking reform measures into account. In addition, the PSI aims to indicate where reforms are most likely. For this reason, Allianz added a qualitative measure of the reform momentum which has been assigned a weight of 0.6. The qualitative assessment is made by Allianz pension experts, based on the continuous observation and comparison of reform trends in the pension area worldwide.

- **Evolution of the replacement rate of the first pillar (35 years – weight: 0.3):** The first pillar replacement rate is a key indicator of the public pension scheme's generosity. As populations are aging, public pension schemes have to keep replacement rates in check.
- **Evolution of the distance to social assistance level (35 years – weight: 0.1):** While reforming pension schemes, policy-makers face the difficult task of balancing financial sustainability and retirement income adequacy. Poorly designed reforms may result in a steep decline in income adequacy, significantly increasing old-age poverty. Such reforms are counter-productive as the state will have to provide financial assistance. As the focus of this index is on sustainability, the weight assigned to this variable is relatively small.

...COMBINED INTO 1 SINGLE SCORE: FOCUS ON SOUTH AFRICA

The variables of each sub-group are normalized, that is translated into one single score ranging from 1 (the worst score) to 10 (best). Let's see how it works in practice in the case of South Africa.

In 2010, South Africa had an old-age dependency ratio of 8%. The United Nations projected in 2015 that this ratio would be almost twice (1,9) as high in 2050, reaching 15%. Using a scale developed by Allianz researcher Renate Finke, the value of each variable is normalized and South Africa's demographic score can then be calculated as follows:

				DEMOGRAPHY		
				Old age dependency rate		
SCALE	2010	2050	change			
10	0	15.0	0.5			
9	15	30.0	1			
8	20	35.0	1.5			
7	25	40.0	2			
6	30	45.0	2.5			
5	35	50.0	3.0			
4	40	55.0	3.5			
3	45	60.0	4			
2	50	65.0	4.5			
1	55	70.0	5			

$$10 \cdot 0,2 + 10 \cdot 0,4 \cdot 8 \cdot 0,4 = 9,2$$

The same methodology is applied for each sub-indicator (see Appendix 1 for the full categorical scale). The average of the scores of all sub-indicators gives the final pension sustainability score.

Part II

Applying the PSI methodology: prerequisites

5 OECD, Handbook on Constructing Composite Indicators, Methodology and User Guide, 2008, p.17, <https://www.oecd.org/std/42495745.pdf>

A COMPOSITE INDICATOR IS ONLY AS GOOD AS THE DATA IT IS MADE OF

“The quality of a composite indicator as well as the soundness of the messages it conveys depend not only on the methodology used in its construction but primarily on [...] the data used.”⁵

As highlighted at the beginning of this report, a good composite indicator can be very valuable as it brings several advantages: it can help apprehend a multidimensional concept, enables comparisons between complex dimensions as well as help assess progress over time. Nevertheless, a poorly constructed composite indicator can have significant negative consequences as listed by the OECD:

- It may send misleading policy messages
- It may disguise serious failings in some dimensions and increase the difficulty of identifying proper remedial action
- It may lead to inappropriate policies if dimensions of performance that are difficult to measure are ignored.

High quality data is of paramount importance to a good composite indicator. But what does high quality mean? The OECD has identified several criteria to determine the quality of the data, and among them, three are especially crucial:

- The data must be coherent over time
- The data should be published in a timely manner
- The credibility of the source is relevant: “one important aspect is trust in the objectivity of the data. This implies that the data are perceived to be produced professionally in accordance with appropriate statistical standards and policies and that practices are transparent [...]. Other things being equal, data produced by “official sources” (e.g. national statistical offices or other public bodies working under national statistical regulations or codes of conduct) should be preferred to other sources.”

Unfortunately, at this stage, pension-related data from most sub-Saharan African countries – when available – does not satisfy these criteria. It is therefore not possible to include more countries into the PSI ranking without the risk of sending wrong messages.

6 European Commission, The EU 2015 Ageing Report, Underlying Assumptions and Projection Methodologies, http://ec.europa.eu/economy_finance/publications/european_economy/2014/pdf/ee8_en.pdf

CROSS-COUNTRY COMPARISON REQUIRES HARMONIZATION

One objective of the Allianz Pension Sustainability Index is to enable cross-country comparisons by offering a systematic way to assess the financial soundness of a system. Changes in the ranking are as – if not more – important to assess the evolution in one country as are changes in the sustainability score itself. However, each system has its own specificities. To be able to compare data between countries, the data needs to be coherent across countries.

Harmonizing data related to public spending on pensions is an especially complex, time-consuming and difficult task. Allianz relies on international institutions to carry out this task. The diversity of pension systems makes it difficult to use one centralized framework for all countries. The European Commission, for instance, which publishes projections of public spending on pensions for each member state every two years, does not use one common model but asks every single member state to make its own projections using national models “run on the basis of the commonly agreed underlying assumptions”⁶. As part of a reviewing process, the EU commission then asks member states to adjust their projections so the results can be compared.

This arduous and technical reviewing and harmonization process cannot be carried by a company such as Allianz. This is better placed with independent authorities such as the European Commission or the OECD. The set-up of a similar and regular process of data collection and harmonization across African countries would be a decisive step towards the inclusion of more African countries into the Allianz Pension Sustainability Index. This would in turn improve the understanding of the aging and retirement challenges faced by sub-Saharan African countries.

Conclusion

7 Edward Whitehouse, Pensions Panorama, The World Bank, 2007, <https://openknowledge.worldbank.org/handle/10986/7177>

“The comparison of [pension] systems across countries are crucial parts of policy analysis and reform,” says Edward Whitehouse, a leading expert in the field of pensions. “This is equally valid for the high-income countries of the OECD as it is for the low- and middle-income countries [...]. Yet, such [...] comparisons are far from easy, and they require a well-thought-through methodology, access to detailed information at the country level, verification of information and outcome by country specialists, and a network of pension experts who provide feedback and input [...]”⁷

Over the past 15 years, initiatives launched by the OECD and the World Bank have greatly contributed to better pension statistics around the world, thereby enabling reliable cross-country comparisons. These have been beneficial to policy-makers, allowing them to better identify and understand existing and potential challenges faced by their own old-age provisioning schemes and the different solutions that could help them address these issues.

The Allianz Pension Sustainability Index is built upon reliable data and offers a unique view into the complex topic of financial sustainability of pension systems. Data on pension and retirement-related issues from African countries would contribute to deepen the existing knowledge on the dynamics of pension systems around the world. It would also help local governments and policy-makers tackle forthcoming challenges and pick the right and most appropriate tools to do so.

Appendix

Categorial scale

Scale	DEMOGRAPHY			FISCAL SITUATION			
	Old age dependency ratio (OAD)			2015	2050	2015	
	2010	2050	Change (relative difference between 2010 and 2050 OAD)	Public spending on pensions (% of GDP)	Change in public spending on pension as share of GDP (pp)	General government debt (% GDP)	Distance to Social assistance level
10	0	15	0.5	0.0	-4.0	0	-40
9	15	30	1	3.5	-2.0	20	-20
8	20	35	1.5	5.0	-1.0	40	-10
7	25	40	2	6.5	0.0	60	0
6	30	45	2.5	8.0	1.0	80	5
5	35	50	3.0	9.5	2.0	90	10
4	40	55	3.5	11.0	4.0	100	15
3	45	60	4	12.5	5.0	120	20
2	50	65	4.5	14.0	7.0	150	30
1	55	70	5.0	15.5	9.0	200	40

Scale	PENSION SYSTEM DESIGN						REFORM MOMENTUM		
	Retirement entry age		Gross replacement rate (1st pillar only)	Coverage (workforce)	Reserve fund assets (% of GDP)	Pension fund assets (% of GDP)	2050		Qualitative reform valuation
	Statutory (incl. scheduled increases)	Effective					Change in replacement rate (1st pillar only – pp)	Distance to Social assistance level	
10	67	67	5	100	60	150	-40	-40	
9	66	66	20	90	40	120	-20	-20	
8	65	65	30	80	20	90	-10	-10	
7	64	64	40	70	15	75	-5	0	
6	63	63	50	60	10	60	0	5	
5	62	62	60	50	5	45	5	10	
4	61	61	70	40	2	30	10	15	
3	59	59	80	30	0	15	20	20	
2	57	57	90	20		5	40	30	
1	55	55	100	5		0	60	40	

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