# Measuring vulnerabilities to improve aid allocation, especially in Africa

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### Foreword

This book is part of a long research conducted at FERDI about vulnerability and the allocation of foreign aid. For more than 10 years, FERDI has argued that aid allocation should take into account the vulnerability of recipient countries. FERDI has produced a variety of theoretical and practical work on the subject, and progress has been made in this area on the international scene. Firstly, the United Nations General Assembly adopted a resolution on the "soft" transition out of the category of Least Developed Country (LDC), which invites partner countries to use the criteria used to identify LDCs, one of which is vulnerability, the other two being per capita income and a human capital indicator, as criteria for allocating aid. Secondly, the European Commission adopted an aid allocation formula prepared by FERDI which uses these criteria for the allocation of the European Development Fund and the Development Cooperation Instrument.

Multilateral development banks use an allocation formula that makes explicit the criteria they use, so it was natural that the question of introducing vulnerability into their formulas should be raised. As the African Development Bank (ADB) has a prominent role in dealing with fragility, the question was particularly relevant in its case. The African Development Bank took the initiative, in collaboration with the board members of the African Development Fund, to initiate a study on the subject, and after a call for tenders, asked FERDI to work with it in this study. Two reports were produced in 2016 and 2018 which examined the limitations of the current system, reviewed indicators that could be used to improve it, and proposed formulas and options for a new allocation policy. This study was an opportunity for many fruitful exchanges between FERDI and the management of the Bank, and also, during test and presentation missions, in fragile African countries between FERDI and political leaders and the civil society of these countries.

This book has benefited deeply from this study. It is the sole responsibility of its authors and does not reflect the views of the African Development Bank Group. It does not have the operational focus of the study prepared for the African Development Bank, but in light of the experience of the African Development Bank and of other multilateral development banks (the World Bank in particular), and based on a large body of past research by FERDI, it presents a conceptual framework to take into account the different forms of vulnerability in the allocation process. It shows that it is possible to do this without calling into question the principle of performance-based allocation, a principle to which funders are attached, but on the contrary makes performance-based allocation more credible.

This work, in its present form, was finished at the beginning of summer 2019. Editorial reasons led to the publication being pushed back to this period of the

coronavirus pandemic which is throwing an unforgiving light onto the importance of the attention paid to the problems of vulnerability by politicians. The analysis which follows does not deal specifically with the vulnerability which results from a global health shock like coronavirus because it deals with natural shocks which are recurrent or increasing in magnitude, and are different for different countries. However, the analysis contributes in two ways to taking the global coronavirus pandemic into account. Firstly, the effect of coronavirus will be felt differently in the different countries covered in this book depending on the indicators of economic vulnerability and societal vulnerability proposed in this book. Secondly, the structural factors of resilience are similar whatever the nature of the shock. It just needs to be noted that the response to exceptional global shocks like coronavirus cannot be met by a process of regular aid allocations, but rather by exceptional measures. After what is hoped will be an immediate international response to the coronavirus shock, if the future aid allocation is made on the principles proposed in this book the criteria used would naturally reflect the shock received from coronavirus depending on the country.

Our thanks must go to the many people within the Bank and in the African countries, be they government officials or civil society, and in the donors of the multilateral banks, who have exchanged with the authors of this book. Many contributions are also to be noted and thanked by FERDI personnel, first and foremost that of Sosso Feindouno, who provided decisive statistical support for the work, within the framework of the program "Innovative Development Indicators" of FERDI, led by Michaël Goujon.

### Introduction

It is widely recognized that, on average, African countries are not only poorer, but also more vulnerable, than countries in other continents. This high vulnerability, combined with low income per capita, is a major handicap to their development.

The vulnerability of an economy results from the apparition or the recurrence of exogenous shocks of various origins, such as economic, climatic, or societal shocks. This may be due to the instability of the international price of primary products, which still constitute a large proportion of the exports of many African countries, or episodes of severe drought, which drastically reduce agricultural production (or, conversely, floods), or violence, for instance when the country becomes the hub of an international drug trade or is raided by foreign armed gangs or, as recent history has shown, epidemics that are costly not only in terms of human lives but also in terms of economic activity. If the economic vulnerability of African countries is not new, their political fragility seems to have increased, and it is likely that climate change will exacerbate its consequences. African countries are likely to be by climate change in the near future, even though they can hardly be blamed for it. This is a challenge for the international aid policy of developed countries.

Many structural factors lead to the high sensitivity and exposure of African economies to exogenous shocks, whether it is small size, geographic location, or simply low level of development resulting in a lack of infrastructure and low diversification of activities. It is the responsibility of national policies to mitigate the consequences of exogenous shocks, however while resilience to vulnerability depends largely on the will of governments, there are also structural factors which condition resilience. A low level of development of any African country is usually accompanied by a low level of education and health, an age structure of the population which has a high proportion of young people, and often the presence of refugees from other vulnerable African countries. These characteristics of African economies weigh on their public finances and make counter-cyclical fiscal policies difficult to implement. In addition, low human capital reduces the capacity of the public and private sectors, which are critical to resilience. The common history of many African countries has shown how economic growth and human development are threatened by exogenous shocks of various origins.

This is why the fight against vulnerability must be at the heart of international aid policy for African countries (and also for other similar developing countries). This requirement is all the stronger because nearly half of international aid goes to the African continent and its effectiveness depends largely on its suitability for Africa's characteristics (see Figure 1).

#### Figure 1: ODA by Region (in millions US dollars), 2005-2018



#### Source : OCDE-CAD

There are many aid donors in Africa, but most international aid is concentrated in a few donors (Figure 2). Among those which formally reported donations to the OECD's Development Assistance Committee (DAC) in 2017, multilateral aid was 43%. The biggest of the multilateral agencies is the World Bank through the International Development Association (IDA) with 14.3%, followed by the European Commission, although often considered as a bilateral donor, 9.5%, then the African Development Bank (ADF) 4%. The graph in Figure 3 below shows the rise in IDA while ADF is stable.

#### Figure 2: Aid disbursements in Sub-Saharan Africa, 2017



African Development Fund [AfDF] International Development Other Multilateral Agencies







Source : OCDE-CAD

The rules governing the selection of countries to support at the World Bank and the African Development Bank only take into account the vulnerability of African economies a little through the creation of special windows or funds. This derogatory approach breaks from the general allocation rule which is based mainly on an assessment of countries' performance in terms of economic and social policies. On the other hand, the European Commission makes structural economic vulnerability an important criterion for allocate of assistance. The purpose of this book is to show why, and how, to reform the allocation system of the World Bank and the African Development Bank to better take into account African vulnerabilities.

The first part of the book explains the rationale for the reform by showing that taking into account the vulnerability of African economies for aid allocation would increase the effectiveness, equity, and transparency of aid. The second part examines the issue of the most appropriate vulnerability indicators to be used in an aid allocation formula. The third part presents the general conceptual framework in which the reform should be implemented, and shows through some simulations of various allocation models that the proposed reform is possible and necessary. Finally, the fourth part shows how aid for regional integration can also be in response to the vulnerability of African countries characterized by their small size or their remoteness.

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## Part I -Why change aid allocation formulas?

This part of the book is devoted to a detailed review of the ADF and IDA allocation systems and their impact on the allocation of concessional resources in Africa. The ADF system was initially inspired by the IDA system and then gradually moved away from the IDA in terms of the general allocation rule across countries and the special treatment of fragile countries (Reisen & Garroway, 2014). It is instructive to compare these two institutions, and to see that they are different from other multilateral institutions which already take vulnerability into account.

The ADF and IDA allocation systems will then be evaluated according to the three principles that should in our view govern the allocation of aid: effectiveness, equity, and transparency (Guillaumont 2008). Regardless of the benefits of the current ADF and IDA allocation formulas (Performance Based Allocations (PBAs), and specific treatment of fragile states through special financing windows), and also the validity of the changes made over time, these two allocation instruments do not really appear to comply with the three stated principles, which thus justifies the proposals presented in this book.

### Chapter 1: The performance-based allocation rule and the specific treatment of fragile countries

Up to today neither the African Development Bank nor the World Bank has introduced a vulnerability criterion in the allocation formula for their concessional aid (the performance-based allocation), but both institutions have created a specific window for a category of States that they specifically target because of their "fragility". This framework is not universal, as can be seen by the frameworks implemented by the European Union or the Caribbean Development Bank.

#### 1) Performance Based Allocation (PBA)

The formulas of the IDA and ADF are similar in that they are both based on a performance index (defined in the same way) and on income per person and the population.

#### The IDA formula

The formula of IDA-18 is the following 1:

Aid allocated to a country = Population<sup>1.0</sup> x GNI/pc<sup>-0.125</sup> x Performance Factor<sup>3.0</sup>

Where the Performance factor = 0.24CPIA<sub>ABC</sub> + 0.08PORT + 0.68CPIA<sub>D</sub>

The 0.24CPIA<sub>ABC</sub> + 0.08PORT + 0.68CPIA<sub>D</sub> refers to the macro-economic policies(A), structural policies (commerce, finance, business environment), social inclusion policies(C), whereas the CPIAD (D) refers to the quality of institutions and public sector. PORT refers to the performance of the IDA project portfolio.

#### The African Development Fund formula

The ADF allocation for the period 2017-2019, according to a performance-based formula, involves several steps. The first step is to calculate the share of resources to be allocated to each State using a formula that includes two main elements:

1) a country's needs - approximated by the gross national income per capita (GNI/P), the country's population (P), and the African Infrastructure Development Index (AIDI)

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<sup>1.</sup> IDA 18 Report from the Executive Directors of the IDA to the Board of Governors. Addition to IDA Resources: Eighteenth Replenishment. Toward 2030: Investing in Growth, Resilience and Opportunity (January 31 2017)

2) a country's performance - determined by the Country Performance Assessment (CPA). The CPA score is made up of 4 components: (i) the average score of 3 components (A, B, and C) of the Country Policy and Institutional Assesment (CPIA), which reflects the quality of macroeconomic, structural, and social policies, (ii) the fourth component (cluster D) of the CPA, which reflects the quality of governance, (iii) the fifth component (cluster D) of the CPA, which represents the capacity of the regulatory framework to support infrastructure development and regional integration, (iv) a performance indicator for the AfDB's project portfolio in the country.

The AIDI index and cluster E of the CPIA were added during the cycle of ADF-13  $(2014-2016)^2$ .

The performance-based allocation formula is as follows:

Ai = (CPA) $i^{4,125} x \left(\frac{GNI}{P}\right) i^{-0,125} x (POP)i^1 x (AIDI)i^{-0,25}$ 

With Ai, the score derived from the PBA formula of country i, its share in the ADF annual envelope is given by  $\frac{Ai}{\sum Ai}$  and its allocation being the product of this share with the total amount of the ADF envelope:

 $CPA = \begin{cases} 0.20 \times CPIA_{ABC} + 0.58 \times CPIA_D + 0.06 \times CPIA_E + 0.16 \times PPA \\ 0.36 \times CPIA_{ABC} + 0.58 \times CPIA_D + 0.06 \times CPIA_E & without portfolio \end{cases}$ 

According to the coefficients, it appears that the share AiAi depends mainly on the size of the population and the evaluation of the performance. On the other hand, it depends little on the needs reflected by per capita income and the quality of infrastructure. To maintain a high weight relative to the CPA when the  $\frac{Ai}{\sum Ai}$  was added during ADF-13, the CPA exponent was increased from 4 to 4.125<sup>3</sup>.

#### The different weighting choices selected by both institutions

However, the coefficients or exponents for the variables included in the PBA formula differ from one bank to another. In general, the exponents relative to performance assessments have significantly increased over time since PBA formulas where first introduced, but recent developments in both banks have made the formulas different. For the IDA, the performance exponent progressively increased from 1.8 in 1991 to 5 between 2008 and 2014, then reduced to 4 for IDA-17 and then 3 for IDA-18. For the ADF, the performance coefficient has remained similar to IDA for a long time. This exponent, initially set at 1.75 or 2.0 (depending on the performance level) between 1999 and 2001, was set at 2.0 between 2002 and 2007, then following the IDA, increased between 2008 and 2013 (it was 4 for ADF compared to 5 for IDA). In 2014, for IDA-17 it decreased from 5 to 4, and to 3 for IDA 18, it increased for ADF-13 to 4.125. However, this was first and foremost to balance the impact of the introduction of AIDI<sup>4</sup> (see Annex 3 for the detail of changes in the formulas). The decrease in the coefficient for performance is obviously favorable to fragile countries (which generally have a low CPIA), and to countries with low per capita income, the relative weight being *de facto* increased.

#### After applying the formula: further steps and exceptions for ADF

The second stage of the allocation process for the African Development Fund consists of a split between loans and grants. Where there is a high risk of debt unsustainability, the country receives only grants, rather than a combination of loans and grants. In the case of grants, their amount is 20% lower than the allocation initially calculated. According to the ADF documents, the 20% is made up of 15% corresponding to the ADF's additional cost of substituting a grant for a loan, and 5% aimed at encouraging countries to improve their policies and reduce their debt.

In a third step, ADB debt cancellations are deducted from the allocation under the Multilateral Debt Relief Initiative (MDRI). About half of the amount of this deduction is reallocated among ADF countries according to the PBA formula.

These two deductions (according to the proportion of grants and to the multilateral debt relief initiative) initially existed at the World Bank for the allocation of IDA funds. They were removed for IDA18 (2018-2020).

There are two other exceptions to the performance-based allocation:

1) The allocations to each ADF country must not exceed 10% of the PBA envelope available for the corresponding year. This provision acts as a ceiling, and was applied to Ethiopia, Nigeria, and Tanzania in 2016. Following the same principle, although there is no formal rule, several IDA eligible countries have seen their allocation limited because of their large size. However, this provision is not used in the most recent IDA cycles, because the need for this provision seems to have faded given the larger number of countries among which the envelope is distributed. This exception to the general principle appears justified in the case of ADF by the existence of a few countries. However, it does not seem that this special treatment for the largest countries blurs the relationship between allocation and performance, unlike the following exception.

<sup>2.</sup> see ADF-13 Report Supporting Africa's Transformation (Annex V).

<sup>3.</sup> It is also important to note that the introduction of the African Infrastructure Development Index was accompanied by the introduction of the infrastructure component of the CPIA.

<sup>4.</sup> The weight given to the new cluster E (6%) was taken from the one given to the average of clusters A, B and C (reduced from 26% to 20%).

(2) In the case of the ADF, a minimum allocation of 15 million Units of Account (UA) per cycle is provided for each country, with the exception of countries reclassified to ADB-only status (the so-called "blend" countries <sup>5</sup>). The minimum allocation favors small, fragile countries. It is a substitute to the general allocation formula, but is not additional to the allocations made under the PBA. The minimum allocation tripled in ADF-13 compared to ADF-12 (for 5 to 15 million of UA). As a result, 11 of the 38 ADF eligible countries benefited from this provision in 2016, putting their *de facto* allocations well above their original allocations according to the PBA formula, compared to only 1 or 2 countries for ADF-12. For 6 of these 11 countries (Central African Republic, Comoros, Gambia, Guinea-Bissau, Mauritania, and Sao Tome & Principe), the rationale for an increased minimum allocation was made necessary because of the impact of the MDRI compensation mechanism (which decreases their respective allocations and could have even led to negative allocated amounts).

For IDA, which also has a minimum allocation, the system is slightly different, a "base allocation" is added to the allocations defined by the PBA. Like for ADF, the base allocation has recently been significantly increased - it went from 4 to 15 million SDRs a year (45 million SDRs per cycle)<sup>6</sup> for IDA-18.

#### 2) The specific treatment of fragile states

The sole application of the PBA was not favorable to countries in a situation of great socio-political fragility since it translated into a low level of the CPIA. In order to take into account the specific needs and contexts of States in fragile situations, the two institutions have created specific windows for these countries.

For IDA, several concessional windows for fragile countries have followed one another. Today (for IDA-18) only Sudan continues to benefit from a special support for post-conflict States, unlike six other eligible States during IDA-17. The turnaround facility granted to post-conflict and reengaging countries, which benefits countries "in post-conflict and re-engaging" or "not suffering from conflict or accumulated arrears but facing a transitional situation out of fragility", is maintained, to increase their resilience to their fragile situation. This regime concerns 3 countries (Gambia, Madagascar and Syria). . In addition, a new Risk Mitigation regime for Fragility, Conflict, and Violence (FCV) was created: 4 countries will benefit from it during IDA-18, 2 African countries, Guinea and Niger, and 2 non-African countries, Nepal and Tajikistan. Although there are guidelines for eligibility for the post-conflict and turn-around country regime or for the risk mitigation regime, the choice is up to the bank's management. The maximum amount allocated for to the first regime depends on a performance rating<sup>7</sup> according to a pre-established grid, and the amount for the second is 1/3 of the PBA with a ceiling of 300 million dollars. Thus, the treatment of fragile countries by the World Bank seems more complex and more discretion nary compared to the African Development Bank. This complexity and discretion are reinforced by the fact that fragile countries can benefit from other windows, including those provided for emergencies (natural disasters or epidemics), the secondary window for refugees and communities that harbor them, and the private sector window for encouraging private sector intervention (including in fragile countries). Fragile states are the most vulnerable to exogenous shocks, and they also have access to the crisis response window, established for situations where IDA countries are affected by severe economic crises, natural disasters or public health emergencies.

AFD-11 (2008-2010) put in place a "Fragile States Facility (FSF)", which 6 years later for AFD-13 became "Transition Support Facility (TSF)", and was different from the simple identification of post-conflict situations of the precedent formula, by better recognising the vulnerability of recipients.

The facility to support countries in transition (TSF) has 3 pillars: for supplementary financing, Pillar 2 for the debts of potentially eligible countries (Somalia, Sudan and Zimbabwe), Pillar 3 for targeted support for reinforcement of capacity and technical assistance<sup>8</sup>.

The eligibility of countries for TSF depends on their being on the harmonized list of Fragile States<sup>9</sup> (as defined by having a CPIA under 3.2), to which are added other criteria – a commitment to peace and security, a low economic growth during the last 15 years, a lack of human capital, and an understanding of the quality of economic policies in the country. 15 countries<sup>10</sup> were classed as Fragile States at the end of 2013, to which were added Guinea and Chad. Thus, 17 countries benefitted from of the TSF during AFD-13 against 15 at the start of AFD-14, Cote d'Ivoire and Guinea having left the list.

Thus, each country eligible for blending continues to receive 50% of the resources it would have been entitled to receive if it was an ADF-only country but is still subject to the minimum allocation of UA 15 million.
 Of the 72 countries eligible for IDA-18, 22 received less than 30 million SDR in 2019. For these countries, the

minimum allocation represents more than 50% of their allocated resources.

Performance = 0,8 PCPI + 0,2 PPR, PCPI stands for the Post-conflict performance indicator and PPR for portfolio performance rating.

<sup>8.</sup> For ADF-13 the FCT was 3,108 million UA of which 572 million for Pillar1, 30 million for Pillar 2, and 60 million for Pillar 3.

List formulated jointly by the World Bank, Asian Development Bank, and the African Development Bank (see Part II).

Burundi, Central African Republic, Comoros, RDC Congo, Cote d'Ivoire, Guinea, Liberia, Madagascar, Mali, Sierra Leone, Somalia, South Sudan, Sudan, Togo, Zimbabwe (Guinea and South Sudan did not receive FCT in 2014)

The share allocated to ADF and the allocations by country are decided before the cycle. The biggest part of the facility for transition (TSF), , acts as a finance to augment the allocation from the PBA for eligible countries of the previous cycle, which is then multiplied by a factor of 2 (or 1.5 if they have had FCT finance for more than 3 cycles). However, there are several exceptions. 3 discounts are applied to the allocation of of the TSF depending on the CPIA, income per person, and if length on the Fragile states list is more than 5 years. Also the allocation of limited to between 10 and 60 million UA per cycle.

The leading role of the governance criterion in the PBA has been maintained over time, but it has been criticized in academic circles, as well as by some donors. The main criticism is that it does not take into account sufficiently the structural characteristics of countries, especially low-income African countries. Also, the addition of a large number of rules or exceptions to the main formula, as well as the creation of a category of fragile states (whatever the name given to this category), has made the allocation system complex and not very transparent.

There are, however, counter-examples to the AfDB and World Bank allocation framework which are instructive.

### 3) The counter-examples of the Caribbean Development Bank and the European Commission

#### Vulnerability in the Caribbean Development Bank formula

The Caribbean Development Bank (CDB), presumably because it operates in many small islands which suffer from vulnerabilities, has for a long time included in its allocation formula an assessment of countries' economic vulnerability to capture their specific needs. Since 2000 the formula is as follows:

 $A_i = log Population^1 x GNI/pc^{-0.9} x VUL^2 x Performance^2$ 

Performance being a combination of the CBD CPIA and the quality of its portfolio in country I, and VUL the vulnerability index produced by the CBD. The principle of this formula has been maintained without being questioned, although there may have been discussions on the design of the vulnerability indicator.

#### Vulnerability in the European formula

An approach similar to the one we propose in this book (based on a study by FERDI which proposed it) was implemented by the European Commission for the European Development Fund (EDF), for allocations to African-Caribbean-Pacific (ACP) countries and the Development Cooperation Instrument (DCI) for non-ACP

and non-ACP developing countries for the period 2014-2020<sup>11</sup>. This reform replaced an extremely complex system, with a multitude of indicators and therefore little transparency, with a simple framework more favorable to poor and fragile countries.

The country allocations result from a formula, that in addition to a per capita income indicator and the Worldwide Governance Indicators (WGI) produced by the World Bank, incorporates the two indicators reflecting structural handicaps that also serve to identify the Least Developed Countries (LDCs) at the UN (the level of human capital - the Human Assets Index (HAI) and the level of structural economic vulnerability - the Economic Vulnerability Index (EVI). Both of these indicators were developed by the United Nations Committee on Development Policy to define the category of Least Developed Countries (LDC), and to propose the inclusion of new members or the phasing-out of member countries (so-called graduation). A United Nations General Assembly resolution of 2012 (A/C.2/67/L.51, 3 December 2012), about "graduation" issues, recommended the use of these indicators by the development partner countries for the allocation of their concessional funds.

The formula adopted by the European Union was:

 $A_i = Population^{0.5} \times GNI/pc^{-1} \times HAI^{-1} \times EVI^1 \times WGI^1$ 

The results of this new method are that the share of EDF allocations to LDCs and other low-income countries has increased, going from 79.5% for the 2008-2013 cycle to 85% for the 2014-2020 cycle<sup>12</sup>.

#### 4) Conclusion

The African Development Bank and the World Bank, attempts to address the vulnerability of African countries through the creation and use of specific facilities, not as part of the general allocation framework of the PBA. The counter-examples of the Caribbean Development Bank and the European Commission which have introduced a vulnerability indicator in their allocation formula show that another approach can be implemented. This calls for a reconsideration of the dual system currently implement by the two largest multilateral banks operating in Africa. This can be done in accordance with the principles that should drive aid allocation: effectiveness in promoting development, equity between beneficiaries, and transparency of allocation rules, *vis-à-vis* taxpayers of donor countries and governments of partner countries and their civil societies.

Part I -Chapter 1: The performance-based allocation rule and the specific treatment of fragile countries

<sup>11.</sup> European Commission, Directorate-General for Development and Cooperation — Europe Aid, European External Action Service A Methodology for country allocations: European Development Fund and Development Cooperation Instrument 2014-2020.

<sup>12.</sup> The DCI shows a greater variation as the share allocated to low-income countries doubles, while only reaching 56%.

### Chapter 2: Allocation frameworks with respect to the principles of effectiveness, equity, and transparency

The AfDB and World Bank concessional fund allocation models must be assessed against 3 key principles that should guide aid allocation: effectiveness, equity, and transparency, which have been extensively highlighted in previous publications (Guillaumont 2008, Guillaumont et al, 2017a and b, Guillaumont and Wagner, 2015). Determining the extent to which current ADF or IDA practices meet these criteria should allow us to shed light on the different options for reform. This evaluation is based on the vast theoretical and empirical literature about the

optimisation factors for aid allocation, notably as regards the objective to reduce global poverty. This literature is summarised in the adjacent panel. In this literature the concepts of performance and need are often used, concepts which come closer to each other by differentiating from effectiveness and equity.

Box 1. Theoretical basis for optimal aid allocation

As we have seen, the systems of allocation are most often based on performance, generally following:

 $AID_i = f(P_i^{\alpha}, Pop_i^{\delta}, y_i^{\varepsilon})$  (1)

Where AIDi is the allocation of aid based on the performance of country i, P(i) is the performance of i based on an evaluation of the quality of its policies and its institutions, Pop (i) is the population size, and y(i) the income per inhabitant. a,  $\delta$  et  $\varepsilon$  are multipliers. The income per inhabitant is taken as an indicator of poverty, and so the need for aid. A relatively low income per inhabitant indicates a relatively high poverty and so a relatively higher need for aid. The value AID(i) is converted into a share of aid (correct?) by dividing AID calculated for the total of n eligible countries, and multiplying this fraction by the total amount of aid available.

Either for IDA or ADF, because of the multiplier  $\varepsilon$  is negative, the aid is higher for those countries which have the lowest income per inhabitant. However, given the respective values of a and  $\varepsilon$  it is clear that the allocation of aid is principally based on performance (the allocation increases with increasing performance), and not on the needs indicated by the income per inhabitant. The theoretical base of the formula of PBA used by the principal multilateral banks, summarised in equation (1), is a result of the problem of optimisation where the total aid allocated to all receiving countries equals the total of aid available for allocation. Thus, the allocations for each country are 21

inter-dependents. Collier and Dollar (2001,2002) proposed an "algorithm to allocate aid between receiving countries", such that it would maximise the reduction of global poverty.

The division of aid which maximises the reduction of poverty depends on the rate of GDP growth, the level of poverty, and its elasticity with respect to growth and the population size as follows:

$$\max_{A_i} - \sum_i g_i \eta_i h_i N_i \quad (2)$$
Under the constraints 
$$\sum_{i=1}^n A_i y_i N_i = \bar{A} \text{ et } A_i \ge 0, \forall i$$

Where A(i) is the amount of aid received by country i as a percentage of its GDP (Y(i)), q(i) is the rate of growth per inhabitant, n(i) is the elasticity of the reduction of poverty relative to income per inhabitant defined as  $(\partial h_i / \partial y_i)(y_i / h_i)$ ,  $h_i$  is a measure of poverty calculated as the percentage of the population of country(i) living with less than \$1 per day, N(i) is the population and A is the total amount of aid available to divide between all the eligible countries.

The concept of performance does not appear in this optimisation. It is introduced in an indirect way through the growth rate per inhabitant which is itself influenced by the performance (P) of country(i) as follows:

 $g_{i} = \beta_{0} + \beta_{1}A_{i} + \beta_{2}P_{i} + \beta_{3}A_{i}P_{i} + \beta_{4}A_{i}^{2}$ (3)

Thus, according to Collier and Dollar (2001,2002) who build on the influential work of Dollar (2000), the economic growth of country I depends on the level of aid received, the performance, the effectiveness of the aid (which is dependent on the performance), and on the capacity of the receiving country to absorb the aid (estimated with a squared term). The hypothesis that performance is the key factor of aid effectiveness comes from a report by the World Bank in 1998 entitled "Assessing Aid" and a document by Collier and Dollar in 2001 published in World Development. This formalisation and its empirical validation still constitute the key building block of the IDA and AFD allocation framework.

However, the hypothesis that aid effectiveness is influenced by the quality macroeconomic policies and/or good governance has been invalidated numerous times by the scientific community for whom the statistical results are based on an extremely fragile econometric analysis (see for example Dalgaard et al. (2004), Roodman (2007a, 2007b), Rajan & Subramanian (2008), Clemens et al. (2012) ou Mekasha & Tarp (2013)).

Nevertheless, this controversy has not reduced the use of PBA, but has changed the logic of its use. More then a factor of the effectiveness of present aid the use of performance as a central element of the PBA was seen as encouraging receiving countries to adopt better policies. This is an important change with regard to the model of equation (2), in which aid effectiveness is supposed to depend on policy and not on aid.

Many empirical studies fed by this controversy have since showed that other characteristics of receiving countries are likely to influence aid effectiveness, especially the vulnerability to exogenous shocks which has received growing attention in the literature, even if it is not always well understood by politicians (see Guillaumont & Wagner, 2013). Structural vulnerability is a negative factor for development whereas good governance is positive; both are likely to increase the effectiveness of aid. One of the principal reasons for the positive effect of vulnerability on the effectiveness of aid is the stabilisation effect of aid, which reduces the negative effect of exogenous shocks on growth and development, notably when the capacities of countries are limited.

Thus, to take into account structural vulnerability in a wider sense in aid allocation is likely to make it more efficient. It also makes it more equitable, because to take into account structural handicaps in aid allocation is to contribute to equalising development chances across countries. These arguments were developed in a special section of World Development (February 2017, edited by Mark McGillivray and Patrick Guillaumont with contributions by the authors of this book. The first article of this special section by McGillivray and Pham concerns the problem of equation (3), which defines the rate of growth of the income per inhabitant q(i) as follows:

#### $g_i = \beta_0 + \beta_1 A_i + \beta_2 P_i + \beta_3 A_i P_i + \beta_4 A_i^2 + \beta_5 V_i + \beta_6 A_i V_i \quad (4)$

The new optimisation problem is different from Collier and Dollar's by the taking in account of structural vulnerability following the work of, among others, Guillaumont & Chauvet (2001), Chauvet and Guillaumont (2003,2009) and Wagner (2014). Henceforward aid reduces poverty by its impact on the rate of growth of income per inhabitant (q(i)) which is a function of the aid received as a percentage of income  $A_i$  ( $\beta_i$ >0), of aid squared ( $\beta_4$ <0 decreasing returns), of the degree of structural vulnerability  $V_i$ , negative factor ( $\beta_5$ <0), of the interaction between aid and structural vulnerability  $A_iV_i$ , positive factor ( $\beta_6$ >0), of the performance  $P_i$  positive factor

 $(\beta_2 > 0)$ , of the interaction between aid and economic performance  $(\beta_2 > 0)$ , that is taken to be positive  $(\beta_3 > 0)^{13}$ .

<sup>13.</sup> According to Guillaumont and Chauvet (2001), Chauvet and Guillaumont (2003, 2009) and Wagner (2014) the coefficient  $\beta_s$  is negative and the coefficient of the interaction between aid and structural vulnerability  $\beta_c$  is positive. Following Collier and Dollar (2001, 2002), the performance coefficients  $\beta_2$  et  $\beta_3$  are positive, and for those linked to aid  $\beta_c$  and  $\beta_c$  are respectively positive and negative.

Thus, starting from equation (4) the marginal effect on the growth of country I is as follows:

 $\frac{\delta g_i}{\delta A_i} = \beta_1 + 2\beta_4 A_i + \beta_3 P_i + \beta_6 V_i \quad (5)$ 

Starting from the first order conditions of the optimisation problem (Equation (2)), the optimal aid allocation  $\{A\}_{i=1}^{\eta}$  must meet the following 3 conditions:

$$\widehat{A}_{i} = 0 \, si - \frac{\delta g_{i}}{\delta A_{i}} \eta_{i} h_{i} N_{i} = \widehat{\lambda} y_{i} N_{i} + \widehat{\mu}_{i} \, et \, \widehat{\mu}_{i} > 0 \quad (6)$$

$$\widehat{A}_{i} > 0 \, si - \frac{\delta g_{i}}{\delta A_{i}} \eta_{i} h_{i} N_{i} = \widehat{\lambda} y_{i} N_{i} + \widehat{\mu}_{i} \, et \, \widehat{\mu}_{i} = 0 \quad (7)$$

$$\sum \widehat{A}_{i} y_{i} N_{i} = \overline{A} \qquad (8)$$

where  $\lambda$  is the Lagrange multiplier associated with the amount of aid (which can also be interpreted as the assumed value of aid, equivalent the number of people taken out of poverty for each dollar spent, and the values  $\mu$ i are the Lagrange multipliers associated with an amount of aid which is positive. The satisfying condition so that  $\{A\}_{i=1}^{\eta}$  should be the solution of the optimisation problem is still verified because the objective function is concave with  $\{A\}_{i=1}^{\eta}$  and the constraints are linear. For receiving country i  $\widehat{A}_{\iota} > 0$ , quation (7) gives the optimal amount of aid, efficient for the objective of reducing poverty as follows:

$$\widehat{A}_{i} = -\frac{\beta_{i}}{2\beta_{4}} - \frac{\widehat{\lambda}y_{i}}{2\beta_{4}\eta_{i}h_{i}} \tag{9}$$

where  $\hat{\lambda}$  is given by:

i

$$\hat{\lambda} = \frac{\sum_{i} \beta_{i} y_{i} N_{i}}{\sum_{i} \frac{y_{i}^{2} N_{i}}{\eta_{i} h_{i}}} - \frac{2\hat{A}\beta_{4}}{\sum_{i} \frac{y_{i}^{2} N_{i}}{\eta_{i} h_{i}}}$$
(10)

 $et \ \beta_i = \beta_1 + \beta_3 P_i + \beta_6 V_i \quad (11)$ 

Given that  $\hat{\lambda} > 0$ , equation (9) shows that the optimum level of aid allocated to country i is related negatively to its GDP per inhabitant and positively to the level of poverty, its performance, and its level of structural vulnerability. This result shows that it is possible to construct a model of aid allocation which recompenses and encourages performance, thus favoring growth, reduction of poverty and at the same time takes into account the structural vulnerability of the receiving country, thereby favoring at the same time growth and equality of chances. Such a system would be more favorable to growth and to poverty reduction than an allocation system based only on performance. It would be more efficient and more equitable. It is this intuition which was the motivation for this book.

Other authors have proposed optimum allocation models based on Rawls' equalisation of chances principle Llavador and Roemer (2001) and Cogneau and Naudet (2007). According to this principle the aid givers should agree on an allocation which compensates the countries which are in a bad initial situation, so that the final differences in the results are only attributable to their efforts and not their initial situation. Llavador and Roemer's growth model takes account of the initial growth factors, structural or not, without including vulnerability, nor its interaction with aid effectiveness. Cogneau and Naudet use the same growth model as Collier and Dollar in which aid effectiveness depends on performance and takes account of the initial situation, like Llavador and Roemer, but vulnerability is not included, neither as initial condition, nor as a factor in aid effectiveness.

#### 1) The effectiveness question

#### A founding argument debated and reinterpreted

The CPIA, the indicator for the evaluation of national economic and social policies and institutional quality, was initially used by the World Bank as a major criterion for aid allocation because the quality of economic policies was assumed to be an essential factor of aid effectiveness in promoting economic growth. In technical terms, in a cross-sectional econometric estimation growth was assumed to positively depend on multiplying aid with an economic policy indicator. This was the thesis put forward in the famous article by Burnside and Dollar, published in 1997 by the World Bank, then in 2000 in the American Economic Review, and repeated in various World Bank publications, in particular Assessing Aid (World Bank, 1998). However, academic work quickly found that this result was difficult to replicate<sup>14</sup>.

<sup>14.</sup> Such as Hansen et Tarp 2001 ; Roodman, 2007 ; Easterly et al., 2004 or more recently Akramov, 2012.

Good economic policy is good for growth, but that does not mean that it increases the marginal effectiveness of aid<sup>15</sup>.

The main reason for keeping the CPIA central to the PBA as a criterion for allocation and selectivity of aid has changed: instead of being a direct factor of aid effectiveness, the PBA is meant to be an incentive to the adoption of better policies, and reflects the sentiment that giving more aid to countries considered as the "good guys" will drive other countries to become more virtuous. This is a significant change from Burnside and Dollar's initial philosophy, in which aid effectiveness depended on the quality of economic policies and not the other way around. While better policies are good for growth, encouraging them could become an indirect driver of growth.

### Are the relevant macroeconomic factors of aid effectiveness well reflected by the PBA model? The lack of vulnerability

Although the impact of governance on aid effectiveness has been challenged on many occasions in the academic literature, there is a consensus that aid effectiveness depends on some specific characteristics of recipient countries<sup>16</sup>. Among these characteristics, vulnerability to exogenous shocks has received increasing attention. These exogenous shocks are of various origins: economic (e.g. when a country undergoes a sudden deterioration of its terms of trade), climatic (e.g. when there is an unusual drought), security (e.g. when armed bands come from neighboring countries), health (e.g. when a deadly epidemic breaks out). On the one hand shocks and the resulting structural vulnerability are handicaps to growth, on the other hand good governance is a positive factor. Vulnerability to shocks is a factor that improves marginal aid effectiveness, more so than good governance. In technical terms in a cross-sectional estimate, the growth rate depends on an interaction variable between aid and a vulnerability indicator. In this framework, aid can have a macroeconomic impact on growth and development thanks to its stabilizing effect: aid dampens the negative impact of shocks on growth and development. (Guillaumont and Chauvet 2001, Chauvet and Guillaumont 2009, Collier and Goderis 2009, Wagner 2014, Chauvet et al., 2019).

A low level of human capital, which is also a structural handicap to growth, does not influence the effectiveness of aid in the same way. A low level of human capital could certainly be considered as a factor of low aid effectiveness. However, if we consider that aid is likely to have an influence by its content in terms of knowledge and know-how (especially its share specifically targeted at human capital), its marginal impact on growth according to the level of human capital is higher when the initial level of human capital is low.

#### The issue of aid instability

There is another reason, also linked to the effectiveness objective, to introduce structural handicap into the allocation formula, which leads to lowering the weight given to governance. With a high exponent applied to the CPA, small changes in the level of the CPA have significant effects on aid allocation, making allocations unstable and difficult to predict. Aid volatility is generally detrimental to growth and the management of economic policies. The lack of predictability of aid is a major concern for governments in development countries and for the international community<sup>17</sup>. With a exponent for the CPA of 4.125 (as in the last ADF PBA formula) a 10% increase / decrease in CPA ceteris paribus results in a very large increase / decrease in the country's PBA score and thus of its final allocation. For example, Mauritania's CPA increased from 3.84 in 2015 to 3.72 in 2016. This 3% decrease theoretically led to a 12% decrease in the allocation<sup>18</sup>. Since the CPA is relatively unstable, the importance given to it by the formula is an important factor in the variability of aid. However, with ADF 13 the instability of the CPA during a cycle has decreased. While the annual average change in the CPA was 0.17 per year for ADF-12, it was 0.08 for ADF-13. It should be noted that a reform of the ADB CPIA during the ADF-14 cycle, consisted of evaluating the CPIA once every two years instead of every year. This could favorably impact the stability of ADF country allocations.

The situation is a little different at the World Bank where the average annual variation of the CPIA of the IDA-eligible countries, more numerous and on average less fragile, remains low and relatively stable during the 15th (2012-2014) and 16th (2015-2017) IDA cycles with average annual variations of 0.04 and 0.05, respectively. It remains that this dependence of the CPIA with regard to exogenous circumstances has been highlighted in the case of IDA in the economic literature (Guillaumont, Mc Gillivray, Wagner, 2017). Since the CPA generally improves or deteriorates according to whether the exogenous economic conditions are favorable or unfavorable, the weight given to governance in the allocation formula tends to make the allocations pro-cyclical, i.e. allocating less aid to the countries where it would be most useful.

#### 2) The question of equity

#### Does PBA help to equalize growth opportunities across countries?

It is widely accepted that equity should be a central concern of the geographical allocation of aid<sup>19</sup>. There are certainly many points of view as to the definition of equity. A now widely accepted definition is linked to the notion of equal opportunities (Rawls, 1971). Developing Rawls' idea, Amartya Sen has shown that assessing the advantages and disadvantages a person has implies studying their ability to

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<sup>15.</sup> In technical terms, the coefficient of the interactive variable "aid x economic policy" is not significant when the econometric estimation is rigorous (see Easterly et al., 2004, Rajan and Subramanian, 2008, Roodman, 2007a, 2007b, Clemens et al., 2012).

<sup>16.</sup> See a review in Guillaumont et Wagner, 2014.

<sup>17.</sup> See Bulíř and Hamann, 2008 ; Fielding and Mavrotas, 2008; Kodama, 2012

<sup>18.</sup> The precise impact cannot be assessed without taking into account changes in CPIA levels relative to other countries since the total allocated amount is given.

<sup>19.</sup> See J.E. Roemer 1998, World Bank, 2006.

do or be what they want, in other words the "capabilities" of each person to realize herself. This perspective suggests that a low income is only one of the many factors that lead to reduced capabilities<sup>20</sup>. Equity requires the equalization of opportunities between individuals, and implies taking into account factors that reduce their abilities and are beyond their control (Bourguignon, 2018). Transposing this perspective to the country level in order to determine the best

allocation of aid implies taking into account the structural obstacles to growth that each country faces, that is to say the obstacles that do not depend on the present will of countries<sup>21</sup>. Taking into account structural handicaps as criteria for aid allocation would make aid more focused on equalizing opportunities. A reworked PBA could help to bring growth prospects at the international level closer.

#### Vulnerability missing again

The current PBA formula, because it refers mainly to per capita income and the quality of economic policies, does not take into account the main structural handicaps which hinder development. The recent addition of the AIDI (with a negative exponent, to reflect lack of infrastructure) in the ADF formula is a step in the right direction, but has only a limited impact. Moreover, it takes into account only one dimension of structural handicap.

The contrast between the design of the PBA and the UN's approach to identifying Least Developed Countries (LDCs) is striking. The UN identifies LDCs countries by their per capita income and two indicators of structural handicaps: the Economic Vulnerability Index (EVI) and the Human Assets Index (HAI), thus taking into account economic vulnerability and the lack of human capital which affect a country regardless of its present will. Structural economic vulnerability results from the repetition of exogenous shocks, whether natural or external, which result in various forms of instability, and exposure to these shocks (small demographic size, distance to global markets, structure of production). A (low) human capital index reflects the level of health (represented in particular by infant and child mortality, and chronic malnutrition) and the level of education (measured by the rate of access to secondary education and the rate of adult literacy).

The disadvantages of high structural vulnerability and low human capital interact: a low level of human capital is not only a structural handicap in itself, it is also a handicap that increases with vulnerability<sup>22</sup>; it exacerbates the adverse effects of recurrent shocks by lowering the resilience of countries. The level of human capital is durably affected by negative shocks because of their often irreversible effects on health and education. Taking into account neither the vulnerability of countries to external shocks, nor the structural factors of low resilience, which can by approximated by a low level of human capital and a high demographic dependency ratio, is unfair in the light of the objective of equalizing opportunities and asks the question of the very meaning of the idea of performance.

#### Is the word "performance" used correctly?

The success of PBA is largely due to the word "performance". Everyone wants developing countries to be successful and aid to support that success. But the measure of performance used in PBA formulas is questionable, in particular, as just suggested, because it is not fair. The problem lies in the ambiguity of the word "performance". There is a vast literature on performance (see, among others, Guillaumont and Chauvet, 2001, Kanbur, 2005, Tang, 2010, Guillaumont, Mc Gillivray, Wagner, 2015). Part of the work relates to the discussion of performance as measured over the past 20 years by the CPIA.

The performance indicator used in the PBA formula is far from the current meaning of performance. Performance usually refers to the results obtained (in this case by a country), given the initial context or external conditions, which are given. What is obvious, for example for a sport performance seems often forgotten in the field of macroeconomic performance. These two considerations, that performance is about results rather than policies, and that results should be measured against initial and external conditions, are essential here. They are critically important for fragile states. Indeed, these are the countries whose results are most affected by adverse external factors. Fragile states are also countries where the assessment of performance can best be measured by the improvement of specific outcome indicators which reflect political fragility. In particular, the decrease in internal violence reflects the improvement of governance.

On the contrary, the "performance" reflected by the PBA is based on assessments made by the Bank staff of countries' policies. While the CPA evaluation process includes operational guidelines, quality assurance and benchmarking, performance inevitably remains a subjective assessment of the country's policies, which is very different from an impact evaluation. The CPIA, and in particular its cluster D relative to governance is not a performance index in the true sense of the word for two reasons: it is not an index of results in terms of development, and it is not evaluated with reference to initial or external conditions. In short, governance is not performance. Another problem is that as the CPIA is an assessment based on common standards, the evaluation does not fit well with the principles of alignment and ownership adopted in 2005 in the Paris Declaration on aid effectiveness, reformulated during the Accra (2008) and Busan (2011) conferences, and often reaffirmed at international meetings.

<sup>20.</sup> Sen's publications are numerous, see in particular The Idea of Justice, Penguin Books, London 2009.

<sup>21.</sup> This transposition is different from that proposed by Llavador & Roemer (2001) – see panel above 22. See Guillaumont 2009.

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The figure below illustrates the main meanings given to the word "performance" by the economics literature. Performance as understood in the various "PBA" formulas is (1). A performance that is primarily by results is (2). If (2), measured by the results, is corrected for the influence of the exogenous factors, it is (4). If this correction is applied to (1), it is (3). For the measure of performance to be equitable and unambiguous, we should refer more to the results than to the policies, and take into account the structural handicaps suffered by developing countries, which in turn condition their performance. Thus, in our opinion (3) is an improvement, because it takes into account structural vulnerabilities, but (4), which is based on the measure of performance by results, is even better.

**Figure 1.1:** The four meanings of performance, according to whether economic policies, outcomes, or structural handicaps are considered



Lastly, the main issue with the CPIA is not so much its presence but the overwhelming weight it receives in the formula. Populations suffering from bad policies and bad governance are at the same time at risk of being penalized by less aid, and so of being punished twice. This leads us to the special treatment for fragile states. But this special window, as well as the minimum aid allocation due to the small size of countries' population, which is a handicap to growth, weakens the principles of the PBA. Thus, for reasons of equity, in order to better promote equality of opportunity between nations, and to avoid a "double punishment" (e.g. when the population of a country is poorly governed and receive less aid), even more than for reasons of effectiveness, it would be legitimate to introduce indicators of structural handicap into the criteria for aid allocation, in addition to the CPIA, such as a an indicator of low human capital and indicators of structural vulnerability, whether economic, climatic, or socio-political.

#### 3) Transparency: exceptions and coherence

Facing the difficulty of rigorously applying the PBA formula because it does not take into account the vulnerability of economies, particularly African economies, both the ADF and the IDA have been forced to introduce exceptions to the rule such as ceilings and floors, and the creation of a category of states in fragile situations that should receive more aid. Small countries and fragile states are treated as exceptions, so that their vulnerability is taken into account outside the general rule. The exceptions are so numerous that they tend to make the very foundations of PBA obsolete, which led us to the title a recent article: "PBA, Still Alive? " (Guillaumont and Wagner, 2015). In addition, some special windows have been added with different objectives such as regional integration, private sector development, health improvement, and the reception of refugees.

#### The impact of the minimum allocation on the PBA

The minimum allocation that serves as the floor for allocations is the means by which the question of small country size is taken into account. A small population is an important factor of structural vulnerability, and the minimum allocation is a recognition that the allocation of aid should take it into account. The minimum allocation reflects the acceptance of the idea that aid should be increased less than proportionately to the size of the population. However, the choice of the level of the minimum allocation is arbitrary. Moreover, in the case of ADF, for countries that are below the threshold, there is a *de facto* complete de-correlation between their performance and their actual allocation. In the case of IDA, as discussed above, the minimum allocation is a "basic allocation" which is added to the PBA, and so is only partially de-correlated, all the more so as the population is small.

Conscious of the problems raised by small population size and because the minimum and base allocations represent only a small financial effort, the African Development Bank and the World Bank have recently increased them (see above).

Figure 1.2 below shows the ADF-13 per capita allocations based on "performance" before and after the application of the minimum allocation. The blue curve is the allocation from PBA, implementing the minimum allocation. The green curve is the allocation from the PBA, without the minimum allocation. The per capita allocation increases linearly with performance, but the curve is modified once the minimum allocations are taken into account, and becomes non-linear. Figure 1.2 shows that minimum allocations strongly favor the first two quintiles of the lowest performers. 13 countries (out of 40) escaped the PBA rule in 2014, 12 in 2015, and 11 out of 38 in 2016.

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Allocation fra

Figure 1.3 shows the impact of the minimum allocation or base allocation for IDA allocations, including its significant increase between IDA-17 and IDA-18. Starting with IDA-18, the basic allocation increased from SDR 4 million per year (SDR 12 million per cycle) to SDR 15 million (SDR 45 million per cycle). As with the previous figure, the relationship between the Country Performance Rating (CPR) and the per capita allocation is almost linear. However, once the base allocation is introduced, the relationship becomes distorted and the link with performance is weakened. The de-correlation is all the more sensitive as the base amount increases, as indicated by the comparison between the green and blue curves, which respectively represent the 2017 and 2018 allocations. In 22 of the 75 IDA-eligible countries in 2018, the lump-sum base allocation was at least as much as the PBA allocation.

**Figure 1.2 :** Per capita allocations by performance index quintiles - ADF-13 (2014-2016) - with the exception of Sao Tome and Principe



Source: Authors' calculations based on AfDB data

**Figure 1.3:** Per Capita Allocations by IDA Performance Index Quintiles for 2017 (IDA-17) and 2018 (IDA-18)



#### The treatment of fragile situations

An even more important exception to the general rule has been the introduction of a category of countries "in a state of fragility". This category targets countries where the CPIA level has reached a very low level due to situations of conflict, civil war, or severe State weakness, but where financing needs remain very high, but these countries appear to be penalized by the PBA. We argue that this reform has neither transparency nor coherence.

The use of an explicit category of fragile states (by the ADB, rather referred to as Transition States), or not, (by the IDA), introduces a discontinuity in the allocation between countries considered fragile and those that are not and which don't benefit from the additional allocation from special windows dedicated to fragility, even though they can be vulnerable, which is obviously unfair. By favoring countries with a low CPIA, through these instruments, and countries with a high CPIA, through the PBA, the current articulation of the two systems penalizes the countries that remain around an average level of CPIA, especially those for whom the issues related to fragility are crucial or are likely to become so.

Firstly, in the context of the ADF and the African Development Bank, the problem is that the CPIA is used to assess both performance and fragility; a CPIA of less than 3.2 is the main criterion defining the harmonized list of fragile states to which the ADF refers for TSF eligibility. Falling below the threshold of 3.2 and being recognized

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as a fragile state can result in a significant increase in the total allocated amount: if a 10% decrease of the CPA (derived from the CPIA) implying that a country is now considered as fragile causes a sharp increase in the allocation, it accounts for a decrease of about 40% if only the PBA formula is considered (ceteris paribus and with a multiplier of 4 for the CPA). In other words, special treatment of fragile states leads to them receiving higher allocations than countries with higher CPIA. This discontinuity, coupled with the impact of the minimum allocations (see Figure 1.2), significantly weakens the relationship between the CPA (or CPIA) and aid per capita. This can also be seen in Figure 1. 2, which shows the per capita allocations and the CPA (by quintiles) over the three years 2014-2016 under ADF-13. This figure shows how the various changes made to the PBA since its introduction have profoundly changed its meaning and fundamental principles. As illustrated here, once the minimum allocations and the TSF pillar I are taken into account, the relationship between allocations and performance becomes negative (in addition to being strongly non-linear), which challenges the rationale of the PBA system.

Secondly, the multiplication of "eligibility" criteria for the TSF pillar I (whatever efforts are made to move from a harmonized list) makes it even more difficult to understand, in a clear and synthetic way, how the degrees of fragility of each State are taken into account. The use of particular cases is legitimate if they are exceptional, but must result from a clear political decision (as in the case of acute crises), but it is questionable when the exceptions create a permanent and opaque parallel system. This is currently the case at the World Bank which has multiple instruments dedicated directly or indirectly to the treatment or prevention of fragility for which eligibility is essentially left to the discretion of management.

Thirdly, the treatment of fragile situations by a special treatment for fragile states is curative, and not preventive<sup>23</sup>. Fragile states are often identified as "failed states", *ex post*. A preventive or *ex ante* treatment for fragility, targeted at fragility drivers<sup>24</sup>, might be less costly than *ex post* and curative treatments after a crisis or conflict. An illustration of this is given by the countries of the Sahel (Mali, Burkina Faso, and Niger). None of them were considered fragile by the ADF in 2011 (they all had a CPIA slightly higher than 3.2), whereas they would have been if their economic, climatic, and socio-political structural vulnerabilities plus their weak level of human capital had been taken into account. However, during ADF-13 (2014-2016), only Mali received funds from TSF Pillar I. The same goes for Guinea, which despite its high vulnerability was not eligible for TFS support at the beginning of the ADF-13 cycle. Only an *ad hoc ex-post* intervention linked to the Ebola epidemic allowed Guinea to receive a higher allocation, but in a curative way. The allocations during the previous cycle, which are themselves determined by the CPA, itself measured with

a 2 year lag (as specified by the PBA formula). It would appear that this system lacks reactivity and requires very frequent recourse to the emergency reserve.

Overall, the impact of the PBA as a share of the total amount received by ADFeligible countries has been significantly reduced. If, in the context of ADF-13, the number of small non-fragile countries whose allocation is essentially provided by the minimum allocation (7 out of 15) is added to the ADF-eligible countries considered to be fragile states (16), this gives a total of 23 countries. The proportion of countries eligible for ADF whose allocation is truly the result of the application of the PBA formula is a minority (18 out of 41 countries in 2014) (see Figure 1.4). In addition, the share of TSF Pillar I in the total ADF allocations increased from 4.5% for ADF-11 to 16.5% for ADF-13. This means that the fragility-related issues are now fundamental, and the number of country eligible under the strict application of the PBA will keep decreasing over time.

**Figure 1.4:** Allocation of ADF-13 Resources (in 2014) in ADF-eligible countries according to the origin of the resources



Source: Authors' calculations based on AfDB data

#### **Regional operations**

The distortion to the PBA allocations becomes even more pronounced if regional operations are taken into account, as shown in Figure 1.4 above. This is probably due to the fact that the contribution of countries to regional operations from their PBA allocations is reduced for small countries (with a threshold effect) and is nil for fragile states (see section 4).

<sup>23.</sup> With the notable exception of the Conflict and Violence Risk Mitigation Scheme of the World Bank. 24. See Guillaumont, McGillivray and Wagner (2015).

#### Earmarked funds and trust funds: an exception still limited at the ADB, but very significant for the World Bank

A final source of distortion from the figures obtained by the pure application of the PBA formula comes from the use of trust funds managed by the multilateral development banks. This gap is much smaller for the ADF than it is for the IDA (see Wagner, 2016). The amounts allocated to these funds correspond to a significant share of total commitments (for the IDA it was 23% in 2013, for the ADF it was 3.4% in 2011, 2012, & 2013, and 4.6% in 2013).

#### A diluted and elusive PBA

The allocation process ultimately lacks the transparency, which the PBA formula was meant to provide. However, the PBA accounted for more than 50% of the total funds received for only 16 of the 41 African ADF-13 eligible countries, or less than 40% of these countries (see Figures 1.7 and 1.8). This difference between the principle and the reality of the PBA clearly shows that the PBA in its current form is no longer suitable<sup>25</sup>.

Figure 1.5: Eligible Countries and Application of the PBA during ADF-13 (in 2014)



Countries at minimum allocatio Other countries for which the PBA

Countries for which the PBA represents

Source: Authors' calculations based on AfDB data

#### 4) Conclusion: new indicators in a renewed conceptual framework

The ADF/IDA PBA formula for the allocation of concessional resources to eligible African countries is certainly a useful instrument for implementing the development strategy of the ADF and IDA, and has proved capable of adapting to observed developments, particularly in Africa. Every reform made to PBAs over the years has had its own rationale. But generally, by complicating the system, these multiple reforms have reduced transparency and consistency. While performance is still considered the key principle of the PBA, the basic rule of the PBA only really applies to a minority of eligible African countries. The result is a mosaic of exceptions, a multiplication of windows, and special instruments which dilute the PBA. This PBA system is no longer transparent enough. Its effectiveness in promoting development is debatable and its equity is dubious.

The main difficulty for the ADF and IDA comes from the contradiction between the traditional objective of the PBA, which is to reward performance, and the new challenge stemming from the fact that an increasingly number of African countries eligible for ADF or IDA funds are considered to be in fragile situations and as such deemed to be underperforming: these countries perform poorly, and also have significant external financing needs. The allocation of aid to fragile states should be treated in an integrated framework, rather than as an exception to a general rule. This requires the use of "continuous" indicators reflecting fragility, rather than classifying countries in a dichotomous and static way. The definition of such indicators is the subject of Part II, below. In addition, as new international resources for climate change adaptation will be channeled to developing countries, particularly in Africa, the indicators have to include physical vulnerability to climate change. Finally, given the growing and recognized importance of the link between security and development, an indicator of structural violence must be included in these indicators.

In summary, a new look at the PBA seems necessary. The PBA was conceived as a simple rule based on the idea that concessional financing should promote "performance". This idea is appreciated by decision makers, taxpayers, and a part of public opinion. But the reality is that the PBA, in its original sense, is being applied less and less, and when it is applied, its meaning is diluted by exceptions. The risk is that the support from policy makers and public opinion for PBA-financed operations will erode. A reform of performance-based allocation systems, consistent with these new challenges, is therefore needed to strengthen the political support for ADF and IDA. Such a reform is possible, and will be discussed in Part III. Before that discussion, the reliable and relevant indicators which can be used to introduce vulnerabilities into allocation formulas will be presented.

Part I -Chapter 2: Allocation frameworks with respect to the principles of effectiveness, equity, and transparency

<sup>25.</sup> There is a lack of transparency with regard to public opinion of the States which contribute to the African Development Bank because the allocation data by country is considered to be sensitive, and their diffusion is limited. The data in Fig 5 are for AFD-13, and not for AFD-14, and country names are not included. On the contrary the World Bank discloses allocations during disbursement.

## Part II -What indicators should be used for aid allocation?

The main innovation of the conceptual framework for aid allocation proposed in this book is to put the emphasis on structural vulnerability. However, the choice of the right vulnerability indicators is a difficult question.

Firstly, we present a general framework to take vulnerability into account, which implies 1) to restate the different components of structural vulnerability, in particular for African countries, 2) to specify the main criteria that vulnerability indicators have to meet, 3) to analyze why the indicators present in the previous literature do not meet those criteria.

Secondly, to go beyond the indicators of vulnerability already available and in coherence with the general framework, we propose a new set of indicators that can be computed with available data and which correspond to the needs of the African Development Bank and the World Bank in order to improve their allocation models.

Furthermore, it is necessary to specify alongside indicators of structural vulnerabilities, other structural factors which condition the quality of policies and structural resilience. The characteristics of the population, such as a low level of human capital, the youth bulge, the presence of refugees, are clear sources of fragility, which further weaken economic and social policies. These factors are imperfectly reflected and approximated by the level of income. They are generally classified as indicators of need, and not as indicators of vulnerability in the strict sense, as they should be in a more comprehensive assessment of structural vulnerability in Africa.

### Chapter 1: The general framework for the analysis of vulnerability indicators.

A synthetic vulnerability indicator that can be included in an aid allocation formula should cover the different forms of vulnerability, but only those that are structural or independent of current policies. The indicators available in the literature do not meet these criteria.

#### 1) The 3 dimensions of structural vulnerability indicators

Fragility is understood here in a broad sense, encompassing political or societal fragility (in its structural component), economic vulnerability (structural), and physical vulnerability to climate change. Political or societal fragility, often identified by a low level of CPA, is partly determined by exogenous factors. It translates into situations of insecurity faced by populations, marked by different forms of conflicts and violence. Structural economic vulnerability and climatic shocks exacerbate conflict situations, highlighting the links between the different forms of vulnerability. Moreover, political fragility is subject to contagion effects between neighboring countries. Not explicitly taking into account these different structural vulnerabilities, as summarized in figure 2.1 below, would lead to an incomplete picture of the challenges faced by countries in transition out of fragility.

Faced with the spread of Ebola, and even more so, the coronavirus pandemic, which throw a cruel light onto the importance of vulnerability, one could ask why the vulnerability types mentioned above do not include a health dimension. The principal reason for this omission is that the classification is based on "channels" of transmission of shocks and their "national" impact, rather than on their origin which could in the framework used include health shocks. The impacts of health shocks, including Covid-19, interact closely with the 3 categories of vulnerability mentioned above.

Figure 2.1: The different forms of vulnerability or structural fragility



In this context, the notion of structural vulnerability is of paramount importance and must be clearly explained with regard to its use for the aid allocation. General vulnerability results from the occurrence of endogenous and exogenous shocks. Conversely, structural vulnerability includes only factors that do not depend on a 41

country's policies and are entirely determined by exogenous and persistent factors. General vulnerability also includes the effect of current and future policies and therefore evolves more quickly. Only structural vulnerability can be used as a positive criterion for aid allocation.

The economic impact of an exogenous shock (whether economic, climatic, or societal) depends on the scale of the shock, the economy's exposure to it and the country's resilience to it. Resilience refers to the ability to cope with exogenous shocks by implementing measures to correct or mitigate the effects of shocks. However, resilience not only depends on the current will of countries; there are structural factors of countries' resilience, such as their level of human capital and more generally their level of development or per capita income which result in a more or less effective implementation of resilience policies. The following figure summarizes the different components of general vulnerability to exogenous shocks.

#### Figure 2.2: Vulnerability to exogenous shocks



#### 2) Criteria for selecting indicators

#### Four principles have to be respected

Firstly, the selected vulnerability indicators should reflect exogenous elements that are not influenced by current country policies. The corresponding indicators then only reflect "structural" vulnerability, because it results from events beyond the control of the countries' governments (such as a climatic event), or because it results from previous policy choices that the present authorities have inherited. The challenge is to distinguish between these 2 components of vulnerability. In effect the vulnerability which comes from a present policy weakness does not lead to the allocation of more aid, which is contrary to structural vulnerability which does justify more aid.

Secondly, the indicators must be relatively simple and transparent, in order to allow an easy read of the allocation formula<sup>26</sup>. The optimal number of components of each composite indicator is a difficult choice: a large number of components, as it is often the case in the literature, has the disadvantage of weakening the weight and the visibility of the components that are the most representative of what the indicator must reflect.

Thirdly, the redundancy of components from one indicator to another should be avoided when multiple composite indexes are used in the same formula. It is necessary for the clarity of the conceptual framework and its formulation that each indicator must have a specific meaning.

Fourthly, it is important, wherever possible, to build those indicators from internationally recognized and already existing indicators, even if they need to be adapted to become as coherent as possible with the conceptual framework: this reference to recognized indicators can reinforce the legitimacy of the new indicators.

### 3) Why fragility assessments do not provide vulnerability indicators that can be used in an allocation formula

Although the concept of state fragility has been widely used in recent years in the economic literature, as shown by the large number of research and publications on the subject<sup>27</sup>, it has proved difficult to reach a consensus on the definition of fragility. Each institution tends to establish its own terminology and definition according to its own beliefs and objectives.

#### The objectives behind the various definitions of fragility

There are 3 types of fragility analysis that correspond to 3 different objectives:

1) The first type aims to define a category of fragile states, which is historically done by aid agencies that have a special window for allocating funds reserved for fragile countries. As developing countries, and particularly African countries, are all potentially fragile to varying degrees and in different ways, defining a category of fragile states implies defining criteria of fragility against which a state is or is not considered fragile. Identifying states that will be described as "fragile" is more difficult than identifying fragility itself, and may rapidly become arbitrary, as does any category whose definition depends on a discretionary threshold. Multilateral Development Banks use Country Policy Institutional Assessment (CPIA), sometimes with other criteria, to determine countries'

<sup>26.</sup> It is common to recommend building SMART indicators (specific, measurable, achievable, relevant, timebound).

<sup>27.</sup> See for example the last joint United Nations/ World Bank report (2018) for a review of this literature.

eligibility to their specific window for fragile states. The CPIA is or was used in 2 ways, either as an absolute threshold indicating fragility, namely 3.2 (e.g. by the AfDB<sup>28</sup>), or as a relative threshold: countries with CPIAs in the bottom two guintiles (OECD Development Assistance Committee, OECD Department for International Development, United Kingdom DFID, Asian Development Bank)<sup>29</sup>. Until 2016, the OECD used a "list of fragile states" to distinguish between "fragile" countries and territories on the one hand and "other" developing countries on the other. This list was based on the "Harmonized List" of fragile situations established jointly by the World Bank, the Asian Development Bank, and the African Development Bank,. It was supplemented by the use of other indices: first, the Country Indicators for Foreign Policy (CIFP) of Carleton University and the Brookings Institution's Index of State Weakness, then the Fragile States Index of the Fund for Peace. But in 2016, the OECD gave up listing fragile states, considering that fragility is multi-dimensional and certainly affects all countries in the world, including developed countries, to varying degrees<sup>30</sup>. It is worth mentioning that this list was not stable, which tended to show the list's own "fragility"<sup>31</sup>.

On the contrary the World Bank has reaffirmed its wish to maintain a list of Fragile States while trying to adapt this list to take into account the varying degrees of fragility. From 2020, the list includes 3 types of situations: high intensity conflict, medium intensity conflict, strong institutional and social fragility. High intensity conflict and medium intensity conflict are now based on the number of deaths due to armed conflict. Institutional and social fragility, besides the CPIA for which the threshold is now 3.0, is based on the number of refugees coming from neighboring countries (or the presence of UN forces)<sup>32</sup>.

2) The second type consists of identifying the different forms of fragility that will guide the nature of donors' interventions. This is the purpose of the AfDB strategic document *Operational guidelines for the implementation of the strategy for addressing fragility and building resilience in africa and for the transition support facility* (AfDB, 2014). According to this document, fragility is characterized by "a high risk of institutional breakdown, social collapse or violent conflict". It is a multidimensional phenomenon, with many drivers both internal and external, especially regional. The analysis of the different aspects of fragility, as well as its roots,

is essential to the choice of the right intervention strategy, whose objectives and instruments must be adapted to each specific situation. In order to strengthen the capacity to analyze fragility in its various dimensions, the AfDB has built a new analytical tool, called the Country Resilience and Fragility Assessment (CRFA), which gives an overview of fragility for eligible African countries on the basis of 7 criteria (which cover 91 indicators): 1. legitimacy of policy, 2. security, 3. justice, 4. economic and social inclusion, 5. social cohesion, 6. exogenous shocks (economic and regional), 7. climatic vulnerability. In addition, the 7 criteria are themselves divided into 2 components, representing the capacities of the countries but also the pressures faced by each of them. The AfDB intends to make the CRFA, because of its comprehensive and operational approach, the international reference for the analysis of fragility. However, it is not intended to be an indicator for resource allocation, since the analysis is not intended to distinguish between structural factors of fragility and non-structural factors. A similar objective and a similar limit emerge from the OECD's new approach, which was developed following the abandonment of the list of fragile states and is a guantitative synthesis of the different sources of fragility. This new tool developed by the OECD has 5 major sources of fragility (economic, environmental, political, security, and social), measured using a statistical classification method and aggregating a large number of underlying guantitative variables (structural or not). The fragility resulting from each of the 5 categories is then measured on a scale of 1 to 6. The World Bank is also currently reflecting on a new strategy for identifying and integrating the various dimensions of fragility, conflict, and violence to take them into account in its operations. The framework focuses on factors related to both horizontal and vertical inequalities, in order to strengthen its action in countries, including strengthening its preventive approach to conflict and fragility. This strategy, once formulated, will be implemented over the period 2020-2025<sup>33</sup>.

3) The third type of fragility analysis consists of selecting indicators of fragility in order to classify countries according to their degree of fragility, which is a prerequisite for the definition of a system for the allocation of concessional funds across countries according to their fragility level. Many indicators of state fragility have been built over the last decade by various institutions. State fragility has been the subject of in-depth qualitative analyzes in 3 dimensions: authority, provision of essential services, and legitimacy (e.g. Stewart and Brown, 2009). The notion of "political" fragility appears to be dominant in this literature; it denotes both a lack of capacity, a lack of will, or a lack of legitimacy of the States to implement policies for the majority of the population, or simply to exercise sovereign functions.

33. Cf. World Bank Group Strategy for Fragility, Conflict, and Violence 2020–2025 Board Report, février 2020

Partie II -Chapter 1: The general framework for the analysis of vulnerability indicators.

<sup>28.</sup> The AfDB has classified African countries into different categories, initially 2 (fragile and non-fragile), now 3 (countries officially recognized as fragile (ie.. countries on the Harmonized List of Fragile States), high-risk countries, and low-risk countries. This does not allow for a continuous assessment of the degree of fragility.

<sup>29.</sup> See Guillaumont et Guillaumont Jeanneney (2009).

<sup>30.</sup> OCDE, Sates of Fragilty 2016: Understanding Violence, OCDE, Paris, 2017, p.78

<sup>31.</sup> There are other attempts to identify states that may be considered as fragile (e.g. the Center for Global Development and Harvard University's Belfer Center's Program on Intrastate Conflict, Conflict Prevention, and Conflict Resolution.

<sup>32.</sup> In addition, the lowest score among the CPIAs of the World Bank, the African Development Bank, and the Asian Development Bank is now used instead of the average of the three.

The OECD (2015) previously distinguished 3 kinds of fragility indices: (i) "functionbased indices" which cover the different areas of government intervention, (ii) indices that aim to capture "constraints and tensions" that may lead to war and the collapse of institutions, (iii) "event-based" evidence who seek to measure the degree of insecurity. It is necessary to look at the main ones by trying to assess their adequacy to the criteria required for their inclusion in an allocation formula. A detailed analysis of these indices is in Annex 1.

### The unsuitability of the available fragility indicators as criteria for aid allocation

It is apparent that the indices from these works have multiple dimensions which lead to a lot of complexity and do not make the difference between structural factors of fragility and those factors caused by present policies. The reasons for not using them in an allocation formula are the same from one index to the next : their components, which are too numerous, are based in part on subjective data or opinion surveys. Above all they are mainly performance indices as much as fragility indices and are not exogenous (see Annex 1).

The country rankings that result from these indicators of fragility are not fully consistent, which is explained by different conceptions of fragility, even if they are close to one another. Moreover, the (negative) correlation between the indices presented and the CPIA or per capita income, which are at the heart of the PBA formula, is high. This shows the limits of the approach that would consist in introducing them directly into the PBA formula to take into account political fragility. These indicators, which do not distinguish between resilience and vulnerability, or between structural and non-structural factors of vulnerability, would imply both a high risk of redundancy in a formula that already contains the CPIA and per capita income and a risk of lack of coherence in the formula where it is important to treat performance and structural handicaps with an opposite sign.

Moreover, these indices do not take into account fragility in neighboring countries: existing fragility indicators only measure fragility at the national level. The impact of the regional context is therefore underestimated. Fragile states negatively affect their neighbors. For example, the Central African Republic, presented by most indices as one of the most fragile countries in the world, has seen all of its neighbors, except Cameroon, experience violent conflict. With porous borders, weapons of war are illegally circulating from one territory to another. Hence integrating the regional dimension, or at least the neighborhood, in the construction of vulnerability indicators should be mandatory.

#### The unsuitability of other indicators of vulnerability

The observations made in the previous paragraphs apply *mutatis mutandi* to the vulnerability indicators which have an objective seemingly more precise than State fragility, and which correspond to other dimensions of fragility. It is thus notably for *climate change vulnerability*, one of the three dimensions of what is called here "fragility", like *health vulnerability*, for which it was explained above that it could not logically be used in the model.

#### 4) Conclusion

This review of the existing fragility and vulnerability indicators leads to the conclusion that they cannot be used directly to reform the aid allocation system. The next chapter presents a description of vulnerability indicators which seem to respect the criteria defined above – the principal criterion is that they should be exogenous to present policies. Although they must cover the 3 aspects of fragility, economic, climatic and societal, they must stay relatively simple and calculable by the institutions which use them, and must avoid the redundancies which might obscure their transparency.

#### Chapter 2: What indicators should be used?

Three types of indicators that should be included in an aid allocation formula need to be defined:

(i) General indicators of needs. According to the current PBA, the needs of countries are represented by the size of their population and their per capita income. This seems insufficient, especially since the formula does not consider the level of human capital, which has a low level reflecting a dimension of poverty different from the dimension derived from per capita income. On the other hand, as pointed out above, a low level of human capital, or a youth bulge, make it more difficult for policies to respond to shocks, in order to improve resilience. Both these dimensions are structural factors of lower resilience.

(ii) Indicators of vulnerability. Vulnerability indicators also reflect specific needs of countries, for the reasons developed in the first part. The aggregation of these indicators into one synthetic index of structural vulnerability represents structural fragility.

(iii) One or more performance indicators. Beyond the traditional indicator of governance (the CPA), one may wonder about the rationale of considering indicators which address the quality of policies when faced with various different forms of structural vulnerability<sup>34</sup>.

#### 1) Needs Indicators and Low Structural Resilience

The needs indicators that must be included in any allocation formula are traditionally related to the size of the population, and to a low per capita income to which should be added the low level of human capital. They should be supplemented by two exogenous demographic indicators: the youth bulge or the presence of refugees. Together they should provide a common basis for estimating needs, and at the same time reflect the low structural resilience of eligible countries. It should be remembered that a low resilience level, when structural, should act as a positive factor in allocation, whereas low resilience due to bad policy is taken into account by the performance indicator as a negative factor in aid allocation.

#### The size of the population

The size of the population is necessary in all allocation formulas to balance per capita allocation. A small population size is a clear handicap to growth by reducing the size of the internal market and decreasing possible economies of scale.

34. The values of the indicators for ADF-eligible countries and used in the simulations presented in the following chapter are provided in Appendix 2. 49

This handicap can be partially taken into account by applying to the population an exponent lower than 1, which could make it possible to reduce the need for the minimal allocation from the PBA, which despite having the same goal, leads to an excessively broad spread in terms of per capita allocation. Another solution, possibly complementary to the use of a exponent lower than 1 relative to population size, would consist of introducing the population size variable as a logarithm instead of the actual number of inhabitants. But the considerable increase in the base allocations does not allow use of this solution without reducing the levels of aid allocated to Developing Small Island States (SIDS).

#### Per capita income

In development economics, the preference for the use of the gross domestic product (GDP) rather than the gross national income (GNI) has long been justified by the desire to take into account growth capabilities. But given the importance of the factors which influence the balance of payments (which makes the difference) in a number of developing countries, for example, a positive balance of payments due to large income transfers from migrants, the GNI better reflects the standard of living of the populations, and even the growth potential of the economy<sup>35</sup>. The use of GNI also allows for the deduction from GDP of salaries paid to members of international organizations and foreign governments, which may be important in some countries, because they do not correspond to production capacities. As a result, the use of GNI seems more appropriate and in line with the practices of the multilateral development banks, but also with the United Nations for the identification of LDCs. Similarly, it seems appropriate to use 3-year averages to limit the influence of transient fluctuations and exchange rate volatility<sup>36</sup>.

### A specific indicator of human needs linked to the characteristics of the population

Per capita income gives too narrow a snapshot of the country's needs and capabilities. Therefore, it seems useful to also include an indicator of human needs in the allocation formula, including a human capital index which reflects low levels of education and health and additional indicators reflecting the specific needs resulting from the share of young people in the population and the presence of refugees. These complementary indicators have to represent the demographic structure of the population and the relative importance of the number of refugees in the population.

Many indicators of human development are already available. We choose to use the Human Asset Index (HAI) developed for the United Nations by the Committee for Development Policy (CDP) and used primarily for the identification of Least Developed Countries (LDCs). This index was designed to measure the handicap stemming from low levels of human capital. It highlights a lack of development capabilities, and its use in the allocation formula will allow meeting the principle of equity and equal opportunities among countries. Although there is a strong correlation between the capabilities resulting from health and education levels and the well-being derived from their attainment, the HAI represents the capabilities of countries in terms of development<sup>37</sup>. In its 2005 revision, the HAI is composed of 4 indicators: the under-5 mortality rate, the percentage of the population undernourished, the gross secondary school enrollment ratio, and the adult literacy rate. In 2015, an additional component was added - the maternal mortality rate. Because the maternal mortality rate is more an indicator of well-being than of capacity, the initial version of HAI was preferred in the simulations for which the results are provided and discussed Part III of this book. However, the new version of the HAI can just as easily be used, and has little effect on the relative levels of HAI.

The main competitor index to the HAI was until recently the Human Development Index (HDI), published since 1990 by the UNDP and which has undergone various improvements over the years without changing its basic structure<sup>38</sup>. However, there are at least 4 reasons to prefer HAI for aid allocation:

- 1. HDI is primarily an indicator of quality of life rather than an indicator of human capability
- 2. HDI includes among its components the per capita GNP already present in the allocation formulas

<sup>35.</sup> Gross National Income (GNI) is defined as Gross Domestic Product (GDP) minus the primary income paid to non-resident economic units and augmented by the primary income received from the rest of the world by resident units. It gives a measure of the primary incomes received by all the resident economic units and allows for international comparisons (Definition by the French National Statistical Institute (INSEE)).

The current HAI is a slightly modified version of the HAI designed in 2002 by the CDP, and which was itself
a modified version of the APQLI index, Augmented Quality of Life Index, previously used by the CDP for
the identification of LDCs (itself derived from an index called Quality of Life Index, without operational
use). The transition from the APQLI index to the HAI index (with different names) was initially intended to
show the change of perspective, from well-being to human capital. The choice and modification of components also reflected this shift in perspective. But they were also dictated by the availability and reliability of the data needed to build indicators that could be used for operational purposes: inclusion on the
list of LDCs, graduation from LDC status, or aid allocation. For example, learning attainment is a much
better indicator of human capital than enrollment rates, but it is not available on a sufficiently large scale.
 The index of human development is measured using 3 principal criteria: GDP per inhabitant, life expectancy
of citizens, and level of education (15 years +).

HDI has the same problems as other indices (apart from the HAI) in terms of data quality and availability<sup>39</sup>: conversely the selection process of HAI components was done by taking into account their coverage and reliability, because of the HAI is used for an operational purpose (i.e. the identification of LDCs)
 HDI does not include any component related to nutrition, despite the significant impact of undernourishment and malnutrition on development, especially for African countries.

A more serious competitor to the HAI to measure and compare human capital levels across countries has recently been developed by the World Bank, the Human Capital Index (HCI), which is the most recent development in this field (World Bank, 2018, 2019; Kraay, 2019). The HCI combines health and education indicators into a measure of human capital (as a measure of potential productivity) that a child born today can expect to reach on his 18th birthday given the risks of poor education and health that prevail in the country. It is an indicator of capital, not of well-being. It integrates, in a coherent theoretical framework, education data on enrollment and survival rates by age, and data on the quality of education (measured by international surveys), and health data (provided by anthropological and nutritional surveys e.g stunted growth). However as acknowledged by the authors of the index (Kraay, 2019), it has a number of limitations, mainly due to issues of data availability or statistical comparability. Moreover, its complexity, which is theoretically justified, risks making its results unclear for an operational exercise<sup>40</sup>. For these reasons, HAI still seems to be the most appropriate indicator for taking into account the lack of human capital in aid allocation formulas.

However, for sub-Saharan Africa it seems appropriate to adapt the Human Needs Index (HNI) to the characteristics of sub-Saharan African countries by complementing it with the age structure of the population and the number of refugees (Figure 2.3 below, and Table A10 in the appendix). The age structure factor is the ratio of the population aged from 0 to 19 over the total population, to reflect the weight of the youth bulge and the major challenge of youth employment in many African countries. The data about number of refugees are obtained from the UN High Commissioner for Refugees (UNHCR).

#### Figure: 2.3: The Human Needs Index



### 2) The synthetic indicator of vulnerability or structural fragility, aggregating 3 specific structural vulnerability indicators

The design of vulnerability and / or fragility indicators is critical to appropriately introduce a synthetic index of fragility into the allocation formula. Each indicator used to build the synthetic indicator of structural fragility relates to a specific form of vulnerability:

- Structural economic vulnerability
- Physical vulnerability to climate change
- Societal vulnerability.

#### Structural economic vulnerability

In order to be used for the allocation of concessional resources in an allocation formula, the economic vulnerability indicator, like the other vulnerability indicators, must be an indicator of structural handicap. It should not depend on current economic policies. There are various indicators of economic vulnerability, but they are unsuitable for this particular use as a criterion for aid allocation, since their composition mixes structural components with other components that depend on the policy of the government of developing countries, or the effect of previous policies on their present will. In addition, the level of income per capita is often included, which is already is taken into account separately in the formula, leading to redundancy.

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<sup>39.</sup> This question has been debated regularly at the UN, which for the countries concerned preferred reliable indices rather than more complex indices with uncertain reliability (e.g. infant mortality rate from DHS surveys, rather than life expectancy at birth, which would require knowledge of mortality by age band) cf Guillaumont 2009.

<sup>40.</sup> Another closely related human capital indicator was almost simultaneously published in Lancet (Lim et al., 2018) by the Institute for Health Metrics and Evaluation, but relied heavily on imputed or extrapolated data making it inadequate for operational use (see Kraay analysis, 2019).

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For example, the Briguglio index (1995), which covers 114 countries and has 3 main components: (i) exposure to external economic conditions measured by ratio of imports and exports to GDP, (ii) remoteness and insularity as measured by the ratio of transport and freight costs to export earnings, (iii) the propensity of natural disasters as measured by the ratio of value the damage caused by disasters relative to GDP. In 2007, the author modified the index by adding 3 new variables (concentration of exports, dependence on strategic imports, and dependence on external sources of financing) while excluding the variable for the propensity of natural disasters<sup>41</sup>. Over the period 1999-2000, the UN Committee for Development Policy decided to use a vulnerability indicator for LDC identification. When looking at the available indicators it was decided not to retain the Briguglio index for the same reason that it should not be used for aid allocation (see Guillaumont, 2009). Export and import rates depend on countries' openness policies and not only structural factors, which are clearly identifiable. Indicators from other sources were also reviewed and discarded for identification process of LDCs in part for the same reason (Atkins et al., 1998, 2000)<sup>42</sup>. Other authors have since proposed vulnerability indices that suffer from the same caveats<sup>43</sup>.

The only index designed in accordance with the required properties (structural index without redundancy compared to the other variables included in the formula) is the Economic Vulnerability Index (EVI) established by the Committee for Development Policy (CDP) of the United Nations as one of the three criteria for identifying LDCs. As LDCs are defined as poor countries with high structural handicaps, the EVI was designed to reflect truly exogenous factors.

## The EVI was originally designed in 2000, revised in 2005 for the CDP's 2006 triennial review of the list of LDCs, unchanged during the 2009 review, and then slightly

revised in 2011 for the 2012 review<sup>44</sup>. Since 2005, the EVI has consisted of a simple average of two sub-indices, reflecting respectively the exposure to exogenous shocks and the magnitude of these shocks, each sub-index being a weighted average of several components.

The index used from 2005 to 2009 had 7 components:

- 4 components for exposure to shocks: size of the population, distance from world markets, concentration of merchandise exports, share of agriculture, forestry and fisheries in GDP.

- 3 components for magnitude of shocks: percentage of homeless people due to natural disasters, instability of agricultural production, instability of exports of goods and services<sup>45</sup>.

Two changes were made in 2011. Firstly, the definition of one of the components relative to natural hazards was changed by replacing the displaced (homeless) population share due to natural disasters by the share of the population affected by these disasters, which is a broader but vaguer concept. Although the change may seem minor, especially since both indices come from the same source (Emergency Disaster Database (EM-DAT)), it appeared to be a significant change, as indicated by a very low rank correlation (23%) between the two versions of the component (Cariolle, Goujon and Guillaumont, 2015). However, it seemed reasonable to use the most recent version in our work as it is considered superior by the CDP.

A second, conceptually significant modification was to include among the components relative to exposure a "climatic" component - the risk associated with sea level rise - as measured by the share of the population living in Low Elevation Coastal Zones (LECZ), and also reducing the weighting of population size in the sub-index. These changes are a problem in the context of aid allocation for 2 reasons. Firstly, there is a significant risk of bias. The introduction of this single climatic component, unbalances the EVI indicator to the detriment of countries facing other climatic risks, such as the risk linked to desertification<sup>46</sup>. Therefore, in order to keep this climatic component in the exposure sub-index, the introduction of the share of arid lands in the total country area should also be considered. As a result, the specific vulnerability of West Africa and the Sahel countries, as well as of countries such as Botswana and Eritrea, would be captured alongside that of small island

<sup>41.</sup> Briguglio and Galea (2003) have since proposed another index of economic vulnerability for 117 countries (including 23 small states). Their index uses 4 components: economic openness (share of exports and imports over GDP), dependence on a very narrow range of export products, dependence on strategic imports (average imports of energy as a percentage of national energy production), remoteness (ratio of freight and transport costs over trade revenues).

<sup>42.</sup> Atkins et al consider the volatility of GDP as a sign of economic vulnerability. To build their index, they regress the volatility of GDP on 3 explanatory variables: economic openness (measured by the percentage of exports of goods and services over GDP), lack of diversification of exports, impact of natural disasters (measured by the proportion of the population affected by such events). The final index is an average of the 3 explanatory variables weighted by the coefficients obtained from the regression. The index covers 111 countries. The factors used to explain volatility are not only structural. Also, structural vulnerability is not just shown in GDP.

<sup>43.</sup> Turvey (2007) assesses countries economic vulnerability by their exposure to human and physical risks as well as the risks and dangers that may arise over time and the geographical context. 4 indicators are used by Turvey: (i) a "coastal" indicator measuring the risk of flooding, (ii) a "remoteness" indicator measuring remoteness and insularity, (iii) an urbanization indicator expressed as the proportion of the population living in urban areas, (iv) an indicator capturing natural disasters expressed as the percentage of the population affected by natural disasters. Vulnerability due to external economic shocks is not taken into account, however some indicators cut across it. Barrito (2008) proposes an index of vulnerability to external economic and financial shocks called "GVI" (Geographic Vulnerability Index). Barrito tries to estimate the negative impact of natural disasters on economic growth from the ratio of the value of economic losses to net capital formation.

<sup>44.</sup> See history and comments in United Nations, 2015 or 2016, Guillaumont 2009a, 2009b, 2015, 2016a, 2016b). This index was recommended by the United Nations General Assembly as a criterion for aid allocation (as well as the other two criteria for identifying LDCs).

<sup>45.</sup> The raw data are drawn from different databases (Emergency Disaster Database (EM-DAT) of the Center for Research on the Epidemiology of Disasters (CRED) in collaboration with the WHO, and the World Bank's World Development Indicators database).

<sup>46.</sup> We have quantified the impact of the change made in 2012 by the CDP to the rank of various types of country with regard to the index: Landlocked countries from the Sahel, but also some small mountainous island states would be classified as less vulnerable (Guillaumont, 2014).

states. Secondly, there is a significant risk of redundancy and therefore of lack of coherence. Should we maintain a vulnerability component to climate change in the EVI insofar as the new framework proposes to simultaneously introduce structural economic vulnerability and vulnerability to climate change in the allocation formula? To avoid any redundancy, it seems preferable not to include in the EVI this new "geo-climatic" component introduced in 2011. While the EVI reflects a risk or handicap to economic growth, the vulnerability to climate change indicator captures longer-term risk.

However, we propose to add among the components reflecting exposure to shocks a component reflecting the low quality of public infrastructure, in order to better adapt the EVI to the specificities of Africa. The infrastructure index used is the one established by the African Development Bank, the AIDI (Africa Infrastructure Development Index). The introduction of the AIDI makes it possible to understand the lack of infrastructure in Africa in the general context of structural economic vulnerability, rather than as a standalone need alongside GNI per capita in the allocation formula as is currently the case for the ADF (Figure 2.4 below and Table A7 in annex). Hence AIDI simply replaces the climatic component in the 2012 review of the EVI.

Various other technical improvements of the EVI are conceivable. These concern the introduction of other new components (e.g. taking into account the instability of remittances alongside the instability of exports of goods and service (see Guillaumont, 2017)) and the methodology for computing instability (e.g. how to set up the trend allowing to estimate instabilities (see Feindouno, 2019)). Such alterations to the EVI have been the subject of several FERDI publications (see also Carriolle et al., 2014) and could easily be introduced into the EVI by any of the multilateral development banks that might use it. The advantage of the EVI is that it is based on a clear, internationally validated concept, although its construction can be modified, depending on the particular needs of each user<sup>47</sup>.

**Figure 2.4:** The structural economic vulnerability indicator (revised EVI)



#### Physical vulnerability to climate change

To be introduced in an allocation formula a climate change vulnerability index must meet several criteria (see Guillaumont 2015, from which the following is inspired). First, the index must be independent from the country's policies. If policies make it possible to reduce vulnerability by increasing the capacity to adapt to climate change, that is to say its resilience, this should not imply a lower allocation. There are 2 components of the general vulnerability to climate change whose impact on allocation are in opposition. Firstly, there is the exogenous vulnerability, which results from climate shocks faced by the country and for which policymakers are not responsible, and which justifies external support. This is not the case for the vulnerability that a country could reduce by improving its policies. On the contrary, good resilience policies, which are a factor of reduced vulnerability, may be seen as a performance criterion, if it is considered useful to have such a criterion in the allocation formula<sup>48</sup>. The above distinction is particularly relevant for resilience, which results from both structural factors, such as per capita income or human capital, which are generally considered separately in the allocation process, since their low level justifies more support, and the quality of policies for a better resilience, the lack of which may eventually lead to less aid. However, most of the available vulnerability to climate change indices combine the two types of vulnerability, and in particular the two factors of resilience, which allows them to offer a broad view of a country's vulnerability, but makes them unfit for allocation purposes<sup>49</sup>.

Secondly, for a similar reason, it is not appropriate to use indices which are an assessment of the economic damage expected from climate change for international comparisons and for aid allocation<sup>50</sup>. Considerable progress has been made

<sup>47.</sup> Ferdi has developed an application called "Build your own index" that allows users to recalculate different EVI according to alternative weights and components (www.ferdi.fr).

<sup>48.</sup> That can be translated into adapted measures such as external reserves, insurance mechanisms, etc. 49. An example is the ND-GAIN index (University of Notre Dame Global Adaptation Index).

<sup>50.</sup> Wheeler (2011) in particular refers to the losses in agricultural productivity estimated by Cline, 2007, for the CGD.

in the assessment of the damage, as shown in the review by Dell, Jones and Olken (2014) of the "New Climate-Economy Literature". Hallegate et al (2015) also provide examples. These estimates are inevitably debatable, as well as limited, which the authors mentioned above emphasize. For example, the decrease in agricultural production resulting from increased aridity in the distant future depends not only on changes in rainfall and temperature, but also on changes in agricultural technologies, research and policies. Moreover, there are economic damages of climate change that are even more difficult to predict and approximate (e.g. peace and security). In general terms, any estimation of damage implies assumptions about adaptation policies that can only be specific to each country if we are to respect the principles of alignment and appropriation. While extremely useful for global resource mobilization, cost estimates of potential damage or of adaptation carried out on a global scale cannot be the basis for cross-country allocation of aid<sup>51</sup>.

Thirdly, the vulnerability which is relevant to the allocation process, from an ethical perspective, is the "vulnerability to climate change" and not the "climate vulnerability" in itself which has always existed in various forms in different parts of the world. Climate vulnerability does not engage the responsibility of developed countries in the same way. As for the economic vulnerability resulting from this climate vulnerability, it is taken into account by some components of the EVI presented above, notably the instability of agricultural production and the number of victims due to natural disasters.

Many indices have been developed following growing awareness of the phenomenon of climate change: Disaster Risk Index (UNDP, 2005), Natural Disaster Hotspots (Dilley et al, 2005), Predictive Indicator of Vulnerability (Adger et al, 2014), Social Vulnerability Index (Cutter et al, 2003), Climate Vulnerability Index (Sullivan, 2008), Quantitative Assessment of Vulnerability to Climate Change (ICRISAT, 2009), ND-GAIN Country Index (Notre Dame Global Adaptation Initiative, University Notre Dame). Most of these indices are constructed at the country level, allowing for crosscountry comparisons. The principle behind these indicators of vulnerability to climate change<sup>52</sup> is based on the definition of vulnerability by the Intergovernmental Panel on Climate Change (IPCC). According to the IPCC, the vulnerability of a system depends on 3 essential components: exposure, sensitivity, and adaptability. Schauser et al (2010) highlight the difficulty of disentangling these 3 aspects, because of the overlap between sensitivity and adaptability. These indices do not meet the required conditions mentioned above to be used for aid allocation, in particular due to the fact that they include components that depend on the policy of the government of developing countries, or the effect of previous policies and/or that are redundant with respect to other variables in the allocation formula. Most available indexes are composite and integrate a wide range of variables, combining the physical, social, economic, and political dimensions of vulnerability. Cutter et al (2003) developed the "Social Vulnerability Index" from 42 socio-economic variables (age, race, ethnicity, education, family cohesion, etc.). Wongbusarakum and Loper (2011) focus only on the social aspect of vulnerability using 10 indicators: an exposure indicator, a sensitivity indicator, and 8 indicators which reflect adaptive capacity, thus measuring the level of vulnerability to climate change of various communities. Their indicators reflect the households' subsistence level, the diversity of the sources of income, the ability of a society to reorganize after a shock, governance and leadership, equitable access to resources, etc. One of the most prominent indexes is the Notre Dame University "Notre Dame Global Adaptation Index" or "ND-GAIN". The index aggregates 14 indicators gauging the state of readiness of each country (rule of law, political stability, etc) and 36 vulnerability indicators (number of endangered species, dependence on natural resources, maternal mortality rate, etc). The final country score is the difference between the vulnerability score and the readiness score.

It is easy to see that these indices, because of the plethora of variables they contain and the blurred relationship between vulnerability and resilience they are based on, do not meet the conditions required to be used as a criterion for the allocation of resource for the adaption to climate change. They were not designed for this purpose. They also cannot be used as a criterion for the allocating concessional resources in general.

We therefore propose using a physical vulnerability to climate change index which is exogenous, does not imply any socio-economic assessment, and measures the impact of changes caused by climate change rather than the climate itself. The index must also be constantly updated since it must reflect change which is likely to occur in the future, because non-questionable change is only what we can observe, and the outlook varies with each new observation.

An indicator of physical vulnerability to climate change meeting the above criteria (exogeneity of its components, absence of socio-economic variables, and emphasis on the impact of change) was established by FERDI in 2011<sup>53</sup>, and has been updated and revised several times to account for new data and implement methodological improvements<sup>54</sup>. It is shown in Figure 2.5 below and in Appendix Table A8. Though based on past data, it is a dynamic, forward-looking indicator based on a distinction between 2 kinds of risks due to climate change:

<sup>51.</sup> The World Bank highlights the fragility of cross-country conclusions on adaptation costs (World Bank, 2010, *p*89).

<sup>52.</sup> European Environment Agency, UK Department of Environment, Food and Rural Affairs, United Nations Framework Convention on Climate Change.

<sup>53.</sup> Guillaumont, P. and C. Simonet (2011).

<sup>54.</sup> Guillaumont, P. and C. Simonet (2014) Guillaumont, P., C. Simonet, M. Closset and S. Feindouno (2018), Feidouno and Guillaumont (2019).

• Risks associated with gradual shocks, such as sea level rise (e.g. risk of flooding), trends in increasing temperatures, or decreasing rainfall (e.g. risk of desertification)

• Risks associated with the intensification of recurrent shocks, whether rainfall shocks, temperature shocks, or cyclones.

Like the EVI, for each of type of shock, the physical vulnerability to climate change index is based on a distinction between magnitude of shocks and exposure to shocks. Since the sources of vulnerability are heterogeneous and the vulnerability of each country is specific, sub-indexes corresponding to the various types of shocks are aggregated by quadratic mean, which gives greater weight to the components which reflect higher vulnerability.

Figure 2.5: The Physical Vulnerability to Climate Change Indicator (PVCCI)



NB. In this figure the boxes on a grey background represent the shocks and the boxes on the white background of the last line represent the shock exposure.

#### Societal vulnerability

It is essential to take into account "societal vulnerability" alongside economic and climatic vulnerabilities. The main manifestation of this vulnerability is the recurring existence of conflicts and violent events that the organization of society is unable to ward off. It is accepted that the insecurity, in which a large part of the African population, or more broadly of the developing countries lives, hinders the development chances of these countries. Poverty and political fragility are inextricably linked to the degree of violence experienced by some countries (UNDP 2008).

In order to use a societal vulnerability indicator as a positive factor of allocation, it is necessary to separate, as for other forms of vulnerability, the structural components of insecurity or conflict and the structural components of quality of economic policies and governance that influence security. Again, it is only structural vulnerability, seen as exogenous, that justifies allocating more aid. The list of structural factors of insecurity is long, controversial, and composed of elements for which the quality of available measures is debatable and not precise. There is then a real question about the result of their aggregation, their representativeness, and their dynamics, as well as the precise interpretation of these measures.

Faced with these difficulties, the approach taken in this book is not based on measuring the factors underlying insecurity, but on measuring the results of violence, in all its forms and degrees.

FERDI proposes to measure societal fragility by an Internal Violence Index (IVI). This index focuses on internal violence, as internal conflict and crime may have more structural roots than inter-state conflict. In addition, the number of large-scale inter-state wars has declined in recent decades, but domestic violence and crime has increased. However, internal violence and crime are phenomena that take many forms, which requires a composite index.

The construction of an internal violence indicator requires the collection of reliable data that can capture the intensity of violence in developing countries, particularly countries in sub-Saharan Africa. The IVI is built directly from quantitative data; it is data-based, which is a radical difference from existing indices that rely on subjective assessments by various observers or experts. The data used are objective in nature because they do not take into account the perception of violence but its occurrence. The perception of violence is only used to correct quantitative indicators for the indicator if it is well documented and highly discordant with the data. The costs of violence (i.e. damage) are also not included in the index because they are directly related to the level of income.

By continuously and dynamically measuring violence on a continuum ranging from social protests to civil wars, the index is able to act as a proxy for tensions arising from societal vulnerability. The data on violence is of good quality and easily observable. Data points have little delay between the actual events and their accounting. The IVI is an "S.M.A.R.T." indicator, which integrates the different dimensions of violence, but uses a reasonable number of sub-components to remain transparent<sup>55</sup>. The composition of the IVI is shown in Figure 2.6, below. 9 quantitative variables related to violence are divided into 4 clusters: internal armed conflict, crime, terrorism, and political violence. An identical weight (25%)

55. For alternatives see Feindouno, Goujon, Wagner, 2016.

is assigned to each cluster. Firstly a "direct" IVI is calculated ass an arithmetic mean of the 4 clusters. This makes it possible to measure the level of violence of each country without taking into account neighbor effects.

Secondly, an "indirect" IVI is calculated, measuring the level of violence observed at the regional level by an arithmetic average of the IVIs of neighboring countries. Finally, the "overall" IVI is calculated as an average of the direct IVI and the indirect IVI, a lower weight being given to the latter. In measuring societal vulnerability by the degree of past violence the index reflects a structural component of political fragility, because violence is a phenomenon whose recurrence is well established in the literature, and the consequences of past violence remain on the shoulders of the present policymakers.

For the indicator of political fragility not only to be based on past events but also to be forward looking, it seems useful to supplement it with an indicator of risk of violence, which is an indicator of the structural risk of future conflict. The index of internal violence based on the observation of past events has itself a forwardlooking value because of the recurring nature of violence and conflict, but it is important in an objective analysis of structural fragility to be able to take into account the historical and structural factors that determine the risk of conflict.

There is a wealth of recent literature on the factors which determine the risk of internal conflict<sup>56</sup>. This literature does not generally distinguish between factors that are structural and those that fall under current policy. However, for reasons that have been highlighted several times in this book, structural factors alone must be taken into account to justify an increase in the allocation according to a political risk.

To estimate the risk of conflict is not to predict its onset, but it is to assess for each country the probability of conflict by identifying the factors that determine conflict onsets. This implies using a large set of internationally comparable data, and using an econometric method that can capture the most robust correlations with the occurrence of conflicts or violent events. Empirical works on conflict prediction are numerous, but yield to few satisfactory results (Cederman and Weidman, 2017). This is why FERDI has sought to build a robust indicator of structural risk of conflict.

A good estimate of risk of conflict depends on the econometric model and the variables used in the estimation. In recent years significant progress has been made in risk forecasting has been made, thanks to the development of advanced calculation techniques. Some new models have been able to resolve the problems of the traditional models. In any case these models, which although they are good, are not designed to respond to our objective which is to estimate separately the

structural and the non-structural risk of conflict onset. We propose to use the *boo-lean logic* model (for more details see Feindouno and Wagner 2020).

The underlying concept of the *boolean logic* model used here is that the onset of a new conflict is the result of the interaction of 2 types of factors, structural risk and non-structural risk. This definition is similar to that of shock exposure and shock and occurrence. Structural risk is taken to be like a long-term risk which changes slowly over time, which captures the characteristics and structural vulnerability of a country, whereas non-structural risk which fluctuates more is linked essentially to more short-term shocks, or an imbalance coming from the national, regional or international situation. A build-up or intensification of the influences and reinforces the arrival of the second risk, which in turn contributes to the onset of conflict.

Structural risk and non-structural risk, which are an aggregation of numerous factors, are not observed directly. They can be treated as unobserved latent variables. Their impact on the onset of a new conflict is made through the inference of multiple variables, each of which measures a part of the risk. The impact of each of these variables in the onset of a new conflict is made by the unobserved latent variable. So, in using a "link function" of a logic model the 2 risks can be estimated separately. This approach allows a synthesis of the empirical works in the economic literature, by condensing this large number of factors into 2 categories, which facilitates the visibility and the understanding of the risks.

The Societal Vulnerability Index (SVI) is the arithmetic mean of the overall internal violence index (IVI) and the Structural Conflict Risk Index (SCRI) (see Figure 2.6 below, and Table A9 in the appendix)<sup>57</sup>.

<sup>56.</sup> See Blattman and Miguel (2010), Garfinkel and Skaperdas (2012, Rohner (2018).

<sup>57.</sup> A variant of this indicator has been established by replacing the observed value of the IVI by a value estimated from structural factors. The average of the IVI thus estimated and the structural risk index of conflict then constitute an index of structural risk of violence.



### 3) A complement to vulnerability indicators: performance indicators specific to fragile situations

It is not the purpose of this book to propose an overall reform of the CPIA. But if structural vulnerability indicators are introduced into the allocation formula, it makes sense to include in the performance indicator a measure of the quality of the policies which address these vulnerabilities, or to ensure that this indicator can capture what is specific about changes in these policies in fragile or in transition states.

The Country Policy and Institutional Assessment (CPIA) of the AfDB refers to the multiple aspects of economic and social policies since it is based on 5 clusters of indicators reflecting for each country A) the quality of its economic management; (B) the coherence of its structural policies; (C) the ability of its policies to promote equality and social inclusion; (D) the quality of governance and management of public sector institutions; and (E) the capacity of its regulatory framework to support infrastructure development and regional integration, all of which can increase the resilience to economic vulnerability. To be consistent with our framework it would also be necessary to measure the political commitment of the countries to face climate change or societal vulnerability.

There are a number of measures available in the literature on the results achieved by countries in their climate change mitigation policies, such as reductions in CO<sub>2</sub> emissions or in the carbon intensity of the economy. However, these results are not just the result of how governments are trying to mitigate climate change. A government's commitment to reducing CO<sub>2</sub> emissions must be measured by policies to combat climate change. These policies are reflected by laws and institutions. There are as yet very few internationally comparable measures of these policies, and none have sufficient coverage and quality to be used as an indicator in an aid allocation formula. Most of the existing indices cover a small number of countries<sup>58</sup>. However, there are other indexes which try to capture the quality of environmental policies through general indices of institutional quality, such as the World Bank's Doing Business or the World Governance Indicators. This is also the case for the "readiness" component of the Global Adaptation Index (GAIN) of the University of Notre Dame, albeit more climate and environment oriented<sup>59</sup>. But the coverage of these indicators goes far beyond action against climate change.

The best available option today would be to use the 14th variable of the CPIA from its C Cluster which aims to measure the quality of environmental policy, beyond global warming<sup>60</sup>. In the future, it seems necessary to design a performance-based "climate" indicator, for example by considering changes in CO<sub>2</sub> emissions, but by correcting for initial conditions and economic growth, since emissions can increase despite good environmental policies due to the development of the economy.

The importance given to societal vulnerability in aid allocation raises the question of the adequacy of the current CPIA for the conflict and violence situations in fragile states. For many years, Multilateral Development Banks have been using a performance indicator specific to states in fragile or post-conflict situations. This is the case, for example, for the World Bank's Post Conflict Performance Index (PCPI) originally created during IDA-13 and revised during IDA-16. This index is based on a lighter version of the CPIA, to which are added various components related to the security, demobilization and reintegration of ex-combatants, political reconciliation processes, and the reintegration of displaced populations. The World Bank uses the PCPI, in addition to GNI per capita, to allocate funds for its special window for fragile states. Partie II -Chapitre 2 : Le choix des indicateurs

<sup>58.</sup> The European Bank for Reconstruction and Development's Climate Laws, Institutions and Measures Index CLIMI, ou Künkel, Jacob and Busch's Climate Policy Index, 2006. For example, the German Watch Climate Change Performance Index (Burck and Bals, 2016), compiled from CLIMI and published annually, covers only 58 countries. Five components are used: level of emissions (30%), recent evolutions of emissions (30%), renewable energies (10%), energy efficiency (10%), and climate policy at national and international level (20%) evaluated by more than 300 experts.

<sup>59.</sup> The "readiness" component uses fourteen indicators: freedom of enterprise, freedom of trade, fiscal freedom, government spending, monetary freedom, freedom to invest, financial freedom, accountability of the administration, political stability and absence of violence, control of corruption, higher education, freedom of work, number of mobile phones per 100 people, rule of law.

<sup>60.</sup> According to the CPIA's 2016 questionnaire, this component "This criterion assesses the extent to which environmental policies foster the protection and sustainable use of natural resources and the management of pollution. Assessment of environmental sustainability requires multi-dimension criteria (i.e. for air, water, waste, conservation management, coastal zones management, natural resources management). The two-way relationship between environmental degradation and poverty is well recognized. Poverty tends to lead to an extensive use of marginal land, water and forest resources, thus straining the already fragile and limited environment abse. This question assesses the effectiveness of government's policies to protect the environment and promote sustainable development".
Taking societal vulnerability into account in a general allocation formula justifies completing the definition of CPIA or CPA. This could be done by adding an additional cluster representing the country's commitment toward peace and security, which would be related to actions against insecurity, conflict management and the return to peace, and strengthening the quality of institutions related to security and justice. It would require adding new components to the questionnaire sent to the local offices. To this end, the CRFA<sup>61</sup> of the African Development Bank, adapted into a composite index, could constitute a working basis, as well as the specific components of the World Bank's PCPI.

A simpler and more transparent alternative solution (because it is based on quantitative results) would be to use the variation of the societal vulnerability indicator as a proxy for the commitment toward peace and security. One could consider the variation of the "direct" internal violence index (DIVI) without taking into account the regional component of the IVI. The DIVI, once calibrated between 1 (no decrease in violence), and 6 (strong reduction of violence), could then be integrated as part of the CPA. Its introduction would not affect the performance of countries without obvious violence, but would improve the CPA of countries in transition out of fragility whose initial fragility negatively influences the other components of the CPA<sup>62</sup>.

We now have a set of coherent and compatible vulnerability indicators, which, alongside traditional indicators of need and performance, are suitable for aid allocation, because they are structural in nature, or in other words, because they do not reflect the present will or policies of African states. The next chapter examines how vulnerability indicators can be introduced in the general allocation formula of multilateral banks, as well as in the allocation formula of the specific windows which address fragility directly.

## Part III -How to reform the allocation formula?

The first chapter of Part III presents the required principles that allow the introduction of structural fragility into the aid allocation formula in a fair, efficient, and transparent way. It also shows why and how the special windows for fragile or transition states need to be reformed to ensure the coherence of the different financing instruments.

The second chapter explores, using numerical simulations, the impact of these reforms on the allocations of concessional funds across sub-Saharan African countries, based (experimentally) on the current ADF allocation model.

Part III -How to reform the allocation formula?

<sup>61.</sup> CRFA's framework is based on a modified CPIA and the Peacebuilding and Statebuilding Goals (PSGs) database. CRFA is made up of 5 criteria: legitimacy of politics, security, justice, economic and social inclusion, exogenous shocks (internal and regional).

<sup>62.</sup> The coefficients of the formula should naturally allow that the positive impact of a reduction of the IVI on the index of performance has on its negative impact through the level of the index of structural fragility.

#### Chapter 1: New principles and allocation formulas

Taking into account a performance index, such as the Country Performance Assessment (CPA) and structural vulnerability indicators (economic, climate and societal) is a way of recognizing that performance cannot be measured without taking into account these different forms of vulnerability. By doing so the new formula reflects a performance and vulnerability allocation, or "PVBA". Applying the PVBA to all eligible countries (to IDA or ADF), without defining a predefined category of "fragile" or "transition" states, recognizes that every country faces exogenous factors of vulnerability and incurs the risk of being caught in a cycle of conflict and violence and that preventive, and not just curative, action is necessary. Moreover, a more targeted approach aimed at the causes of fragility and implemented through specific means can be carried out within the framework of a special window dedicated to fragility, as long as its design remains consistent with the new PVBA framework.

In the case where there was only one PVBA, that's to say if the present windows reserved for fragile states were integrated into the PVBA, it would obviously ensure that the weight given to vulnerability indicators in the PVBA would allow an allocation of at least as much aid to fragile countries as in the case of two separate windows.

## 1) Introducing vulnerability into the performance based allocation: the PVBA, performance and vulnerability-based allocation

The simple structure of the performance and vulnerability-based allocation (PBVA) formula derived from the current PBA formula and following the recommendations of previous chapters is as follows:

 $A_i = f$  (Population, Needs, Fragility, Performance),

In addition to the size of the population, needs are taken into account by supplementing per capita income by the new Human Needs Indicator (HNI). Fragility is measured by combining 3 vulnerability indicators (economic, climate, societal), the EVI, PVCCI, and IVI. Lastly, performance is still measured by the CPIA.

Compared to ADF and IDA this new formula introduces a new criterion, namely fragility as a consequence of structural vulnerabilities, but also 2 other modifications for the sake of coherence and simplicity, which will be presented in more detail below. It broadens the notion of need by supplementing per capita income with a composite indicator of "human needs" which is more reflective of the multidimensional nature of poverty. It also removes the indicator of infrastructure included in

the ADF PBA formula as it is now incorporated in the structural economic vulnerability index which contributes to the assessment of composite fragility.

2) Maintaining a special support facility for fragile and transition states? If so, how should it be reformed?

Three questions arise here. Is there a rationale for maintaining a specific window for fragile states along with the PVBA? If so, should the eligibility conditions for this instrument be modified? How to allocate its funds?

#### Should we maintain such an instrument?

The use of the category of fragile state introduces a discontinuity in the allocation between countries which are considered fragile and other vulnerable countries which miss the additional allocation provided by the special windows for the treatment of fragility. This is unfair when the PBA does not take vulnerability into account. By favoring, on the one hand, countries with a low CPIA, through these special regimes, and on the other hand countries with a high CPIA, through the PBA, the current coordination between the two systems penalizes the countries which remain at around an average level of CPIA, but which may nevertheless present high risks of fragility. This discontinuity results from the dual role of the CPIA, which is used to evaluate both performance and fragility. Falling below the threshold and being recognized as a fragile state leads to a significant increase in the allocated amount. In other words, the special treatment of fragile states leads to allocations that are increasingly disconnected from performance, without the coordination of the respective objectives, and without the complementarity of the operations carried out under these two instruments being clearly stated.

It is therefore important, if the decision is to keep a special facility for fragile states, to be able to justify the existence of both windows as long as the PVBA takes into account the fragility of states in its various components. The use of two windows can only be justified as long as the objectives, instruments, and programs are clearly differentiated between the 2 windows, but also as long as they are based on the same theoretical foundations.

Thus, by preventively targeting fragility, a special provision for fragile states is justified when it provides additional resources and is complementary to the general PVBA framework.

The African Development Bank's TSF or the World Bank's fragility instruments for turnarounds or FCV (fragility, conflict, violence) countries should be additional to PBA allocations (the same is true for the exceptional risk mitigation regime) because of their specific allocation, and should not be substitutes for it. Thus, TSF

pillar I should focus exclusively on reconstruction, on the provision of basic services, and on overall efforts to strengthen the state. This property of additionality in terms of targeting and instruments is fundamental and is the main reason to justify maintaining 2 types of allocation, both at the African Development Bank and the World Bank. However, this specificity, which is difficult to maintain when PBA resources for fragile or transition states are low, could be reinforced by the introduction of vulnerability indicators in the new PVBA leading to an increase in the funds allocated to these countries. Transition countries lack resources because of their low CPIA. The resources of these special windows are sometimes used to finance projects that could not be done through the PBA alone, thus reducing these properties of additionality and specificity. In increasing the PBA resources allocated to transition states by introducing vulnerability through the PVBA, the proposed reform reduces the risk of fungibility of both windows.

In any case, the funds allocated through the PVBA should stay quantitively the biggest, because only they are capable of taking into account all the different types of fragility for all the countries, and to play a preventive, and not just curative role against conflicts and violence.

#### How to redefine eligibility to transition or fragile state facilities?

Neither at the African Development Bank where eligibility is based on explicit criteria, nor at the World Bank where eligibility appears to be more discretionary or arbitrary can one find explicit references to vulnerability to determine eligibility to this special fragility facility.

For the coherence of the allocation system of the African Development Bank, fragility measured as the sum of structural vulnerabilities should be considered directly as an eligibility criterion for the TSF as is currently the case for an indicator which reflects a decrease of GDP per capita (or as a replacement to it) (meaning not clear). For example, the median value of this new fragility indicator over all ADF eligible countries could be considered as an eligibility threshold, which would lead to the inclusion of half of the countries (one could also consider the first third or the first two guintiles according to the political consensus around this issue). Similarly, the HNI (Human Needs Index) variable used in the PVBA formula should be taken into account alongside fragility, rather than the HDI (Human Development Index) which is currently considered among the eligibility criteria. Another option would be to use a formula, combining vulnerability, human capital, GDP per capita, and performance to compute a TSF eligibility indicator representing the political consensus around this issue and reinforce the dynamic and transparent aspect of this classification. The implementation of such a strategy and the determination of the most appropriate eligibility threshold, both at the African Bank and at the World Bank, would require further technical and political reflections that lie beyond the scope of this study.

#### How to determine the allocations of the funds dedicated to fragility?

A quantitative measure of fragility is currently absent from these allocation processes among fragile states. The proposed reform would consist in using a formula similar to the PVBA for the allocation of resources from the funds dedicated to fragility:

 $A_i = f$  (Population, Needs, Fragility, Performance)

The coefficients or exponents of this formula would then be modified compared to the PVBA detailed above in order to strengthen the weight given to fragility.

This option would enhance both the transparency and effectiveness of the allocation models specific to fragile states, especially the one used to allocate the funds of AfDB's TSF pillar I (or any other similar instrument, notably the one used by the World Bank), since the link between the allocated amounts, performance, and fragility would appear clearly. In addition, taking into account the drivers and risk associated with fragility would make the system more responsive.

As the use of such a formula for TSF would no longer make it possible to determine in advance the total amount allocated to TSF Pillar I by summing individual allocations based on PBA allocations from previous cycles, the new system would require the setting aside of the total amount dedicated to fragility at the beginning of each budget cycle, possibly as a percentage of the total ADF resource. Since they are based on PBA allocations of the previous cycle, TSF Pillar I allocations are de facto linked to performance but only to a past evaluation<sup>63</sup>. One can question the rationale of this proposal. Admittedly, in a two-stage process, the AfDB ensures when determining eligibility for the TSF that a certain number of future commitments (for peace, debt management, macroeconomic policy, public finances, and transparency) are made by eligible countries. However, as we have shown in the second chapter of Part 1 above, the real performance, especially in the most fragile countries, cannot be assessed without taking into account the structural conditions and factors faced by eligible countries. Taking the different vulnerabilities directly into account directly to determine the allocated amounts would make the TSF more equitable and transparent. It would also make it more reactive. Moreover, by not considering the different forms of vulnerability, the allocation model ignores most of the risk factors influencing the trajectory of transition states, leading to requiring a repeated use of the emergency reserve at discretion.

63. Because they are based on old allocations, themselves based on older CPAs. There is potentially a gap of 6 years between the CPIA year used for the allocation of PBA and the year of payment of TSF resources. One of the major difficulties plaguing the design of the allocation model for special windows dedicated to fragility is to limit the use of discretion, because it leads to the risk of arbitrariness, in order to make the resulting allocations predictable and consensual. By design, the allocation of TSF Pillar I is predictable in the sense that it is determined *ex-ante* at the beginning of the budget cycle. However, the current allocation system, which uses several "discounts" (depending on the CPIA, per capita GNI level, and the duration of engagement to the TSF), and includes a minimum allocation and a maximum allocation, makes allocation of TSF Pillar I, but with a lower correlation than for the PBA. Furthermore, the relationship between the new composite vulnerability indicator and Pillar I allocations is clearly non-linear, as shown in Figure 3.1 below. As a result, even if fragility was taken into account in the PBVA formula, an increase in a country's vulnerability might not lead to an increase in the total funds allocated to it if composite vulnerability was not taken into account in the TSF allocation model.

**Figure 3.1:** Official allocations of TSF Pillar I for the ADF14 Cycle by CPA Quintile (CPA) and Global Vulnerability Index (VI)



A similar criticism can be made regarding the low predictability and transparency of the allocation process of the special windows for addressing fragility at the World Bank, because the eligibility process remains arbitrary and the allocations do not follow much formal methodologies. This question even more to be posed because the World Bank plans to more than double the aid for fragile countries, which would increase to 7 billion dollars for IDA-17 to 17 billion for IDA-18.

In summary, the need for transparency leads to a debate about the eligibility criteria for special windows and the principles of their allocation among eligible countries both at the World Bank and the African Development Bank.

#### A special instrument for addressing adaptation to climate change?

Fragility is now at the heart of donor concerns, but climate change issues have so far not received the same treatment or generated the same kind of responses from multilateral donors. However, much of the argument in this book about the treatment of fragility can easily be adapted to climate change adaptation issues. Debates on climate change finance in developing countries all too often mix separate issues. Climate change adaptation cannot be dissociated from economic development and fragility-related issues, nor can it be considered independently of its mitigation, which is essential to any development strategy. Even if these interactions happen usually at the operational level, they do not exonerate policymakers from the need to distinguish between the financing sources available for development, adaptation, and mitigation, in particular the concessional ones, and the reasons that justify their use.

As noted above, vulnerability to climate change in African countries is intrinsically part of their fragility in a broad sense and can result in onsets of conflict and violence. That is why it is logical that this vulnerability be taken into account in the PVBA and special windows for fragile states alongside climate vulnerability as part of economic vulnerability.

The use of a specific window for adaptation to climate change in African countries makes it easier for multilateral institutions to mobilize international resources, by virtue of the fact that the international community considers adaptation to climate change to be a major specific problem. Furthermore, such an instrument would highlight the interest of institutions for this type of funding (e.g. Green Fund). It would also be a way to preserve the additional nature of funds dedicated to adaptation. Nevertheless, the argument for a specific window is not decisive, because the institutions' accountability to climate donors may be based on an assessment of the contribution of the funded development projects to adaptation to climate change. It is not possible to simultaneously address the optimal geographic allocation of climate change adaptation windows and mitigation windows because their objectives are different. Climate change mitigation is in essence the production of a global public good. It must be implemented in sovereign countries, but for the planet's sake. In this case effectiveness is assessed primarily in terms of avoided CO2, rather than in terms of development results in countries where mitigation policies are also implemented. In terms of effectiveness, the corresponding concessional windows should be used where the mitigation potential is the biggest. These windows can then help the poorest countries to implement a clean development strategy, and can be implemented through simple eligibility conditions, or a modulation according to income, of the concessional funds received.

For the allocation of funds for adaptation as well as for foreign aid in general, 3 principles must be reconciled: effectiveness in the use of funds with regard to the objective, equity in their allocation across countries, transparency. To allocate funds within a multilateral framework these 3 properties can be obtained by using an allocation formula representing global consensus.

This new instrument would require developing by adopting a formula such as the one proposed in the PVBA framework, combining needs, vulnerability, and performance, the specific indicators of which would have to be defined according to the main principles detailed in this book. A climate change vulnerability indicator such as PVCCI could be used in both the PVBA and the TSF formulas and also to allocate funds for adaptation to climate change.

As multilateral development banks do not currently manage specific funds for adaptation, the simulations that follow consider vulnerability to climate change only through a general performance-based allocation framework.

Part III -Chapter 1: New principles and allocation formulas

## Chapter 2: A possible and needed reform: some simulations

This chapter explores the consequences of the use of various mathematical formulas for the PVBA and the TSF allocations. Within the current framework of the African Development Bank, the different formulas examined give a greater or lesser weight to needs, fragility, and performance. The simulations show, by comparing the results obtained with allocations from the ADF formulas, how the choice of coefficients applied to each index makes it possible to address the 3 principles of effectiveness, equity, and transparency which should form the basis for an allocation model (see Part 1, Chapter 2, above). Analyzing the impact of this new approach in the context of the ADF makes it possible to analyze the impact of these reforms for Africa. Given the similarity between the allocation formulas of the different multilateral banks, in particular between the African Development Bank and the World Bank, similar conclusions could be drawn from the same exercise applied to different frameworks.

## 1) Performance Vulnerability Based Allocation (PVBA) allocates more to the most vulnerable countries without giving less to the best performers

Taking human needs and fragility into account through different forms of vulnerability (economic, climate change, socio-political), and also human needs, allows a better characterization of fragile states and countries in transition. Depending on the weight given to fragility in the allocation formula, all things being equal, the share allocated to the most vulnerable countries should rise in comparison to the current Performance Based Allocation (PBA). This new allocation model becomes a Performance and Vulnerability Based Allocation (PVBA). In order to test this hypothesis and to measure the impact of this new conceptual framework on allocations, simulations were carried out, the results of which are presented below using the ADF-14 allocation model as a benchmark, first considering only the PBA and not the TSF allocations.

#### The principles of simulations

We tested the impact of the new conceptual framework on base allocations for the year 2017 and present it here in terms of percentage of the total amount of these allocations at the end of the first step of the allocation process. A ceiling of 10% of the total amount per country is applied and discounts for Blend (-50%) and Graduating countries (-70%). These simulations do not correspond to the final allocations as currently calculated because they do not include the stages of the allocation process beyond the base allocation (MDRI, discounts and incentives for loans and grants, minimum allocation). However, these results make it possible

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to analyze more clearly the impact of the various methodological choices on the allocations.

The technical parameters for the simulations are as follows:
As a starting point, the simulations replicate the ADF allocation model for the year 2017. The PBA formula used as a reference is:

 $A_i = CPA^{4.125} \times GNIpc_i^{-0.125} \times AIDI_i^{-0.25} \times Pop_i^1$ 

with  $CPA_i = 0.2CPIA_i^{ABC} + 0.58CPIA_i^D + 0.06CPIA_i^E + 0.16PPA_i$  if portfolio

and  $CPA_i = 0.36CPIA_i^{ABC} + 0.58CPIA_i^D + 0.06CPIA_i^E$  without portfolio<sup>64</sup>

•The proposed conceptual framework introduces 5 new indicators: 3 structural vulnerability indicators (EVI for structural economic vulnerability, PVCCI for physical vulnerability to climate change, IVS for societal vulnerability). To avoid using too many indicators which would make the allocation formula complex, the 3 structural vulnerability indicators are aggregated into a single composite vulnerability index (Vulnerability Index - VI) using a simple arithmetic mean<sup>65</sup>. The aggregation formula is as follows:

 $VI_i = 0.33EVI_i + 0.33PVCCI_i + 0.33IVS_i$ 

the new allocation formula then becomes:

$$A_{i} = CPA^{\alpha} \times GNIpc_{i}^{\beta} \times VI_{i}^{\gamma} \times HNI_{i}^{\delta} \times Pop_{i}^{\beta}$$

The exponents for each variable remain to be defined as part of the simulations.

• The indices<sup>66</sup> and the years used for their calculation are as follows:

Indices	Year
CPIA	2016
PPA	2016
AIDI	Average over 2012-2014
Population	2013
GNIpc	Average over 2013-2015
EVI	2016
PVCCI	2016
SVI	2016
HNI	2016

64. See Part 1 Chapter 1 for the definition of acronyms

• The amount to be allocated is set to 100 in order to make comparable allocations and shares.

## The results of the current formula with regard to the vulnerability of African economies

Table 3.1 below presents the results of this aggregation and the rankings of countries eligible for ADF. Most of the fragile states according to the 2017 ADB/World Bank harmonized list are ranked at the top. Among the 15 most vulnerable countries, which corresponds to the number of transition countries eligible for the TSF, 8 are in transition, and 2 are fragile. Several countries in transition such as Liberia, Togo, and Sierra Leone have relatively low composite vulnerability compared to other ADF countries. Some countries not eligible for the TSF, such as Gambia or Senegal, have high vulnerability levels (economic and climate change, respectively). To interpret these differences in ranking more precisely, it is necessary to refer to the detailed ranking according to the 3 types of vulnerability (see Appendix Tables A1, A2, A3 and A4)<sup>67</sup>.

67. The values and ranks corresponding to the GNI per capita and the HNI are available in Appendices A5 and Аб.

<sup>65.</sup> Preferred here for the reason of simplicity rather than a quadratic average which could be justified, but would not modify the overall meaning.

<sup>66.</sup> The definition of the variables appears in Part 2, Chapter 2, and the technical details relative to the construction of the indicators are available online on FERDI's website: www.ferdi.fr.

Pays	Composite Vulnerability Index (VI)	Rank VI	Rank EVI	Rank PVCCI	Rank SVI
South Sudan**	5,14	1	2	15	2
Somalia**	4,64	2	6	11	5
Gambia	4,31	3	1	9	29
Sudan**	4,15	4	19	16	3
Chad**	4,14	5	7	13	10
Mali**	4,13	6	25	3	8
Eritrea*	3,81	7	4	10	20
Comoros**	3,70	8	9	1	33
Niger*	3,68	9	14	17	14
Senegal	3,64	10	20	2	19
Djibouti*	3,53	11	16	5	23
Guinea-Bissau**	3,49	12	11	6	27
Madagascar**	3,47	13	15	4	31
Mauritania	3,44	14	24	8	17
Nigeria	3,30	15	32	27	1
Mozambique	3,22	16	21	7	24
Lesotho	3,12	17	3	32	16
Burundi**	3,12	18	17	24	13
Kenya	3,04	19	35	30	7
Zimbabwe**	3,00	20	5	25	26
Central African Rep.**	2,97	21	22	36	6
Rwanda	2,97	22	26	14	21
Congo, Dem. Rep.**	2,95	23	33	34	4
Uganda	2,92	24	34	22	11
Guinea*	2,88	25	28	18	18
Burkina Faso	2,88	26	23	12	28
Malawi	2,80	27	10	19	36
Sao Tome & Principe	2,59	28	12	20	38
Sierra Leone**	2,53	29	13	21	37
Ethiopia	2,46	30	30	37	9
Cameroon	2,22	31	38	31	15
Togo**	2,21	32	27	29	25
Benin	2,20	33	31	23	30
Cote d'Ivoire	2,20	34	37	35	12
Zambia	2,17	35	18	26	35
Liberia**	2,09	36	8	38	32
Tanzania	1,93	37	36	33	22
Ghana	1,87	38	29	28	34

Table 3.1: Composite Vulnerability Index (VI) and ranking of components in 2016

Notes: \*\* Fragile countries eligible for TSF (15), \* fragile countries not eligible for TSF (5)

The construction of a composite vulnerability indicator makes it possible to represent clearly the current relationship between vulnerability, performance, and allocation. Figure 3.2 below, in which ADF-eligible countries are divided into 5 quintiles according to their CPA levels, shows the challenge posed by the reform of the AfDB framework proposed in this report. According to the current formula, while the positive relationship between performance and allocations appears very clearly, the relationship between vulnerability and allocations is clearly negative as the most vulnerable countries are those receiving the lowest amounts.

These countries face a double punishment: numerous exogenous shocks which have severe consequences in economic, human, and institutional terms, plus further penalties in the form of a lower ADF allocation. The present proposal aims to mitigate this paradox.

**Figure 3.2:** Share of base allocations in total ADF envelope by CPA Quintile (Q) and Global Vulnerability Index (VI)



## Simulation results according to different weights given to the synthetic index of vulnerability or fragility

We consider 3 possible formulas for the new PVBA. The ad hoc choice of parameters is used to illustrate the dynamics of the allocation system as the weights given to vulnerability and human needs increase in the formula. In addition, the fact that the lack of infrastructure measured by the AIDI index is now included in the structural economic vulnerability indicator allows us to remove the AIDI from the PBA formula in order to avoid redundancy between the two indices. The CPA is not modified at this stage<sup>68</sup>. 81

<sup>68.</sup> The performance indicators specific to fragile situations are not included to allow a comparison *ceteris paribus*, i.e. using the same definition of performance.

$A_i = CPA^{4.125} \times GNIpc_i^{-0.125} \times Pop_i^1 \times VI_i^{0.5} \times HNI_i^{0.25}$	(1)
$A_{i} = CPA^{4.125} \times GNIpc_{i}^{-0.125} \times Pop_{i}^{1} \times VI_{i}^{1} \times HNI_{i}^{0.5}$	(2)
$A_i = CPA^{4.125} \times GNIpc_i^{-0.125} \times Pop_i^1 \times VI_i^2 \times HNI_i^1$	(3)

with  $VI_i = 0.33EVI_i + 0.33PVCCI_i + 0.33SVI_i$ , the composite index of vulnerability

Figure 3.3 shows the impact of each formula on the allocation for States with high structural vulnerability compared to the current model. As expected, this share is a growing function of the weight given to the new indicators introduced into the formula, reflecting the characteristics of fragile and transitional countries which need to be taken into account in order to achieve a more equitable and efficient allocation of resources.

Simulation (1)

**Figure 3.3:** Share of base allocations in total ADF PBA amount allocated to fragile and transition states<sup>69</sup>



Simulation (2)



69. Fragile states: Fragile countries according to the harmonized list. Transition states: fragile countries according to the harmonized list and eligible for the TSF.





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However, as shown in Figure 3.4 and Table 3.2 below, taking vulnerability into account does little to change the link, which is fundamental in the PBA, between performance and allocation. This important result is not influenced by the value of the exponent relative to the vulnerability index. By setting the exponent of the vulnerability index at 2, the share allocated to the top 2 quintiles of the CPA decreases from 68.06% to 65.56%. This is explained by the fact that in this new framework the 4th quintile is favored compared to the 5th. Some structurally vulne-rable countries, such as Mali, manage to reach relatively high levels of performance, so taking these vulnerabilities into account is favorable to those countries.

**Table 3. 2:** Share of base allocations in total ADF amount by CPA and overall vulnerability index (VI) Quintiles (Q); current values and values simulated by formulas (1), (2), (3)

СРА	Current PBA	Formula (1)	Formula (2)	Formula (3)
Q1	4,10%	4,79%	6,03%	6,07%
Q2	7,69%	6,46%	6,40%	9,46%
Q3	20,15%	19,04%	18,16%	18,91%
Q4	25,55%	28,93%	31,19%	32,01%
Q5	42,51%	40,77%	38,22%	33,55%
Q4+Q5	68,06%	69,71%	69,41%	65,56%

Vulnerability Index	Current PBA	Formula (1)	Formula (2)	Formula (3)
Q1	25.48%	23.32%	21.37%	11.98%
Q2	27.67%	27.70%	25.83%	28.07%
Q3	24.81%	26.37%	26.83%	25.21%
Q4	13.41%	12.11%	12.14%	16.78%
Q5	8.64%	10.51%	13.83%	17.96%
Q4+Q5	22.04%	22.61%	25.97%	34.74%

Figure 3.4: Share of base allocations in total ADF PBA amount by CPA quintiles











Figure 3.5 shows that the relationship between vulnerability and allocation changes as the weight given to the vulnerability criterion increases. The relationship changes from very negative (as currently, figure 3.2) to slightly positive (formula 3). It is clear that the most vulnerable countries are favored compared to the least vulnerable ones.

**Figure 3.5:** Share of base allocations in total ADF PBA amount by composite vulnerability indicator quintiles



Simulation (1)

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**Figure 3.7:** Variation in share allocated to each country (in %) between current allocation and allocations - equation (3) simulation



Note: \* indicates fragile states (harmonized list)

30,00% 25,00% 20,00% Current PBA 15,00% -Simulations 10.00% 5,00% 0,00% 01 Q2 Q3 Q4 Q5 Simulation (3) 30,00% 25,00% 20,00% Current PBA 15,00% 10,00% 5,00% 0,00% Q1 Q2 Q3 Q4 Q5

Simulation (2)

Figure 3.6 below summarizes the impact of our proposal on base allocations. While respecting the role of performance, the PVBA allows for allocations to be redirected from the least vulnerable to the most vulnerable countries (Figure 3.6). The relationship between allocations and the CPA also evolves from a linear form to a function similar to a logistic form. This new form makes it possible to maintain the incentive part of the allocation model while modulating it where it is less important for equity reasons (the best-performing countries having easier access to international markets) or effectiveness reasons (the lowest performing countries having lower management capacities).

# Part III -Chapter 2: A possible and needed reform: some simulations

#### Simulation results according to the different weights given to vulnerability

As shown in Figure 3.1 above, the current allocations are correlated with the composite vulnerability indicator but display a non-linear pattern which is difficult to justify. Moreover, the allocations are not highly correlated with performance. Would the use of a PBVA-type formula be suitable to strengthen the correlation between the allocations, vulnerability, and performance? As a starting point, we apply to the ADF-13 cycle TSF Pillar I amount the above-mentioned PVBA formula 3, which gives the biggest weight to vulnerabilities. For the PBA allocation, a maximum threshold is used as the sole exception to the basic formula. This maximum threshold is set at UA 60 million to allow comparability with the current TSF framework. Equation (4), which is similar to the equation (3) of the PBVA, is as follows:

 $A_i = CPA^{4.125} \times GNIpc_i^{-0.125} \times Pop_i^1 \times VI_i^2 \times HNI_i^1$ (4)

#### with $VI_i = 0.33EVI_i + 0.33PVCCI_i + 0.33SVI_i$ , composite vulnerability index.

As shown in Figure 3.8, when compared to Figure 3.7, the use of formula (4) reinforces the targeting of the most fragile countries according to the 3 vulnerability criteria (structural economic, physical climate change, socio-economic) while preserving a positive relationship between allocation and performance. It is also clear that the use of this kind of simple formula makes it possible to replicate the current allocations fairly well.

**Figure 3.8:** Simulation of amounts for ADF-14 cycle TSF Pillar I by using formula 4 by CPA and vulnerability index (VI) quintiles



----CPA -----VI

#### The issue of minimum allocations

The impact of minimum allocations on final allocations was not considered here. However, in Chapter 2 of Pt one, it was shown that the presence of minimum allocations (which have significantly increased both at the African Development Bank and similarly for the base allocations of the World Bank), designed to take into account the handicap represented by population size, had the disadvantage of disconnecting the allocated amount from countries' performance. This disconnection mainly concerns the worst performing countries. As a result, the minimum allocation tends to favor fragile countries. This is a political choice that seems difficult to revisit<sup>70</sup> and does not contradict the will to address vulnerability in the allocation framework.

#### 2) What options are available for the for transition support facility?

Let us continue the analysis by assuming for the reasons mentioned above that we maintain the transition support facility of the African Development Bank and apply to TSF Pillar I (the allocation formula of the African Development Bank's special facility for transition States), the same principles as used for the PVBA. The analysis focuses on Pillar I and not on the whole TSF, as Pillar I is now the core of AfDB's programmable funding for fragility and is the only part of the TSF allocated through a formal process. The interest of such an exercise is to show that it is possible to make this allocation process more coherent and transparent, without taking sides on the merits of maintaining this special facility.

#### The principles of the simulations

In order to test the impact of this new allocation model, simulations were performed, based on the 2017-2019 cycle (FAD14) data, using the current list of TSF-eligible countries. Unlike the PBA in which allocations are determined each year, the TSF Pillar I allocations are decided *ex-ante* at the beginning of each budget cycle. Using a PVBA-type formula applied to the TSF would allow allocations to be determined on an annual basis. However, for the purpose of comparison with the current situation, the assumption is made in the following simulations that all the resources of Pillar I are allocated at the beginning of the cycle. In addition, these simulations do not take into account the emergency reserve of 20% of the TSF amount for ADF-14, as this reserve by definition is not included in the allocation process.

<sup>70.</sup> It would be difficult to remove the minimum allocations for political reasons, but also methodologically speaking. Given the sharp increase in the minimum allocations, their removal, which could be offset by a big reduction in the multiplier relative to population size (a possible solution when the minimum allocations were much lower), would imply a big reshuffle of resources to the detriment of large countries.

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However, it seems inappropriate in this context to consider the same exponents for the PVBA and the TSF as this could blur the specificities of these two instruments and weaken the case for their complementarity. Moreover, although performance is considered to be an important element of the formula, the specificity of the TSF and its eligible countries require a review of the relative weight given to performance in this context. For the allocation to be truly based on performance and vulnerability, the logic would be that an equal weight be given to both components. Formula 5 below decreases the exponent relative to performance from 4.125 to 2, to make it comparable to the one given to vulnerability.

 $A_i = CPA^2 \times GNIpc_i^{-0.125} \times Pop_i^1 \times VI_i^2 \times HNI_i^1$ (5)

with  $VI_i = 0.33EVI_i + 0.33PVCCI_i + 0.33SVI_i$ , composite vulnerability index

As shown in Figure 3.9 below, compared to Figures 3.8, the link between allocation and performance weakens, while the link between allocation and vulnerability strengthens slightly.

**Figure 3.9:** Allocated amounts for ADF-14 cycle TSF Pillar I by CPA and the vulnerability index (VI) quintiles - current and formula 5 simulation



This raises the question of the right balance between performance and vulnerability and the role of the TSF as a complement to the PVBA. Thus, even if we consider that performance must retain a key role for the ADF allocation (through the PVBA), this is not fundamentally true for the specific case of the TSF, especially since the eligibility criteria ensure effective dialogue and strong policy commitment from the governments involved. Indeed, some countries such

as Somalia or Sudan, which are among the most fragile, have their allocations reduced because of their very low CPA. Yet these are the countries for which TSF resources could potentially have the greatest impact by supporting their transition out of fragility. In this context, and as mentioned above (Part II, Chapter 2), it is necessary to reflect on a possible modification of the CPA to integrate a measure of the quality of policies for the reduction of fragility (which could also be measured directly by the decrease in the values of the index of internal violence, IVI, or societal vulnerability, SVI).

 $A_i = CPA^1 \times GNIpc_i^{-0.125} \times Pop_i^1 \times VI_i^2 \times HNI_i^1$ (6)

with  $VI_i = 0.33EVI_i + 0.33PVCCI_i + 0.33SVI_i$ , composite vulnerability index

As Figure 3.10 below shows, an increase in the relative weight of vulnerability makes the relationship between the composite vulnerability indicator and the allocations more linear. Although the elements of the formula related to needs and performance continue to play their roles in this framework, it is the fragility, the sum of structural vulnerabilities, that guides the allocation of TSF Pillar I. This property, which appears to be clearly absent from both the current conceptual framework and its resulting allocations, would then be at the heart of a reworked TSF, directly taking into account vulnerabilities. Future allocations would be more predictable, but also more responsive to changing conditions in countries, including violent events observed in a recent past, as they would now be revised on an annual basis.

**Figure 3.10:** Allocated amounts for ADF-14 cycle TSF Pillar I by CPA quartiles and the vulnerability index (VI) quintiles - current and formula 6



#### How to remove the minimum allocations from TSF?

An important aspect in the design of this type of formula is the way population size is addressed. This is to ensure that the smallest countries receive a sufficient amount and the larger ones do not attract a disproportionate share of resources. For this purpose, the PBA includes a cap of 10% of total available resources in addition to a top-up of 5 million UA annually as a minimum allocation. The current TSF Pillar I allocation model also implements this principle with a maximum of 60 million UA and a minimum of 10 million UA.

Whereas the use of minimum allocations appeared to be potentially justified in the political context of the PVBA, this is not the case for TSF Pillar I. Resorting to too many special adjustments makes the system unclear and less transparent. Moreover, by tweaking allocations in a certain way, the amounts allocated are largely disconnected from the underlying principles of the model. For ADF-14, the correlation between the amount of the two highest allocations of the previous cycle and the amount allocated through Pillar I was 95% before imposing a floor value and a ceiling value as a final step. Once these last two adjustments are applied, the correlation falls to 66%, strongly reducing the link between past PBA allocations and Pillar I allocations.

To reduce these distortions, a different treatment of the population is necessary in order to no longer resort to floor thresholds. While simulations (4), (5) and (6) use an exponent relative to population size equal to 1 while removing the minimum allocation of UA 10 million, the last simulation (7) explores the impact of a reduction of the exponent for population size to 0.5 and a cap at 60 million UA is maintained<sup>71</sup>.

 $A_i = CPA^1 \times GNIpc_i^{-0.125} \times Pop_i^{0.5} \times VI_i^2 \times HNI_i^1$ (7)

with  $VI_i = 0.33EVI_i + 0.33PVCCI_i + 0.33SVI_i$ , composite vulnerability index.

As shown in Figure 3.11, the allocation remains broadly similar while limiting the allocations of large countries vis-à-vis smaller countries.

**Figure 3.11:** Allocated amounts for ADF-14 cycle TSF Pillar I by CPA and vulnerability index (VI) guintiles - current and formula 7 simulation



**Figure 3.12:** Average allocated amounts (in UA) for ADF-14 cycle TSF Pillar I by CPA and vulnerability index (VI) quintiles - current and simulation of formulas 4 to 7



<sup>71.</sup> This choice is essentially motivated by the presence of the Democratic Republic of Congo in the list of eligible countries. DRC is a large country compared to other eligible countries, and requires an ad-hoc adjustment in order to obtain balanced results. However, from this perspective, it would be possible to favor an exception specific to this country by setting in advance the amount allocated for a greater transparency and clarity.

#### Summary

Table 3.3, Figures 3.11, and 3.12 summarize the impact of each option on the respective links between performance, vulnerability, and allocations by comparing actual and simulated allocations of the TSF Pillar I (for ADF-14). The current framework does not display a linear and continuous relationship between the vulnerabilities of eligible countries and the allocations, and has an unclear link with performance. The various options proposed illustrate how it is possible to reinforce the coherence of the whole system by specifically targeting the most vulnerable countries whose needs are also the biggest, while remaining true to the principle of performance base allocation. Moreover, as shown by simulation (7), a specific treatment for the size of population makes it possible to render the link between allocation and population size more coherent, thus making the framework clearer. A PVBA-type formula seems to be able transparently, effectively, and equitably to allocate the resources of the special windows for fragile countries, once a consensus is found on the trade-off between performance and fragility.

**Table 3.3:** Average base allocations (in UA) for ADF-14 cycle TSF Pillar I by CPA quintiles and the vulnerability index (VI) current and simulated by formula 4 to 7

СРА	TSF Pillar I (FAD14	Formula (4)	Formula (5)	Formula (6)	Formula (7)	
Q1	14,67	3,82	8,33	14,41	14,41	
Q2	12,92	18,83	23,95	24,37	27,19	
Q3	60,00	59,01	57,62	55,49	50,00	
Q4	29,33	28,97	26,79	25,52	27,01	
Q5	34,39	40,68	34,62	31,52	32,70	

Vulnerability index	TSF pillar I (FAD14)	Formula (4)	Formula (5)	Formula (6)	Formula (7)
Q1	15,02	13,06	9,91	8,00	10,93
Q2	20,04	22,10	20,15	18,51	19,63
Q3	43,33	40,77	39,07	36,85	33,14
Q4	43,33	40,22	40,33	40,36	40,90
Q5	29,58	35,14	41,84	47,58	46,71

## 3) Under what conditions would a fusion of the PVBA and the TSF be possible and desirable?

In the previous chapter we suggested the maintenance of a special window (the TSF) for specific actions required by countries with high fragility. However, it is also possible to reserve the aid granted through a special mechanism for very specific urgent situations, like for example an epidemic, an invasion by foreign

terrorist forces, or more generally for situations which require a decisive timely action. This type of situation, by definition, must be concentrated on a limited number of countries if we start with the principle that this type of fragility is rare and transitory, and that the resources available are limited and spreading them over a large part of a country would reduce their overall effectiveness. Although this vision seemed to inspire the design of the most recent mechanisms for fragility in opening its Fragile states window to a third of its members and maintaining this proportion over succeeding budget cycles.

Even the existence of a special window for "Fragile states" shows that the question of fragility is not treated punctually but rather as a positive allocation factor like performance. In this framework the maintenance of a mechanism parallel to the PBA (like TSF ) could be called into question since some dimensions of fragility have already found their place in the PBA formula, for instance lack of infrastructure, and even more in the PVBA whose contours were presented above. To make the allocation system more coherent and transparent (gaining in simplicity) it would conceivable to increase the PVBA by the funds from TSF , by adjusting the weights given to the performance and vulnerability criteria. Such an approach would necessitate no longer treating fragility as an isolated silo for allocation, but to integrate it at the conception and choice of all the development projects undertaken in fragile states.

#### This poses 2 questions :

## 1. What conditions to apply so that countries which receive TSF at the moment are not disadvantaged overall?

In order to reply to this question, it is necessary to first question the legitimate basis of the existing system which is the reference for this exercise. As was seen the present system of allocation of funds of TSF Pillar I, although based on previous allocations of the PBA, limits a lot the allocations which are derived from it by imposing a floor value and a ceiling value. To reproduce the allocations of TSF Pillar I with a linear formula limiting the use of the floor and ceiling is not easy, notably because the floor and ceiling are not themselves linked to a fragility measure. Nevertheless, as we showed above, the PBA system favors vulnerable countries at the expense of countries which have good performance but little vulnerability, as the weight given to vulnerability steadily increases. Taking this reasoning further, it would seem possible to obtain a formula which gives the same percentage of the overall total to the most vulnerable countries as that which is given through the present system. In this way, the realignment of the allocation's fundamental parameters necessitates, as argued in this book, that performance and fragility are not considered as opposites, but as a combination which aligns each country

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according to its characteristics. By looking in detail it could be shown that adopting suitable coefficients for the PVBA, neither the countries eligible for TSF Pillar I nor some countries considered as isolated would not be "globally" at a disadvantage.

2. How to ensure that some countries, in particular those which are presently eligible for the TSF, do not suffer from a brutal reduction of their allocation?

This question principally concerns those countries which are eligible for the TSF whose CIPA is close to the eligibility threshold, but whose vulnerability is lower than the other eligible countries. The application of the PVBA would probably slightly reduce the total allocation (PBA + TSF) for these countries. As we have already seen, the PVBA is relatively unfavorable to good performing countries with low vulnerability, but also to those countries whose poor performance is not accompanied by high vulnerability. Thus, to respond to this question, it would be possible to apply a transition phase during which the allocations could only reduce below the most recent allocations in a progressive manner. This assumes that the reform is accompanied by an increase in the funds mobilised for the ADF, which is justified by the increasing importance to the international community of fragile situations in Africa.

#### Conclusion

The introduction of fragility into the PBA formula provides an opportunity, for the sake of consistency, to also revise the allocation system for the special windows targeted at fragile states and countries in transition, including the AfDB's TFS Pillar I. The aim of this double reform is to reinforce the additionality of special windows and their link with structural vulnerabilities, and to increase the predictability, the transparency and the responsiveness of the allocation to new events, without compromising the link between allocations and performance of the global resource allocation framework.

The results of the reform of the PBA (now called PVBA) and of the TSF are illustrated above by simulations corresponding to different hypotheses which give different weights to each variable. The choice of parameters illustrates the dynamics of the allocation system as the relative weights given to vulnerability and needs are increased.

The results of the PVBA simulations show that the proposed general formula, while maintaining a strong link with performance, allows allocations to increase according to the composite vulnerability measure. The positive link, which is essential to the PBA, between performance and allocation is maintained in the PVBA, while the link between vulnerability and allocation, which is negative today, becomes positive. The more vulnerable countries are favored at the expense of the less vulnerable countries.

The impact of introducing vulnerability into the allocation formula of the African Development Bank's TSF Pillar I is also illustrated by simulations. These simulations show that the proposed formula reinforces the targeting of the most vulnerable countries according to the composite vulnerability index, particularly if we give equal weight to vulnerability and performance, while preserving a positive relationship between allocation and performance. Pillar I allocations become correlated with fragility, which is paradoxically not the case today.

The simulations performed confirm that it is possible to combine the principle of an allocation increasing according to the quality of policies (or to performance) with an allocation increasing according to the (structural) vulnerability of eligible countries. A reform of the PBA in line with the objectives of equity, effectiveness, and transparency that takes into account the different forms of structural vulnerability and their unequal intensity is possible without compromising the principle of an allocation based on the performance.

Moreover the use of a "performance and vulnerability-based allocation" on the one hand and a "transition support facility" on the other hand makes it possible to better target the limited resources of this facility to the specific needs of transition states - the PVBA being more preventive, and the TSF more curative.

In the end it seems that a radical reform of the TSF in the PVBA should be possible, while at the same time ensuring a total allocation at least equal for those countries presently eligible for the TSF. The overall coherence of the allocation process would be reinforced, and fragility would be taken into account on a homogenous basis, but the specificity of allocations in the most fragile countries, presently under the TSF, should now be done by taking into account allocation of funds through the PVBA.

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## Part IV -

## What are the options for regional allocation? Implications for fragile countries

Regional integration has, since the Independence of African States, been one of their major concerns. The importance of this objective has increased in recent years, and the diversity of its dimensions has been better analyzed. Achieving this objective makes funding for regional integration projects just as necessary as the policies aimed at lowering tariff barriers.

There are currently 4 instruments for ADF resource allocation: the PBA, the Transition Support Facility with its 3 pillars (TSF), the Regional Operations Envelope (ROE), and private sector facilities. While it is conceivable, as seen above, although this does not necessarily seem opportune, to merge the PBA and the TSF into one instrument, maintaining a special window for regional operations is fully justified. The need for regional integration is a form of vulnerability; and the existence of a specific window is evidence of the AfDB's commitment to regional integration, as stated in its official statutes (Article 2); it is also based on the nature of integration projects, which *de facto* involve two or more countries. This being the case, it would be appropriate, in coherence with the various instruments mentioned above, to set aside the current approach based on the identification of projects on a case-by-case basis, and to define an allocation formula dedicated to regional integration following the principles presented in this book. To illustrate this proposal, we consider as a given the size of the regional envelope, which was gradually increased, from 5% of ADF8 resources to 21% for ADF-13, and remained at 21% for ADF-14. The demand for financing regional operations, however, remains higher than can be financed by the regional envelope and an increase seems necessary.

Similarly, the World Bank increased tenfold its regional window between the 13th and 18th IDA cycles, and it now stands at \$ 5 billion. This window aims to support regional integration projects with the greatest potential for regional spillovers, and is mainly focused on Africa, which now receives 66% of it. Like the AfDB, there is no country allocation, and eligibility is decided on the basis of conditions applied to projects submitted to the regional window of the different regions of the World Bank. However, as noted in the independent evaluation report on this instrument<sup>72</sup>, the current projects seem to correlate poorly with the integration needs as

<sup>72.</sup> World Bank. 2019. IDA Regional Window Program 2003-17: Lessons from IEG Evaluations. Synthesis Report. Independent Evaluation Group. Washington, DC: World Bank.

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formulated through a synthetic indicator which aggregates various aspects of regional integration, such as trade, movement of people, capital flows, and security issues. These projects appear to be similar to those projects financed without support from the regional window, and their effects in terms of integration are not very clear. Thus, an allocation more focused on regional integration needs would enhance the integrative impact of regional projects.

The reflection proposed here is based on the regional integration operations of the African Development Bank. The reform described here is independent of previous reforms detailed above, but it illustrates the adaptability of the conceptual framework presented in this book. It can be applied to other objectives than the simple reform of the PBA, and is illustrated here with regional integration.

#### Chapter 1: Weaknesses of the current allocation framework for regional operations

Although the system has undergone a series of changes, it seems that it has not succeeded in generating the momentum of governments for more integration projects, and has overall proved to be unfair to countries with the greatest needs.

#### 1) An allocation system that has evolved

An innovation of ADF-11 was that 33% of the cost of a regional operation must be paid from the national allocation of the countries concerned (except for regional public goods). This provision was intended to increase the number of regional operations. This share was increased to 40% by the Bank's management during ADF-12 and to 50% for ADF-14. The regional window, by financing 60% of the regional project, then 50% since ADF-14, is conceived as an incentive for states to finance integration projects and ensuring their uptake. However, the share financed from the national allocation remained limited to 33% for transition states (eligible to Pillar I of the TSF) during ADF -12, and then 40% since ADF-14<sup>73</sup>. On the other hand, the levy on the national allocation is capped at 10% of the national allocation when this is less than 20 million UA, and since ADF-14 is capped at 40% instead of 50% of the total cost of the project. This provision corresponds to the idea that small countries, for which allocations are small because they are allocated according to population size, have greater needs for regional integration than larger countries.

The selection of projects to be financed is decided on a discretionary basis by the AfDB's Operations Steering Committee, which establishes a project score according to 3 criteria: the CPA (CPIA + Portfolio Performance), an assessment of the country's commitment to regional integration, and the quality of the project.

#### 2) A low incentive system for integration projects that proves to be unfair

By the ADB's own admission, it seems that this mechanism has not reduced the preference of African countries for national projects<sup>74</sup>. The ceiling applied to the national allocation for small countries is not without inconveniences. It results in a discontinuity in the incentives given to countries to engage in regional operations. As an illustration, let us assume a country whose PBA allocation has increased from UA 19 million to UA 21 million (similar to Zambia's allocation) and which wishes to participate in a regional integration project costing UA 36 million. If the allocation had remained at \$ 19 million, the country would have had to contribute \$ 1.9 million

<sup>73.</sup> The ratio of each country's own contribution to the regional fund's contribution, which was of 1/1.5 in the general case for ADF-12 and 1/2 for fragile states became 1/1 and 1/1.5 respectively for ADF-14.
74. ADF (2016) p.ii.

from its PBA allocation to the regional project, and UA 17.1 million would have remained to finance national projects. But if its allocation increases to 21 million, it must finance 40% of 36 million (14.4 million) from its own national allocation and it is left with only 6.6 million instead of 17.1 million.

Moreover, the allocation to each country of a certain part of a regional project (which will determine the amount of its contribution) depends not on the economic advantage it derives from it, but on the part of the cost of the project actually carried out on its territory. In the case of a road, this part depends on the distance traveled in each territory. It is clear that a coastal country, which has less interest in a road than a landlocked country, risks being forced to contribute more to the road's construction, even if it is true that the benefit to each country of a regional integration project is difficult to assess<sup>75</sup>.

We propose a conceptual framework to strengthen the overall coherence of the various ADF facilities by harmonizing the principles driving them.

#### Chapter 2: A Regional Allocation Consistent with the Proposed Conceptual Framework

Subtracting countries' contributions from the PBA allocation (or the new PVBA framework) for the financing of regional projects is not the only possible way to encourage them to carry out regional projects and to take up the integration issues. This is why it is proposed here to apply the principles of the performance- and vulnerability- based allocation framework as part of a new model of allocation suitable for regional operations. This allocation would be independent of national allocations under the ADF but defined following the same principle, combining needs and performance. The proposed framework consists of defining a regional allocation potential by country based on two criteria, the need for regional integration and the commitment to regional integration.

#### 1) The index of need for regional integration

Before presenting the structure of the need for a regional integration index proposed here, let us examine the content of the "Africa Regional Integration Index ", published in 2016 resulting from collaboration between African Union Commission (AUC), the African Development Bank (AfDB) and the Economic Commission for Africa (ECA) which highlights the specificity of a need index.

#### The Africa Regional Integration Index

This index regroups 16 variables classified in 5 dimensions.

#### Dimension 1: Trade integration

- Level of customs duties on imports
- Share of intra-regional goods exports (% GDP)
- Share of intra-regional goods imports (% GDP)
- Share of total intra-regional goods trade (% total intra-REC trade)

#### Dimension 2: Regional Infrastructure

- Infrastructure development index: transport, electricity, ICT, water, and sanitation
- Proportion of intra-regional flights
- Total Regional electricity trade (net) per capita
- Average cost of mobile phone roaming

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<sup>75.</sup> This problem can be illustrated by the road that joins Mombasa in Kenya to Kampala in Uganda.

#### Dimension 3: Productive Integration

- Share of intra-regional intermediate goods exports (% intra-regional exports)
   Share of intra-regional intermediate goods imports (% intra-regional imports)
- Merchandise trade complementarity index

#### Dimension 4: Free movement of people

- Ratification (or not) of REC protocols on the free movement of people
- Proportion of REC member countries whose nationals do not require a visa for entry
- Proportion of REC member countries whose nationals are issued with a visa on arrival

Dimension 5: Financial and Macroeconomic Integration

- Regional convertibility of national currencies
- Inflation rate differential (based on HPCI)

This index, specifically designed to measure the extent of regional integration in Africa, is an extremely valuable tool for analyzing progress. However, it is not appropriate for aid allocation purposes, because it does not reflect the need for regional integration as a result of the structural characteristics of countries which are outside their own will, but rather it reflects their performance in terms of integration policy. Dimensions 1 and 3, relating to trade integration and integration in regional value chains, do not take into account structural factors such as remoteness or smallness of neighboring markets. Dimensions 4 and 5 reflect de jure integration and thus represent regional policy performance rather than integration needs. A similar criticism can be made of the composite regional integration indicator (CRI) developed by the World Bank<sup>76</sup>.

#### The (relative) need for regional integration index

The Needs for Regional Integration Index (IBIR) established by FERDI for the AfDB is based on 2 structural characteristics (independent of present policy): the size of the internal market, and the remoteness of external markets<sup>77</sup>. These 2 structural factors are major elements of the need for regional integration as poor and small countries have a particular need to expand their potential market in order to benefit from economies of scale. Moreover, they are economically less diversified

and more subject to external shocks. As for the remoteness of external markets, it results not only from the distance separating countries, but also from the possible landlocked nature of the countries and the possible poor quality of transportation infrastructure. These elements represent structural factors in the less competitive countries. They are also a factor of vulnerability.

The first index concerns the size (smallness) of the Internal Market (IM). This dimension is measured as the GDP expressed in purchasing power parity (PPP) so that the relative GDPs are not influenced by exchange rates. This index is the complement to 100 of an index of the logarithm of GDP transformed by the min-max method.

The second index concerns the distance (remoteness) from external markets (IR). It is based on a method developed by FERDI and used by UN-DESA for calculating the remoteness component of the Economic Vulnerability Index (EVI). This index is based on the calculation of the average distance (in km) to reach n% of the world market for imports of goods and services (i.e. n = 1/3 according to UN-DESA). To account for the decrease in the marginal cost of distance (D), this is expressed as a logarithm. The index is adjusted to take into account the negative impact of landlockedness, and in the version of EVI used in this report, insularity (L). In the index, which is built to determine the need for regional integration, the impact of landlockedness is itself adjusted to take into account the level of transportation and communication infrastructure. The transportation and communication infrastructure index (U) is a weighted average of 3 indicators:

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- The Transport Infrastructure Quality Index (50%) of the 2018 *Global Competitiveness Report.*
- The Information Technology and Telecommunications Infrastructure Index (25%), a sub-component of AfDB's AIDI.
- The Electricity Infrastructure Index (25%), a sub-component of AfDB's AIDI.

An interesting option would be to consider the African Infrastructure Development Index (AIDI) already present in the current PBA formula rather than FERDI's Infrastructure Indicator. Compared to the FERDI indicator, the AfDB index introduces 2 additional dimensions: energy infrastructure (measured by the number of kilowatts per hour generated per inhabitant) and social infrastructure (measured by access rates to water and sanitations). The question is to what extent these dimensions are important for regional integration.

<sup>76.</sup> This indicator is composed of 11 variables grouped into 5 components of regional integration: trade integration, financial integration, movement of persons, peace and security, regional investments and value chains.

<sup>77.</sup> see Guillaumont, P., Guillaumont Jeanneney, S. (2014). "An indicator of the need of regional integration" Ferdi Policy brief B106, October 2014.

## The IBIR consists of an arithmetic average of the market size index (IM) and the distance from external markets index (IR)<sup>78</sup>.

Figure 4.1: Need for Regional Integration Index (IBIR)



According to the table below, the 3 countries with the biggest need for regional integration are two landlocked countries, South Sudan and Central African Republic, and one island state: Sao Tomé & Principe. It should be emphasized that this is a relative indicator of needs, calculated for all African countries, all of which have a different level of need for regional integration.

- D' = D(1+K'L) and U' = U(1+K''L)With Distance (D), Landlockedness or insularity (L), Infrastructures (U)
- Then:
- K'= o,5 and K''= -o,5 The index of distance from foreign markets  $I\!R$  is given by :  $I\!R\!=\!D'^{\,b}U'^{\,\nu}$
- with b = 1 and v = -1
- IBIR corresponds to the arithmetic mean of two elements with:  $\mbox{IBIR}=(\mbox{IM}+\mbox{IR})/2$
- with IM, the index of (small) size of the domestic market.

#### Table 4.1 The need for regional integration index (IBIR)

Country	IBIR	Rank
Burundi	52.14	6
Benin	28.91	23
Burkina Faso	35.50	14
Central African Republic	55.23	3
Côte D'Ivoire	10.98	36
Cameroon	19.91	30
Congo, DRC	31.35	20
Comoros	54.23	5
Djibouti	32.42	18
Eritrea	42.06	11
Ethiopia	19.07	32
Ghana	13.52	35
Guinea	27.63	27
Gambia	30.86	21
Guinea-Bissau	43.87	10
Kenya	10.57	37
Liberia	37.04	13
Lesotho	49.53	7
Madagascar	48.57	9
Mali	27.45	28
Mozambique	24.97	29
Mauritania	29.34	22
Malawi	54.60	4
Niger	40.81	12
Nigeria	5.36	38
Rwanda	28.58	25
Sudan	15.97	34
Senegal	17.23	33
Sierra Leone	33.08	17
Somalia	34.56	15
South Sudan	69.56	1
São Tome & Principe	58.07	2
Chad	49.31	8
Togo	27.97	26
Tanzania	19.29	31
Uganda	31.79	19
Zambia	28.69	24
Zimbabwe	33.29	16

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<sup>78.</sup> This can be written :

#### 2) The commitment to regional integration index

There is currently no index which reflects political commitment to regional integration that can be used in this framework. As with the other indices presented above, the main difficulty is to dissociate political commitment from external conditions and structural characteristics. Therefore, we must avoid referring to measures of the results of regional integration, such as the proportion of intra-regional trade. Policy indices should be favored. Thus, the use of AfDB's CPIA Cluster E appears to be the best option. It measures how government policies and strategies, as well as human and financial resources, contribute to infrastructure development, through 3 criteria: 1) legal and regulatory framework for infrastructure, 2) sector strategy, 3) management of public resources in the infrastructure sector. It also measures regional integration and economic cooperation by evaluating government actions and efforts to: 1) promote the free movement of people and labor and facilitate the exercise of the right of domiciliation, 2) contribute to regional financial integration.

Admittedly, a country's commitment to regional integration goes beyond the scope of Cluster E, but the development of a more general index of Commitment to Regional Integration (CRII) for all African countries would represent a considerable amount of work. An attempt is underway at FERDI for the WAEMU and CEMAC regions (see Geourjon, Cariolle and Ubeda, 2018).

The weight given to this index in the allocation formula of the regional window should remain low, compared to the one given to the needs for integration (as measured by the IBIR). Otherwise, fragile countries risk losing their share in the regional window to the benefit of the best performing countries, even though fragile countries most often display a strong need for regional integration, due to their small size, their frequent remoteness, and low level of infrastructure.

#### 3) Defining a drawing right on the regional window

For each country eligible to the regional allocation, a regional drawing right (RDR) is defined as a part of the total regional window. A country's own contribution to the regional integration project would no longer be deducted from the PBA allocation, as in the present case, but from its RDR. The sum of the drawing rights (RDR) would correspond to a fraction of the regional window. The unallocated reserve, which is the remainder of the regional window would be used to finance projects that are difficult to attribute to one country or another, such as regional public goods (to which are currently allocated at most 15% of the total window), or to supplement the financing of some particularly opportune projects, beyond the country drawing rights<sup>79</sup>.

For each country (i) eligible for the regional allocation, a regional drawing right is defined as a part of the total regional window (RDRi) according to:

1. Population of the country (P);

2. Per capita GNI, reflecting the country's ability to mobilize external sources of financing (GNI/P);

3. The country's Need for Regional Integration Index (IBIR), reflecting the size of the domestic market as well as distance to world markets;

4. A performance indicator reflecting the quality of economic policies for infrastructure development and regional integration (CRPA). This indicator may correspond to cluster E of the current CPIA.

The formula is then the following:

$$RDRi = (POP)i^{\gamma} \times \left(\frac{GNI}{P}\right)i^{-\beta} \times (IBIR)i^{\delta} \times (CPIAe)i^{\alpha}$$

#### 4) Results from simulations of special drawing rights

We consider 4 options for the simulations that give more or less weight to the population and the need for regional integration:

$RDR_i = Pop_i^1 \times GNIpc_i^{-0,125} \times IBIR1_i^1 \times CPIAe_i^1$	(1)
$RDR_i = Pop_i^{0,5} \times GNIpc_i^{-0,125} \times IBIR1_i^1 \times CPIAe_i^1$	(2)
$RDR_i = Pop_i^{0,5} \times GNIpc_i^{-0,125} \times IBIR1_i^2 \times CPIAe_i^1$	(3)
$RDR_i = Pop_i^1 \times GNIpc_i^{-0,125} \times IBIR1_i^2 \times CPIAe_i^1$	(4)

As the following 2 figures show, the choice of parameters makes it possible to clearly adjust the allocated amounts according to the political consensus validating the rationale for a regional window. This is particularly true with regard to the balance between performance and needs.

<sup>79.</sup> If the regional fund intended to finance the RDRs is not entirely used, the remaining part will naturally increase the size of the unallocated regional reserve.



Figure 4.3: Percentages of Regional window (RDR) by IBIR Quartiles



The proposed system would be more favorable to fragile or transition states. As an illustration and given the latest information available, transition states received only 55% of the ADF-12 regional window (compared to 57% here with formula 3). Under the new system, the higher the exponent relative to the needs in the formula, the greater would be the share of the regional window allocated to fragile states; this is also the case if we reduce the exponent relative to population size (formulas 2 and 3) since fragile countries are generally small. The share allocated to fragile states is 57% with formula 3 (Figure 4.4, below). Moreover, it is essentially the countries only eligible for the ADF which receive the largest share. It is also worth mentioning that these formulas allocate a relatively similar share to fragile and transition states compared to some of the options discussed above for the PVBA and summarized in table 3.2 in the previous section.

**Figure 4.4:** Share of Regional window (RDR) allocated to Fragile States



Notes: Fragile states: Fragile countries according to the harmonized list. Transition States: Fragile countries according to the harmonized list and eligible to the TSF.

#### Conclusion

According to the proposed framework for the regional funds, each country would have an incentive in line with their need for regional integration to seek regional integration projects, since they would no longer decrease the financing available for national projects funded by the PBA or the PVBA. Each country or combination of countries could submit integration projects to be financed from their regional drawing rights and possibly benefit in a variable proportion from the part of the regional window reserved or not allocated though the RDRs. The contribution of the regional window could vary according to the projects, in particular according to the general interest that the ADF would find for each project. This system in comparison with the current system should at the same time better motivate governments in their search for projects of regional interest and better enable the African Development Bank to promote projects of regional integration whose interest exceeds the sum of individual interests. In addition, the states solicited to participate in a regional project, and who saw little self-interest would have less reason to deny their participation since it would be deducted from funds earmarked exclusively for regional integration. State ownership of projects with regional scope would be based on the obligation to demonstrate the integrative impact of proposed projects to the ADF.

The proposed formula for regional allocation is not just an incentive for regional integration. It is also favorable to countries in fragile situations. This is consistent

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with the overall conceptual framework that has been presented in this book. In fact, the elements that measure the need for regional integration all reflect a form of structural fragility and some of them are found in the components of the structural vulnerability indices used in the general allocation formula (PVBA). It is therefore logical that this new regional allocation formula appears relatively more favorable to fragile and transition states.

### **General conclusion**

The allocation of multilateral aid when it is governed by formal criteria combined into a formula representing the preferences of institutions must make an explicit arbitration between two objectives: effectiveness, traditionally through a so-called performance, and equity, through so-called criteria of needs. This arbitration over the last 20 years has been made more and more difficult, particularly in Africa, by the need to respond to the needs for assistance arising from insecurity, conflict and, more generally, fragility. Indeed, these factors translate into deterioration in performance indicators even though they are not reflected in the indicators for needs. At the same time the method used in the present allocation systems does not seem to be sufficiently oriented to the prevention of conflicts, and more generally not sufficiently oriented to the provision of responses for the different forms of vulnerability.

To solve this dilemma, indicators of vulnerability and fragility that are independent of the current country policy and the assessment that is made of it through the performance indicators have to be developed. The purpose of this book is therefore to refine the diagnosis of the limits and even the internal inconsistencies of the current allocation systems, and to show how they can be reformed when indicators of vulnerability and "structural" fragility are introduced in allocation formulas, fulfilling the condition just stated.

The diagnosis was made following 3 guiding principles for aid allocation: effectiveness, equity, and transparency. Indicators have been proposed, refined, and tested to assess the structural fragility of countries in three main dimensions, economic, climate and societal. As a result, three main indicators of structural vulnerability have been established, based on research results and a number of innovations. They can be easily implemented and can be grouped together into one synthetic indicator of fragility. The three indicators are the indicator of economic vulnerability derived from that used in the United Nations for the identification of the least developed countries, an indicator of physical vulnerability to climate change, designed and regularly revised by FERDI, and an indicator of societal vulnerability, which is an indicator of internal violence and structural risk of violence. These indicators can naturally be modified or refined by each multilateral institution; in their present form they fulfill the conditions of reliability and exogeneity.

The concept of the need for aid, takes into account only the level of GDP per inhabitant and population size in the present formulas, was also refined by taking into account the level of human capital and the population structure (demographics and presence of refugees). 113

General conclusion

Lastly, it was suggested that the evaluation of performance (or good economic policies) should be amended for countries with conflicts.

Using these indicators, it is possible to present allocation formulas that combine the search for effectiveness through its supposed link with performance, and that of equity through the inclusion of vulnerability and needs indicators that can be seen as structural handicaps that reduce opportunities of the countries facing them. It appears to be clear from the simulations carried out in the framework of the African Development Fund that such formulas make it possible to allocate more to the most vulnerable countries without allocating less to the best performing countries. It is thus shown that the search for effectiveness and fairness are not incompatible. When appropriate indicators are available it is possible to move from the PBA (Performance Based Allocation) to a new model based on performance and vulnerability the PVBA (Performance and Vulnerability Based Allocation).

This innovation does not reduce the merits of having an additional, specific window to finance targeted fragility operations. Maintaining this window, alongside the PBVA, must naturally be consistent with the logic of the general regime. Allocations of this special window must be even more strongly based on the relative structural vulnerability of countries and eligibility for this window must be established according to the same principles. The use of robust indicators of structural vulnerability avoids dichotomous and arbitrary definitions of fragility that tend paradoxically to be disconnected from the various degrees of vulnerability faced by eligible countries. It also makes the allocation more preventive.

The approach proposed in this book therefore applies first and foremost to the general aid allocation formula, and complementarily to the special windows which aim to tackle vulnerability A more radical reform has been proposed which would consist of keeping only the PVBA and changing the coefficients of the formula so that the countries considered eligible for the supplementary windows would not be disadvantaged overall. The same type of approach combining indicators of structural integration and performance in integration can logically be applied to the windows for projects with regional interest. The simulations undertaken show that such a reform would be favorable to the most fragile countries.

## Appendices

#### Appendix 1: The fragility indices available internationally

#### The indices based on the function of states

The best known of these is the Country Policy Institutional Assessment (CPIA). Because of the dual and contradictory role of the CPIA, with its positive performance criterion and negative fragility criterion, it is necessary to have a new model for allocation, in which the CPIA remains as a criterion of performance but not fragility. An examination of the CPIA will be made in the following chapter as a performance factor, but not as an indicator of fragility. In what follows we examine 3 other indices based on the function of states.

#### The CIFP of the University of Carleton

The CIFP index takes its name from the fact that it originated in the "Country Indicators for Foreign Policy" project undertaken jointly by the Canadian government and the University of Carleton<sup>80</sup>. It puts the accent on the policy aspects of fragility as follows: authority (rational and centralized), legitimacy (democratic and liberal), capacity of intervention (rational and effective). The evaluation of these 3 characteristics is done in 2 stages. Firstly, 75 structural indicators covering 6 dimensions (governance, economy, security and crime, human development, demographics, environment) are used for a structural evaluation of each country. Secondly, a evaluation by expert consensus determines how each of the 75 indicators fits with the authority, legitimacy and intervention capacity of the state. Thirdly, the CIFP index is an average of the results of the three characteristics which are a form of cluster. The CIFP index was available for 199 countries in 2016, and is regularly updated. The results show that the most fragile states in recent years are African, and that a persistence of fragility is observed. The 25 most fragile countries are African, with the exception of Yemen, Afghanistan, Syria, Haiti, and Pakistan.

#### The Index of State Weakness (ISW) of the Brookings Institution (Rice and Patrick, 2008)

The ISW had a big success when it was created, because it was temporarily used by the OECD, alongside the CPIA, to establish a list of the most fragile countries, but it fell into disuse because it has not been updated since 2008. The ISW captures the performance of a state in 4 dimensions – economy, policies, security and social well-being with the aim of estimating the potential of states. 20 indicators are divided into 4 equal clusters reflecting these dimensions. In each cluster the scores are standardised and aggregated and the fragility index for each country is the mathematical average of the cluster scores. Calculated for 141 countries it was used to define 4 categories of countries; 1. The 3 countries with the lowest scores were classed as Failed States, 2. Countries in the lowest quintile were classed as Appendices

 <sup>&</sup>quot;The CIFP Fragility Index: New Trends and Categorizations, A 2017 Country Indicators for Foreign Policy Report" CIFP 2017 Fragility report".

Critically Weak States, 3. Countries in the second lowest quintile were classed as Weak States, 4. Countries with low scores for one of the clusters were classed as States to Watch. The term Sates to Watch is not totally convenient because the index may now be out of date and also fragile situations may change even though they persist in some countries.

#### The State Fragility Index (SFI).

The SFI is produced by G Marshall and R Cole of George Mason University and is published in the Global Report series<sup>81</sup>. It focuses on the effectiveness and legitimacy of the state. The SFI is closely linked to the capacity of the state to:- 1. Manage conflicts, 2. Decide on and implement state policies, 3. Supply essential service and well-being to populations. Also the SFI takes account of systematic resilience of countries by considering social cohesion and quality of life, according to whether or not the state provides an effective response to problems and crises which menace the existence of societies. The SFI is made up of 8 indicators which focus on the effectiveness and legitimacy of states in the fields of security, politics, economy, and social well-being. In *Global Report 2017* the SFI scored 167 countries. With the SFI, African countries are the 8 most fragile countries, except Afghanistan 3rd and Yemen 7th.

#### The indices based on constraints and tension factors

#### The Fragile States Index (FSI) of the Fund for Peace.

The FSI produced by the Fund for Peace has been regularly updated and published since2005 in the review Foreign Policy. It was created with the aim of identifying not only the tensions and constraints in the life of each country, but also at what moment the tensions and constraints risk leading the country to the edge of the precipice. The FSI is built from 12 principal indicators and more than 100 sub-indicators concerning politics, economic, military, and social which might capture factors likely to lead to the onset of conflicts. The FSI covers a large number of countries, passing from 148 in 2006 to 178 in 2015. The countries are classed into 4 categories, according to a growing level of threat – Sustainable, Stable, Warning, and Alert.

#### Indices based on events

This third category of indices does not give any overall index of fragility, but like the preceding ones, aims to measure the situation of insecurity of the country. Two of these can be mentioned.

*The Political Instability Task Force (PITF)* of the Centre for Development and the Management of Conflicts of the University of Maryland.

The PITF was originated in 1994 and is regularly updated<sup>82</sup>. The PITF is composed of 4 different types of events: revolutionary wars, unconstitutional regime changes,

genocides, and "politicides". The PITF is not really and index but rather a listing of events which allows identification of the countries which facing high intensity episodes of violence risk falling into situations with a lot of political instability. This is why the PITF is put forward as a method for preventing crises and violence such as genocides and wars.

The Political Stability and Absence of Violence (PSAV) is part of the Worldwide Governance Indicators (WGI) of the World Bank. It is 1 of its 6 dimensions. The other 5 measure quality of governance<sup>83</sup>. The PSAV captures the risk that a government could be destabilised, or overthrown by unconstitutional means by violence or terrorism<sup>84</sup>. Contrary to the CPIA, the PSAV is not used by the World Bank for allocation of resources. For our purpose its failing is that it is based on subjective opinions of a multitude of agents, and not on facts.

<sup>81.</sup> CF. *Global Report 2017, Conflicts, Governance and State Fragility* par Monty G. Marshall and Gabrielle C. Elzinga-Marshall, Center for Systemic Peace. August 2017.

<sup>82.</sup> Up to 1999, the database was managed under the direction of Ted Robert Gurr. From 1999 to 2010, it was managed by Monty G Marshall with changes to the rules and coding method of the data. Since August 2010 the PITF has been managed by Societal-Systems Research Inc.

<sup>83.</sup> The other dimensions being: responsibility of expression, effectiveness of government action, quality of application of standards, state justice, fight against corruption.

<sup>84.</sup> For more information on the components of the index see: http://info.worldbank.org/governance/wgi/ pdf/pv.pdf

#### Appendix 2: Values and components of indicators for ADF countries in 2016 Note: The values of the components presented in the tables below correspond to the standardized and calibrated indices and not to the real values of each variable.

Table A1: Stuctural Economic Vulnerability Index (Revised EVI)

Country	ISO	Revis	ed EVI	Low size of population		Exports concentration		Sha agric prod	Share of agricultural production		Remoteness		Infrastructures weakness		Exports instability		Instability of agricultural production		Natural disasters	
		Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Burundi	BDI	44.32	17	70.02	13	35.45	14	7.12	36	42.96	8	40.70	16	42.96	13	40.70	10	36.19	17	
Benin	BEN	36.46	31	69.46	14	27.54	27	2.60	37	23.57	31	34.97	22	29.98	27	29.98	21	30.83	24	
Burkina Faso	BFA	40.29	23	62.98	25	41.63	10	36.59	14	33.11	18	33.64	23	33.64	21	40.02	11	37.34	16	
Central African Republic	CAF	40.78	22	74.45	8	34.33	16	29.98	25	37.02	13	46.69	11	31.41	24	26.27	25	22.56	32	
Côte d'Ivoire	CIV	33.25	37	59.30	28	30.54	23	52.88	6	25.74	27	32.14	24	23.57	33	23.39	30	10.52	37	
Cameroon	CMR	32.67	38	59.98	27	31.73	20	51.27	7	25.20	29	31.73	25	13.12	35	25.20	28	22.38	33	
Congo, DRC	COD	35.73	33	34.55	36	35.85	13	23.39	30	32.14	19	55.35	7	41.63	14	11.68	34	20.11	35	
Comoros	СОМ	51.61	9	93.36	2	48.74	6	71.21	3	51.27	6	28.85	30	43.38	12	7.12	35	39.92	14	
Djibouti	DJI	44.72	16	92.88	3	17.94	35	42.96	11	21.15	34	27.54	32	23.39	34	35.45	14	52.26	6	
Eritrea	ERI	53.80	4	73.73	10	31.41	21	30.92	23	13.12	37	59.85	5	58.52	5	59.85	4	50.63	7	
Ethiopia	ETH	36.58	30	20.11	37	25.74	29	32.14	20	35.85	14	58.52	6	33.11	22	27.01	24	42.64	11	
Ghana	GHA	36.81	29	57.04	30	33.11	18	34.97	17	25.55	28	24.54	37	46.69	10	13.12	33	25.30	30	
Guinea	GIN	36.89	28	67.86	17	33.64	17	23.02	31	27.01	26	40.02	17	35.45	20	2.60	38	24.57	31	
Gambia	GMB	70.18	1	76.98	5	28.85	25	41.63	12	23.39	32	23.02	38	100.00	1	100.00	1	33.47	21	
Guinea-Bissau	GNB	49.27	11	82.06	4	79.89	2	28.42	26	38.15	12	41.63	15	48.74	9	16.54	32	29.63	27	
Kenya	KEN	35.09	35	44.65	34	11.68	37	21.15	32	31.41	20	25.55	35	7.12	36	28.42	23	70.84	2	
Liberia	LBR	51.94	8	74.26	9	32.14	19	100.00	1	28.42	24	42.96	14	55.35	6	35.85	13	22.01	34	
Lesotho	LSO	55.12	3	76.61	6	23.57	33	27.54	27	100.00	1	37.02	19	30.92	25	33.64	16	57.98	5	
Madagascar	MDG	45.90	15	58.37	29	25.55	30	59.85	5	59.85	2	51.27	9	40.70	15	23.02	31	35.76	18	
Mali	MLI	39.10	25	64.15	23	55.35	4	17.94	33	34.33	16	38.15	18	28.42	28	31.73	18	34.12	20	
Mozambique	MOZ	40.92	21	55.43	31	25.20	31	35.85	15	46.69	7	48.74	10	27.54	29	37.02	12	43.84	10	
Mauritania	MRT	39.95	24	74.80	7	30.92	22	44.57	9	16.54	36	35.45	21	31.73	23	6.64	36	45.99	9	
Malawi	MWI	49.69	10	63.41	24	34.97	15	25.74	28	52.88	5	31.41	26	40.02	16	65.45	3	59.32	4	
Niger	NER	48.13	14	61.85	26	29.98	24	40.02	13	30.92	21	71.21	3	25.74	30	43.38	8	65.00	3	
Nigeria	NGA	35.79	32	0.00	38	52.88	5	65.45	4	17.94	35	29.98	29	44.57	11	28.85	22	26.05	29	
Rwanda	RWA	38.68	26	68.59	15	27.01	28	13.12	34	41.63	9	30.92	27	30.54	26	34.97	15	32.23	23	
Sudan	SDN	42.55	19	51.26	32	42.96	9	30.54	24	11.68	38	35.85	20	59.85	4	25.65	26	35.00	19	
Senegal	SEN	41.52	20	65.67	20	21.15	34	33.64	18	23.02	33	25.74	34	4.69	37	79.89	2	32.76	22	
Sierra Leone	SLE	48.58	13	71.58	11	40.70	11	11.68	35	27.54	25	52.88	8	52.88	7	58.52	5	16.86	36	
Somalia	SOM	53.24	6	66.89	18	43.38	8	0.00	38	29.98	23	100.00	1	0.00	38	4.69	37	79.63	1	
South Sudan	SSD	64.78	2	68.27	16	100.00	1	48.74	8	33.64	17	79.89	2	79.89	2	25.65	26	42.21	12	
São Tome & Principe	STP	49.06	12	97.40	1	38.15	12	79.89	2	40.02	11	25.20	36	36.59	18	30.54	20	0.00	38	
Chad	TCD	52.42	7	66.36	19	65.45	3	31.41	22	30.54	22	65.45	4	51.27	8	52.88	6	40.86	13	
Тодо	TGO	37.39	27	71.15	12	16.54	36	31.73	21	24.54	30	43.38	13	25.55	31	31.41	19	26.59	28	
Tanzania	TZA	33.77	36	41.48	35	24.54	32	35.45	16	35.45	15	44.57	12	24.54	32	33.11	17	30.51	25	
Uganda	UGA	35.39	34	47.12	33	7.12	38	43.38	10	40.70	10	30.54	28	37.02	17	24.54	29	30.01	26	
Zambia	ZMB	43.58	18	64.55	22	44.57	7	25.20	29	55-35	4	28.42	31	35.85	19	41.63	9	39.23	15	
Zimbabwe	ZWE	53.44	5	65.03	21	28.42	26	33.11	19	58.52	3	27.01	33	65.45	3	51.27	7	48.07	8	

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#### Table A2: Physical Vulnerability to Climate Change Index (PVCCI)

Country	150	Ρνςςι		Sea level rise		Arid	Aridity		Rainfall		Temperature		Cyclones	
Country	130	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Burundi	BDI	38,62	24	0,00	24	29,81	37	60,00	13	54,48	8	0,00	11	
Benin	BEN	38,95	23	35,94	11	47,92	16	45,98	30	43,42	21	0,00	11	
Burkina Faso	BFA	46,06	12	0,00	24	51,86	10	52,68	23	71,72	2	0,00	11	
Central African Republic	CAF	31,48	36	0,00	24	35,77	34	47,46	27	37,72	25	0,00	11	
Cote d'Ivoire	CIV	31,99	35	25,65	18	46,41	19	38,03	35	29,31	29	0,00	11	
Cameroon	CMR	35,21	31	19,82	20	45,99	20	50,29	25	34,08	26	0,00	11	
Congo, DRC	COD	33,73	34	13,56	23	38,38	32	45,55	31	44,25	19	0,00	11	
Comoros	COM	53,09	1	74,39	1	38,21	33	62,02	11	28,14	30	49,63	4	
Djibouti	DJI	50,04	5	50,59	4	45,47	22	66,27	10	59,17	5	0,00	11	
Eritrea	ERI	47,58	10	50,12	5	58,79	3	67,03	9	29,34	28	0,00	11	
Ethiopia	ETH	31,25	37	0,00	24	32,97	35	59,54	15	15,82	36	0,00	11	
Ghana	GHA	36,98	28	34,40	12	44,39	25	42,70	34	43,13	22	0,00	11	
Guinea	GIN	44,49	18	34,29	13	49,34	14	46,58	29	47,97	14	42,63	6	
The Gambia	GMB	47,88	9	54,33	3	63,21	1	48,04	26	47,01	15	0,00	11	
Guinea-Bissau	GNB	48,64	6	58,44	2	52,51	7	32,62	37	50,50	12	45,17	5	
Kenya	KEN	36,24	30	17,98	22	42,12	27	58,01	19	33,21	27	0,00	11	
Liberia	LBR	29,55	38	26,59	16	45,09	23	3,54	38	40,16	23	0,00	11	
Lesotho	LS0	34,02	32	0,00	24	42,77	26	58,53	17	23,09	33	0,00	11	
Madagascar	MDG	51,35	4	44,46	8	30,19	36	36,95	36	12,32	37	93,70	1	
Mali	MLI	51,96	3	0,00	24	46,61	18	67,26	6	74,44	1	35,50	9	
Mozambique	MOZ	48,30	7	27,28	15	47,45	17	60,85	12	20,48	34	67,41	2	
Mauritania	MRT	48,19	8	41,22	9	52,12	9	72,35	1	44,30	18	0,00	11	
Malawi	MWI	43,72	19	0,00	24	49,41	13	59,60	14	19,85	35	56,31	3	
Niger	NER	45,27	17	0,00	24	55,23	6	69,39	3	48,80	13	0,00	11	
Nigeria	NGA	37,00	27	26,32	17	44,46	24	47,28	28	44,06	20	0,00	11	
Rwanda	RWA	45,51	14	0,00	24	29,23	38	67,07	8	70,74	3	0,00	11	
Sudan	SDN	45,38	16	0,00	24	63,15	2	69,19	4	39,03	24	0,00	11	
Senegal	SEN	52,65	2	49,54	6	55,98	5	54,27	22	61,57	4	39,16	7	
Sierra Leone	SLE	41,55	21	46,34	7	49,62	12	43,85	32	45,82	16	0,00	11	
Somalia	SOM	47,31	11	32,75	14	40,68	30	67,10	7	52,17	11	35,22	10	
South Sudan	SSD	45,41	15	0,00	24	58,65	4	59,47	16	57,76	6	0,00	11	
Sao Tome & Principe	STP	42,08	20	36,26	10	45,72	21	69,87	2	23,79	32	0,00	11	
Chad	TCD	45,56	13	0,00	24	52,28	8	68,84	5	53,93	9	0,00	11	
Тодо	TGO	36,73	29	25,42	19	38,68	31	42,83	33	52,60	10	0,00	11	
Tanzania	TZA	33,90	33	19,10	21	41,70	28	54,88	21	25,10	31	0,00	11	
Uganda	UGA	40,07	22	0,00	24	40,70	29	58,26	18	54,58	7	0,00	11	
Zambia	ZMB	37,05	26	0,00	24	48,47	15	50,40	24	44,44	17	0,00	11	
Zimbabwe	ZWE	38,31	25	0,00	24	50,82	11	56,58	20	8,73	38	38,46	8	

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Country	ISO	IVI		Internal armed conflicts		Crimin	Criminality		Terrorism		Political violence		Neighborhood	
country	150	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Burundi	BDI	52,20	13	59,98	11	16,25	30	62,16	9	58,68	9	49,53	15	
Benin	BEN	27,40	30	6,66	36	25,97	23	10,17	31	9,35	33	53,33	13	
Burkina Faso	BFA	28,04	28	29,28	22	0,00	38	33,72	20	32,38	21	29,82	22	
Central African Republic	CAF	73,53	6	74,71	7	80,87	4	65,52	8	65,82	7	79,26	3	
Cote d'Ivoire	CIV	53,51	12	62,73	10	78,54	5	38,61	18	49,99	12	14,92	28	
Cameroon	CMR	46,21	15	55,80	14	17,38	29	59,21	10	49,07	13	36,70	19	
Congo, DRC	COD	75,03	4	83,09	5	86,53	2	77,27	5	79,08	4	39,13	18	
Comoros	COM	20,67	33	0,00	37	39,92	16	0,00	33	0,00	36	23,30	25	
Djibouti	DJI	35,42	23	11,45	33	30,43	20	20,00	26	0,00	36	69,39	7	
Eritrea	ERI	37,62	20	44,94	17	35,88	18	23,96	23	6,54	35	56,14	12	
Ethiopia	ETH	60,67	9	79,10	6	42,06	15	57,88	11	42,86	16	72,04	6	
Ghana	GHA	18,78	34	24,88	25	1,86	36	14,96	28	12,31	31	27,67	23	
Guinea	GIN	38,92	18	27,12	23	44,25	14	17,43	27	62,68	8	25,46	24	
The Gambia	GMB	27,51	29	12,43	32	47,90	13	0,00	33	9,99	32	35,17	20	
Guinea-Bissau	GNB	29,54	27	16,39	29	57,28	10	21,56	25	14,15	30	12,13	30	
Kenya	KEN	72,93	7	71,82	8	22,07	26	90,40	3	84,67	2	74,91	5	
Liberia	LBR	21,98	32	40,77	19	11,02	33	14,45	29	18,63	28	8,74	33	
Lesotho	LSO	45,90	16	9,47	35	100,00	1	11,26	30	7,91	34	15,93	27	
Madagascar	MDG	26,76	31	36,22	21	0,73	37	32,06	21	34,58	20	6,71	35	
Mali	MLI	65,10	8	69,15	9	73,50	6	69,05	7	71,78	5	32,98	21	
Mozambique	MOZ	34,43	24	42,93	18	15,22	31	48,57	15	38,58	18	1,82	37	
Mauritania	MRT	45,57	17	14,26	31	67,46	7	26,28	22	36,13	19	60,28	9	
Malawi	MWI	14,01	36	15,28	30	5,62	34	0,00	33	23,32	26	13,10	29	
Niger	NER	49,07	14	52,97	15	19,75	27	56,53	12	46,47	14	59,05	10	
Nigeria	NGA	80,09	1	84,69	4	60,25	9	100,00	1	95,99	1	45,36	17	
Rwanda	RWA	36,17	21	18,25	28	19,26	28	47,58	16	15,17	29	57,80	11	
Sudan	SDN	78,67	3	100,00	1	27,75	22	85,73	4	83,06	3	76,98	4	
Senegal	SEN	38,09	19	49,14	16	37,45	17	36,34	19	44,86	15	10,16	32	
Sierra Leone	SLE	11,45	37	10,11	34	3,24	35	7,15	32	20,93	27	7,37	34	
Somalia	SOM	73,67	5	95,99	2	24,50	24	100,00	1	69,11	6	50,44	14	
South Sudan	SSD	79,06	2	89,05	3	84,90	3	75,02	6	57,42	10	84,81	2	
Sao Tome & Principe	STP	11,37	38	0,00	37	13,36	32	0,00	33	0,00	36	21,63	26	
Chad	TCD	59,61	10	58,73	12	51,46	12	54,73	13	27,02	23	89,13	1	
Тодо	TGO	32,59	25	38,66	20	54,42	11	0,00	33	29,19	22	1,02	38	
Tanzania	TZA	35,85	22	26,63	24	33,65	19	40,93	17	26,54	24	46,95	16	
Uganda	UGA	56,10	11	57,48	13	64,29	8	51,70	14	40,69	17	63,01	8	
Zambia	ZMB	18,46	35	21,03	27	23,05	25	0,00	33	24,78	25	10,80	31	
Zimbabwe	ZWE	31,46	26	21,99	26	28,23	21	23,44	24	55,74	11	3,18	36	

#### Table A4: Societal vulnerability index

Country			IVI [1] Risk of vi		iolence [2]	Average	
Country	150	Score	Rank	Score	Rank	of [1] 8	& [2]
Burundi	BDI	59,06	13	60,96	12	60,01	11
Benin	BEN	23,11	30	15,29	32	19,20	31
Burkina Faso	BFA	24,04	28	13,41	33	18,72	32
Central African Republic	CAF	90,41	6	97,88	3	94,14	4
Cote d'Ivoire	CIV	60,96	12	59,06	13	60,01	11
Cameroon	CMR	50,42	15	34,68	23	42,55	19
Congo, DRC	COD	92,60	4	78,26	8	85,43	7
Comoros	COM	13,41	33	7,00	35	10,20	36
Djibouti	DJI	34,68	23	35,78	21	35,23	23
Eritrea	ERI	37,88	20	10,68	34	24,28	29
Ethiopia	ETH	71,77	9	100,00	1	85,88	6
Ghana	GHA	10,68	34	0,12	37	5,40	37
Guinea	GIN	39,83	18	37,88	20	38,86	21
The Gambia	GMB	23,27	29	35,32	22	29,30	25
Guinea-Bissau	GNB	26,19	27	0,00	38	13,09	34
Kenya	KEN	89,56	7	24,04	28	56,80	14
Liberia	LBR	15,29	32	49,44	17	32,36	24
Lesotho	LSO	49,91	16	28,97	26	39,44	20
Madagascar	MDG	22,17	31	33,25	24	27,71	26
Mali	MLI	78,26	8	71,77	9	75,01	9
Mozambique	MOZ	33,25	24	54,54	14	43,89	18
Mauritania	MRT	49,44	17	64,77	11	57,10	13
Malawi	MWI	3,80	36	23,11	30	13,45	33
Niger	NER	54,54	14	38,59	19	46,56	16
Nigeria	NGA	100,00	1	89,56	7	94,78	2
Rwanda	RWA	35,78	21	70,14	10	52,96	15
Sudan	SDN	97,88	3	98,50	2	98,19	1
Senegal	SEN	38,59	19	49,91	16	44,25	17
Sierra Leone	SLE	0,12	37	7,00	35	3,56	38
Somalia	SOM	90,63	5	92,60	4	91,61	5
South Sudan	SSD	98,50	2	90,63	5	94,56	3
Sao Tome & Principe	STP	0,00	38	26,19	27	13,09	34
Chad	TCD	70,14	10	50,42	15	60,28	10
Тодо	TGO	30,59	25	22,17	31	26,38	27
Tanzania	TZA	35,32	22	39,83	18	37,58	22
Uganda	UGA	64,77	11	90,41	6	77,59	8
Zambia	ZMB	10,21	35	30,59	25	20,40	30
Zimbabwe	ZWE	28,97	26	23,27	29	26,12	28

#### Table A5: Human Needs Index (HNI)

Country			HNI Healt		lth	th Education		Population	
	-150	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Burundi	BDI	68,00	8	62,70	4	98,90	15	12,62	15
Benin	BEN	57,87	22	28,24	12	96,03	27	5,06	25
Burkina Faso	BFA	58,21	18	7,24	25	99,78	6	12,61	16
Central African Republic	CAF	67,81	9	61,00	5	99,92	4	9,56	20
Cote d'Ivoire	CIV	57,97	19	18,57	16	98,65	18	2,26	30
Cameroon	CMR	56,61	31	3,97	28	93,73	32	28,51	11
Congo, DRC	COD	73,92	3	75,60	2	94,82	30	41,08	7
Comoros	COM	56,17	33	28,57	9	92,99	33	0,31	37
Djibouti	DJI	56,68	29	1,45	34	98,13	21	2,31	29
Eritrea	ERI	63,39	11	47,71	7	98,87	16	2,00	31
Ethiopia	ETH	70,66	6	5,59	26	99,73	7	70,72	3
Ghana	GHA	51,39	36	1,05	36	88,99	34	1,99	32
Guinea	GIN	57,88	20	10,84	22	99,64	9	2,51	28
The Gambia	GMB	55,86	34	1,86	33	94,94	29	18,57	14
Guinea-Bissau	GNB	57,82	23	10,27	24	99,62	10	1,44	34
Kenya	KEN	62,48	12	1,37	35	88,22	36	62,66	6
Liberia	LBR	59,20	15	23,74	14	99,62	10	5,38	24
Lesotho	LS0	56,78	28	23,68	15	95,45	28	0,18	38
Madagascar	MDG	57,40	26	18,54	17	97,67	24	0,75	36
Mali	MLI	70,21	7	31,18	8	99,42	12	62,69	5
Mozambique	MOZ	59,02	16	3,28	29	99,40	13	23,67	13
Mauritania	MRT	57,88	21	5,06	27	99,68	8	9,47	21
Malawi	MWI	57,26	27	2,33	32	98,56	19	10,82	19
Niger	NER	71,34	4	11,97	18	100,00	2	71,60	2
Nigeria	NGA	58,41	17	28,47	10	96,82	26	7,01	22
Rwanda	RWA	57,57	25	11,97	19	98,26	20	11,98	17
Sudan	SDN	59,86	14	2,58	31	98,84	17	31,21	9
Senegal	SEN	56,67	30	0,43	38	98,09	23	3,55	26
Sierra Leone	SLE	63,69	10	48,64	6	99,00	14	1,73	33
Somalia	SOM	78,56	2	88,02	1	99,84	5	28,24	12
South Sudan	SSD	60,39	13	11,30	20	100,00	1	28,53	10
Sao Tome & Principe	STP	34,76	38	0,66	37	59,90	38	5,95	23
Chad	TCD	78,74	1	63,64	3	99,99	3	67,46	4
Togo	TGO	56,28	32	3,13	30	97,39	25	2,64	27
Tanzania	TZA	57,80	24	10,82	23	94,05	31	32,55	8
Uganda	UGA	71,29	5	11,28	21	98,11	22	74,14	1
Zambia	ZMB	54,17	35	28,26	11	88,70	35	11,69	18
Zimbabwe	ZWE	44,20	37	26,76	13	71,71	37	1,16	35

#### Table A6: GNIpc

e .	160	GNIpc	(PPP)	GNIpc (WBA)		
Country	ISO	Value	Rank	Value	Rank	
Burundi	BDI	770	4	280	2	
Benin	BEN	2170	26	820	23	
Burkina Faso	BFA	1730	17	620	15	
Central African Republic	CAF	700	2	370	4	
Cote d'Ivoire	CIV	3590	33	1520	34	
Cameroon	CMR	3540	32	1400	33	
Congo, DRC	COD	780	5	430	8	
Comoros	СОМ	1540	13	770	21	
Djibouti	DJI	2140	25	1908	36	
Eritrea	ERI	1080	7	823	24	
Ethiopia	ETH	1730	17	660	17	
Ghana	GHA	4150	36	1380	31	
Guinea	GIN	1840	21	670	18	
The Gambia	GMB	1630	15	430	8	
Guinea-Bissau	GNB	1550	14	600	14	
Kenya	KEN	3120	29	1380	31	
Liberia	LBR	700	2	370	4	
Lesotho	LS0	3340	31	1270	29	
Madagascar	MDG	1440	12	400	7	
Mali	MLI	2050	24	770	21	
Mozambique	MOZ	1190	9	480	11	
Mauritania	MRT	3760	34	1130	28	
Malawi	MWI	1140	8	320	3	
Niger	NER	970	6	370	4	
Nigeria	NGA	5740	38	2450	38	
Rwanda	RWA	1860	22	700	19	
Sudan	SDN	4290	37	2140	37	
Senegal	SEN	2480	27	950	27	
Sierra Leone	SLE	1320	10	490	12	
Somalia	SOM	90	1	442	10	
South Sudan	SSD	-	-	182	1	
Sao Tome & Principe	STP	3250	30	1720	35	
Chad	TCD	1950	23	720	20	
Тодо	TGO	1370	11	540	13	
Tanzania	TZA	2740	28	900	26	
Uganda	UGA	1790	19	630	16	
Zambia	ZMB	3850	35	1360	30	
Zimbabwe	ZWE	1810	20	890	25	

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Population size (in logarithm)	<ul> <li>Smaller countries are more exposed to economic, trade-related, and environmental shocks</li> <li>Country population as of July 1 of each year</li> </ul>	1950-2016	Population Division, UNDESA World Population Prospects database	Annually
Remoteness from world markets (and landlocked status and insularity)	<ul> <li>Remoteness inhibits growth and opportunities to trade by increasing transportation costs and the difficulty of diversifying the economy.</li> <li>For each country i, partner countries j are ranked according to their distance from country i. The group of the closest countries is then progressively selected until 50 % of the world market is reached for country i. An adjustment was made to take account the landlocked status and insularity.</li> </ul>	1970-2016	The data on bilateral physical distance between exporting country and trading partners (importers): Centre d'Études Prospectives et d'Informations Internationales (CEPII). Data on market share of each trading partner in world markets: United Nations Statistics National Accounts Main Aggregates Database.	Annually
Merchandise export concentration	<ul> <li>Reflects exposure to trade- related shocks resulting from a concentrated export structure. The more concentrated, the less resilient and the more exposure to shocks.</li> <li>Derived from a Herfindahl- Hirschmann index applied to merchandise exports.</li> </ul>	1995-2016 (UNCTAD database), covering 1970–1994 (CERDI-FERDI database).	United Nations Conference on Trade and Development (UNCTAD)	Annually
Share of agriculture, forestry, and fisheries in GDP	<ul> <li>Reflects country exposure caused by economic structure as agriculture, forestry, and fisheries are particularly subject to natural and economic shocks: the higher, the less resilient and the more exposure to shocks.</li> <li>Percentage share of agriculture, fisheries, and forestry (ISIC A-B) in GDP.</li> </ul>	1970-2016	United Nations Statistics Division; National Accounts Main Aggregate Database	Annually (December of each year)
Index of poor infrastructural development	Like remoteness from world markets, lack of infrastructure inhibits growth by increasing transportation costs.     Africa Infrastructure Development Index (AIDI	2006-2016	African Development Bank	Annually

Appendices

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Victims of natural disaster	• Reflects vulnerability to natural shocks, in particular the human impact of natural disasters associated with these shocks (the larger, the bigger the shocks). • Share of population victims of natural disasters, defined as people killed or affected (i.e., requiring immediate food, water, shelter, sanitation, or medical assistance). Covers weather- and climate-related disasters (such as floods, landslides, storms, droughts, and extreme temperatures) as well as geophysical disasters (such as earthquakes or volcanic eruptions).	1900-2016 (with lower precision for the most distant years)	UNDESA Population Prospects Database Emergency Disasters Database (EM-DAT) WHO Center for Research on the Epidemiology of Disasters (CRED)	Annually
Instability of agricultural production	<ul> <li>Vulnerability of countries to climate shocks evidenced by high variability in agricultural production. Reflects the vulnerability of countries to natural shocks, in particular impacts of droughts and disturbances in rainfall patterns (the higher, the larger the shock).</li> <li>Standard error of the regression of Total Agricultural Production in Real Terms on past values (21 years) and on a trend variable.</li> </ul>	1961-2016	Food and Agriculture Organization of the United Nations (FAO)	Annually
Instability of exports of goods and services	High variability in export earnings in both goods and services has an impact on output, unemployment rates, and the availability of foreign currency, with negative consequences for sustainable economic growth and development. Standard error of regression of Exports of Goods and Services in constant USD on past values (21 years) and on a trend variable.	1970-2016	United Nations Statistics Division; National Accounts Main Aggregates Database	Annually

Table A8: Components of the Physical Vulnerability to Climate Change Index (PVCCI)

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Risk of flooding due to sea level rise	<ul> <li>Ocean warming and melting glaciers increase the frequency and severity of floods. Hazard-prone areas are those located near sea level.</li> <li>Proportion of country located less than 1 meter from sea level.</li> </ul>	1900-2016	Altitude data calculated from two digital terrain models (Scuttle Radar Topography Mission and Global 30-Arc- Second Elevation).	Not specified (data less subject to variations)
Trends in rising temperatures and declining rainfall	<ul> <li>Rising temperatures and shortages of rain are one of the physical manifestations of climate change.</li> <li>Positive trend for temperatures (increasing) and negative trend for precipitation (declining).</li> </ul>	1900-2016	Temperature and precipitation data: Climate Research Unit (CRU TS), East Anglia University	Frequently (about 1 year)
Trend in increasing rainfall shocks	Global warming is characterized by an increase in rainfall shocks and longer dry seasons.     Measures trend in the magnitude of precipitation shocks. The magnitude of rainfall shocks is measured as the square root of the square deviation of rainfall series from their long-term trend.	1900-2016	Temperature and precipitation data: Climate Research Unit (CRU TS), East Anglia University	Frequently (about 1 year)
Trend in increasing temperature shocks	Global warming is characterized by an increase in temperature shocks, with longer episodes of heatwaves.     This indicator measures the trend in the magnitude of temperature shocks. The magnitude of temperature shocks is measured as the square root of the square deviation of temperature series from their long-term trend.	1900-2016	Temperature and precipitation data: Climate Research Unit (CRU TS), East Anglia University	Frequently (about 1 year)

(\*) period covered available as of August 1, 2018

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Trend in increased cyclone intensity	<ul> <li>The upward trend in cyclone intensity is one of the manifestations of climate change. Tropical cyclones increasing in intensity.</li> <li>Measures trend in cyclone intensity over a long period.</li> </ul>	1970–2014	National Climatic Data Center, National Oceanic and Atmospheric Administration (NOAA)	Not specified
Share of drylands	<ul> <li>Countries with a high proportion of drylands are more exposed to rising temperatures and scarcity of rainfall.</li> <li>The proportion of drylands over the country's area (excluding deserts). Drylands are defined following the UNEP terminology as lands for which the ratio of average annual precipitation to potential evapotranspiration is between o.os and o.65, the ratio being less than o.os for deserts.</li> </ul>	1900-2016	Precipitation and evapotranspiration data: Climate Research Unit (CRU TS), East Anglia University	Frequently (about 1 year)
Level of precipitation	Low rainfall countries are more exposed to increased rainfall shocks.     Average level of precipitation over the period 1950–2016.	1900-2016	Precipitation data: Climate Research Unit (CRU TS), East Anglia University	Frequently (about 1 year)
Level of temperature	Very hot countries are more exposed to increased temperature shocks.     Average level of temperature over the period 1950–2016.	1900-2016	Temperature data: Climate Research Unit (CRU TS), East Anglia University	Frequently (about 1 year)
Intensity of cyclones	<ul> <li>High levels of cyclone intensity imply high exposure to increases in intensity of future cyclones.</li> <li>Average intensity of cyclones over the period 1970–2014.</li> </ul>	1900-2014	National Climatic Data Center, National Oceanic and Atmospheric Administration (NOAA)	Not specified

(\*) period covered available as of August 1, 2018

#### Table A9: Components of the Internal Violence Index (IVI)

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Number of deaths due to armed conflict	<ul> <li>Captures the extent of internal armed conflict through number of deaths.</li> <li>Number of deaths due to armed conflict.</li> </ul>	1997–present	Africa Conflict Location and Events Dataset (ACLED)	Weekly Data updated in real time
Internally displaced people (IDP) due to armed conflict (as percentage of the population)	<ul> <li>IDPs do not cross an international border. By staying in their country, they remain under the responsibility of their government. Reflects the economic and social weight of violence, particularly in fragile states.</li> <li>Number of internally displaced persons (n proportion of total population) as a result of armed conflict.</li> </ul>	1998-2017	Global Internal Displacement Database (GIDD), Internal Displacement Monitoring Centre (IDMC) Data on IDPs prior to 2006: United States Committee for Refugees and Immigrants (USCRI)	Annually
Homicide rate	<ul> <li>Homicide is one of the most serious forms of violence. The homicide rate is the preferred indicator for international comparative studies of the level of crime in a country.</li> <li>Homicide rate per 100,000 inhabitants.</li> </ul>	2000-2016	United Nations Office on Drugs and Crime (UNODC)	Regularly; exact frequency of updates unknown (most likely greater than 1 year)
Number of terrorist incidents	Terrorism is now the focus of global concerns over conflicts. The indicator captures the occurrence of terrorist incidents in a country.     Number of terrorist incidents. Terrorist incident defined according to GTD terminology. Defines a terrorist attack as "the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation."	1970–2016 GTD1: 1970–1994 GTD2: 1995– 2012 GTD3:2013–2016	Global Terrorism Database (GTD), National Consortium for the Study of Terrorism and Responses to Terrorism (University of Maryland)	Frequently Annual update planned for future versions of GTD Data for 2017 events to be released in summer 2018
Number of deaths due to terrorist incidents	<ul> <li>Highlights the extent of terrorist incidents as persons killed in such incidents.</li> <li>Number of deaths due to terrorist incidents.</li> </ul>	1970–2016 GTD1: 1970–1994 GTD2: 1995– 2012 GTD3:2013–2016	Global Terrorism Database (GTD), National Consortium for the Study of Terrorism and Responses to Terrorism (University of Maryland)	Frequently Annual update planned for future versions of GTD

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Number of injuries due to terrorist incidents	<ul> <li>Highlights the extent of terrorist incidents as persons injured in such incidents.</li> <li>Number of injuries due to terrorist incidents.</li> </ul>	1970–2016 GTD1: 1970–1994 GTD2: 1995– 2012 GTD3:2013–2016	Global Terrorism Database (GTD), National Consortium for the Study of Terrorism and Responses to Terrorism (University of Maryland)	Frequently Annual update planned for future versions of GTD
Number of social protests not repressed	<ul> <li>Political violence most often refers to protestor violence against established power. The indicator measures the occurrence of social protests that have not been repressed.</li> <li>Number of social protests not repressed by the public authorities.</li> </ul>	1990-2016	Social Conflict in Africa Database (SCAD)	Not specified (most likely annual)
Number of social protests repressed by non-lethal means	<ul> <li>To protect existing social order, the public authorities and institutions resist the protesters by force but without use of lethal weapons.</li> <li>Number of social protests repressed by the public authorities by non-lethal means.</li> </ul>	1990-2016	Social Conflict in Africa Database (SCAD)	Not specified (most likely annual)
Number of social protests repressed by lethal means	To disperse protesters, police forces representing the public authorities use lethal weapons, most often leading to loss of human life.     Number of social protests repressed by the public authorities with the use of lethal means.	1990-2016	Social Conflict in Africa Database (SCAD)	Not specified (most likely annual)

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Internal armed conflict due to neighbors	<ul> <li>Most armed conflicts have a regional dimension. Due to the porous nature of borders in most countries, there is a risk of displacement and contagion of conflicts. Measures intensity of internal armed conflict in neighboring countries.</li> <li>Average internal armed conflict in neighboring countries. Internal armed conflict calculated for each country as the quadratic mean of the index of the number of deaths due to armed conflict and the index of the number of internally displaced persons in neighboring countries.</li> </ul>	1997—present for number of deaths due to internal armed conflict 1998—2017 for IDPs	Armed Conflict Location and Events Dataset (ACLED) Global Internal Displacement Database (GIDD), Internal Displacement Monitoring Center (IDMC)	Weekly Data updated in real time for ACLED database, annually for GIDD database
Terrorism in neighboring countries	<ul> <li>Terrorism in Africa appears to be a cross-border phenomenon.</li> <li>Countries close to a terrorism hotbed more likely to experience terrorist incidents.</li> <li>Average terrorism in neighboring countries. Terrorism calculated for each country as the quadratic mean of the index of the number of terrorist incidents, the index of the number of deaths due to terrorist incidents, and the index of the number of injuries due to terrorist incidents in neighboring countries.</li> </ul>	1970-2016	Global Terrorism Database (GTD), National Consortium for the Study of Terrorism and Responses to Terrorism (University of Maryland)	Frequently Annual update planned for future versions of GTD

(\*) period covered available as of August 1, 2018

#### Table A10: Components of Human Needs Index (HNI)

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Gross secondary school enrolment ratio	<ul> <li>Reflects the proportion of the population with level of skills deemed necessary for the country's development.</li> <li>Number of students enrolled in secondary schools regardless of age or population in theoretical age group for the same level of education.</li> </ul>	1970-2017	Primary data: UNESCO Institute of Statistics (UIS)	Annually
Adult literacy rate	<ul> <li>Shows the importance of resources available to increase the skills a country needs for its development.</li> <li>Literate people aged 15 or above as percentage of total population for this age group. Literacy is defined as the ability to read and write as understanding a simple statement related to one's daily life.</li> </ul>	1970-2016	Primary data: UNESCO Institute of Statistics (UIS)	Annually
Prevalence of under- nourishment in total population	<ul> <li>Undernourishment increases susceptibility to disease and contributes to weakening the country's human capital.</li> <li>Percentage of population whose food intake is less than minimum requirements.</li> </ul>	1970-2016	Food and Agriculture Organization (FAO), FAOSTAT	Annually
Mortality rate for children aged five years or below	<ul> <li>Shows the health conditions of children in a country and makes it possible to evaluate the impact of actions aimed at their survival and well-being.</li> <li>Probability per 1,000 that a newborn baby will die before reaching age five.</li> </ul>	1960-2016	Estimate of child mortality: United Nations Inter-Agency Group	Annually

Variables	Cause(s) Measure(s) used	Period covered*	Data source(s)	Update frequency
Age structure	<ul> <li>Shows the needs of young people, particularly in terms of jobs.</li> <li>Measures population aged o to 19 (under 15 + 15–19 year-olds, often looking for work) as a ratio of total population.</li> </ul>	1960-2017	World Bank Group, World Development Indicators World Bank age structure based on estimated age structure of the United Nations Population Division, World Population Outlook	Annually
Refugees	<ul> <li>Support for reception and accommodation of refugees as the responsibility of the authorities of the host country.</li> <li>Total refugee population in the country.</li> </ul>	1990-2016	United Nations High Commissioner for Refugees (UNHCR)	Annually

(\*) Period covered available as of August 1, 2018

## Appendix 3: Evolution of the Multilateral Development Banks' allocation formulas

Table A11: Changes in the PBA formula at the World Bank (IDA) from 1991 to the current practice

Periods	Changes in the PBA formula	Changes in the Performance Factor
1991-1993	Population <sup>1.0</sup> x GNI/pc $^{0.25}$ x Performance Factor <sup>1.8</sup>	CPIA
1994	Population <sup>1.0</sup> x GNI/pc <sup>-0.25</sup> x Performance Facto <sup>n.8</sup>	0.8CPIA+0.2PORT
1995-1996	Population <sup>1.0</sup> x GNI/pc <sup>-0.25</sup> x Performance Factor <sup>1.8</sup>	0.9CPIA+0.1PORT
1997	<i>If Performance rating less than 2.0</i> Population <sup>1,a</sup> x GNI/pc <sup>0.125</sup> x Performance Factor <sup>0.5</sup> <i>If Performance rating from 2.0 to 2.9</i> Population <sup>1,0</sup> x GNI/pc <sup>0.12</sup> 5 x Performance Factor <sup>1.6</sup> <i>If Performance rating higher than 2.9</i> Population <sup>1,0</sup> x GNI/pc <sup>0.125</sup> x Performance Factor <sup>1.95</sup>	0.93CPIA+0.07PORT
		0.8CPIA + 0.2PORT
1998-2000	<i>If Performance rating less than 3.0</i> Population <sup>10</sup> x GNI/pc <sup>0.15</sup> x Performance Factor <sup>1.75</sup> <i>If Performance rating higher than 3.0</i> Population <sup>10</sup> x GNI/pc <sup>0.15</sup> x Performance Factor <sup>2.0</sup>	The combined rating was then subjected to a governance discount of one-third for borrowers judged to have severe governance problems, which effectively lowered IDA allocations by about half. Finally, IDA allocations for borrowers with populations below 20 million whose combined ratings, less any governance discount, were more than 3.0 were increased by up to 20 percent under a small country premium. (source: OED IDA Review, February 2001)
2000-2008	Population <sup>10</sup> x GNI/pc <sup>0.135</sup> x Performance Factor <sup>2.0</sup>	(0.8CPIA + 0.2PORT) x Gov. Factor Where Gov. Factor = (Gov. Rating / 3.5) <sup>1/5</sup> and Gov. Rating= sum of CPIA criterion n°1 and CPIA criteria n°16 to 20 and the procurement practice criterion included in the ARPP rating.
2008-2014 (IDA 15 & 16)	Population <sup>1.0</sup> x GNI/pc <sup>-0.125</sup> x Performance Factor <sup>5.0</sup>	$(0.24 \text{CPIA}_{ABC} + 0.08 \text{PORT} + 0.68 \text{CPIA}_{D})$
2014-2016 (IDA 17)	Population <sup>1.0</sup> x GNI/pc <sup>0.125</sup> x Performance Factor <sup>4.0</sup>	$(0.24 \text{CPIA}_{ABC} + 0.08 \text{PORT} + 0.68 \text{CPIA}_{D})$
2017-2019 (IDA 18)	Population <sup>1.0</sup> x GNI/pc <sup>0.125</sup> x Performance Factor <sup>3.0</sup>	$(0.24 \text{CPIA}_{ABC} + 0.08 \text{PORT} + 0.68 \text{CPIA}_{D})$

Note: The PBA formula was introduced at IDA in 1977. The PBA formulae give the relative allocation share for each IDA country. PORT refers to an IDA Performance Portfolio element from the Annual Review of Portfolio Performance - ARPP. The CPIA (Country Policy and Institutional Assessment) and the PORT measures have greatly changed over time.

Table A12: Changes in the PBA formula at the African Development Bank (ADF) from 1999 to the current practice

Periods	Changes in the PBA formula	Changes in the Performance Factor
1999-2001	If Performance factor less than 3 Population' x GNI/pc <sup>-0.125</sup> x Performance Factor <sup>1,75</sup>	o.7CPIA + o.3PORT
	If Performance factor higher than <u>3</u> Population <sup>1</sup> x GNI/pC <sup>0.125</sup> x Performance Factor <sup>2</sup>	
2002-2007	Population <sup>1</sup> x GNI/pc $^{0.125}$ x Performance Factor <sup>2</sup>	0.7CPIA + 0.3PORT
2008-2013 (FAD 11 & 12	Population <sup>1</sup> x GNI/pc <sup>-0.125</sup> x Performance Factor <sup>4</sup>	(0.26 CPIA <sub>ABC</sub> + 0.58 CPIA <sub>D</sub> + 0.16PORT)
2014-2016 (FAD 13)	Population <sup>1</sup> x GNI/pc <sup>-0.125</sup> x AIDI <sup>-0.25</sup> x Performance Factor <sup>4.125</sup>	$(0.20CPIA_{ABC} + 0.58CPIA_{D} + 0.06CPIA_{E} + 0.16PORT)$ Or
	AIDI: Africa Infrastructure Development Index.	(0.36CPIA <sub>ABC</sub> + 0.58CPIA <sub>D</sub> + 0.06CPIA <sub>E</sub> ) if no PORT data available

Note: The PBA formula was introduced at ADB in 1999. The PBA formulae give the relative allocation share for each ADF country. PORT refers to an ADF Performance Portfolio indicator. The CPIA (Country Policy and Institutional Assessment) and the PORT measures have greatly changed over time.

Appendices
Institution	Caribbean Development Bank (CDB)	Asian Development Bank (AsDB)	Inter-American Development Bank (IaDB)	International Fund for Agricultural Development (IFAD)
Year of Launch	2000	2001	2002	2005
Changes in the PBAs	Since 2000: Allocation share = log Population1 x GNI/pc <sup>0.9</sup> x VUL <sup>20</sup> x Performance Factor <sup>20</sup> Performance Factor=0.7CPIA+0.3PORT <i>With VUL: the country vulnerability index produced</i> <i>at the CDB.</i>	2001-2003 : Allocation share = Population <sup>0.75</sup> x GNI/pc <sup>0.25</sup> x Performance Factor <sup>1.8</sup> Performance Factor=(0.55CPIA + 0.15PORT + 0.30Gov <sup>2</sup> ) Since 2004 : Allocation share = Population <sup>0.6</sup> x GNI/pc <sup>0.25</sup> x Performance Factor <sup>2.0</sup> Performance Factor= (policy and institutional rating) <sup>0.7</sup> x (governance rating) <sup>1</sup> x (portfolio performance rating) <sup>0.3</sup>	Note: the formulae used at the IaDB give aid allocations in US dollars and not the shares of total allocation as others MDBs With Fund: the size of the FSO or the IFF envelope respectively. <b>Depuis 2002 :</b> <u>Fund for special operations (FSO)</u> Dollar Allocation = $[(0.22Fund) \times (population/\Sigmapopulation)]+[(0.18Fund) \times [(1/GNIpc)/\Sigma(1/GNIpc)]+ [(0.6Fund)*Performance Factor]Performance Factor=(0.7CPIA+0.3PORT)/\Sigma(0.7CPIA+0.3PORT))Intermediate Financing Facility (IFF)Dollar Allocation = [(0.133Fund) × (population/\Sigmapopulation)]+[(0.133Fund) × [(1/GNIpc)/\Sigma(1/GNIpc)]+[(0.133Fund) × (debt/\Sigmadebt)]+ [(0.6Fund)*Performance Factor]Performance Factor=(0.7CPIA+0.3PORT)/\Sigma(0.7CPIA+0.3PORT))$	2005-2008 : Allocation share = Rural Population <sup>0.75</sup> x GNI/ pc <sup>-0.25</sup> x Performance Factor <sup>2</sup> Performance Factor= (0.2CPIA + 0.35PORT + 0.45Rural CPIA) Depuis 2008 : Allocation share = Rural Population <sup>0.45</sup> x GNI/ pc <sup>-0.25</sup> x Performance Factor <sup>2</sup> Performance Factor= (0.2CPIA + 0.35PORT + 0.45Rural CPIA)

Tableau A13 : Changements de la formule de la PBA dans les autres Banques Multilatérales de Développement

Note: Each MDB uses a different definition of the CPIA or of the Performance Portfolio element (PORT).

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## Measuring vulnerabilities to improve aid allocation, especially in Africa

This book is part of a long research conducted at the Foundation for Studies and Research on International Development (FERDI) about vulnerability and the allocation of foreign aid. For more than 10 years, FERDI has argued that aid allocation should take into account the structural vulnerability of recipient countries. FERDI has produced a variety of theoretical and practical work on the subject, and progress has been made in this area on the international scene. The book presents a conceptual framework to take into account the different forms of vulnerability in the allocation process. It shows that it is possible to do this without calling into question the principle of performance-based allocation, a principle to which donors are attached, but on the contrary makes performance-based allocation more credible. This work, in its present form, was finished at the beginning of summer 2019. Editorial reasons led to the publication being pushed back to this period of the coronavirus pandemic which is throwing an unforgiving light on the importance of the attention paid to the problems of vulnerability by international financial institutions.

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