FONDATION POUR LES ÉTUDES ET RECHERCHES SUR LE DÉVELOPPEMENT INTERNATIONAL

LA FERDI EST UNE FONDATION RECONNUE D'UTILITÉ PUBLIQUE.
CETTE PUBLICATION A BÉNÉFICIÉ D'UNE AIDE DE L'ÉTAT FRANCAIS AU TITRE
DU PLAN D'INVESTISSEMENT FRANCE 2030 PORTANT LA RÉFÉRENCE ANR-16-IDEX-0001.

CHAIR
International Architecture
of Development Finance

Using a Multidimensional Vulnerability Index in a Performance Based Allocation

Main Issues to Be Addressed

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Present Context of a Long-Standing Issue

The issue of introducing a vulnerability indicator in an aid allocation formula such as the Performance Based Allocation (PBA) used by several Multilateral Development Banks (MDBs) has been discussed for a long time. Three reasons make it particularly desirable to now reconsider the issue.

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…/… First is the need to follow-up the "*MDBs vision statement*" from the *Paris Summit for a New Global Financing Pact* of June 2023, in which the multilateral banks agreed to explore how they could consider multidimensional vulnerability in concessional finance, while taking into account the work of the United Nations. Second, in July 2024, the United Nations General Assembly adopted a resolution promoting a "*multidimensional vulnerability index*" and inviting international financial institutions to consider using it "as appropriate, as a complement to their existing practices and policies", which is mainly related to concessional financing. More recently in the perspective of *the FfD4, the 4th UN Conference on Financing Development* to be held next July, the Secretariat of 4P (*Paris Pact for People and Planet*) that supports the follow-up of the 2023 Paris Summit has reaffirmed its wish that this proposal be considered in order to direct financing to those countries most in need. Third, within this framework, many countries, as well as several international institutions (The Commonwealth Secretariat, Organisation internationale de la francophonie – OIF, African Union, etc.), have expressed their own interest for such a reform, by which vulnerability would be taken into account for the allocation of multilateral development assistance.

While there are many ways by which development finance can consider the structural vulnerability of countries, using a multidimensional and structural vulnerability index, possibly adapted to the objectives and mandate of each organization, should enable a preventive and transparent ex-ante allocation policy. In so doing it cannot of course replace ex-post instruments to address the most severe shocks that countries have to face unexpectedly.

The present Brief mainly relies on a vast body of works over the past decade and published by the authors as books and papers in academic journals (see Guillaumont, Guillaumont Jeanneney and Wagner, 2017, 2020), and FERDI *Policy Briefs* B246, B259, B278).

What is the Performance Based Allocation?

The Performance Based Allocation (PBA) is a simple mathematical formula developed and used by Multilateral Development Banks (MDBs) to allocate multilateral concessional resources on the basis of "performance". Although the various formulae used have evolved over time, the core principle of the PBA has been maintained through the years thanks to its appealing emphasis on performance.

The origin of the PBA can be traced back to the late '70s when it was first implemented at the World Bank, for the allocation of the credits from its concessional window, the International Development Association (IDA). For the geographical allocation of development assistance by a multilateral institution, rather than leaving it to be governed by discretionary practices, the PBA made it easier to find a consensus among board members in the apparent simplicity of a mathematical formula, where roughly the amount Ai allocated to a country i is a function of population size, Gross National Income per capita (GNI pc) and an assessment of public policy and institutional performance [1]:

$$Ai = f\,(Performance,\ Income\ per\ capita,\ Population)$$

While today's practice, still relying on a formula, has become more complex, the core message of the PBA has remained the same for almost 40 years. The goal of the PBA is to reward well performing countries by allocating a larger amount of aid, according to their "Country Policy and In-

1. The distinction between loans and grants is based on other criteria afterward.

stitutional Assessment" (CPIA) which represents the alleged quality of their public policy and institutions or, in other words, their commitment to development. Performance is measured from the CPIA and its components[2]. Therefore, since the beginning, PBA and CPIA are joint products.

The real debate about the PBA and its embedded vision of aid effectiveness has come under scrutiny essentially since the late '90s and the release of the 1998 World Bank report *Assessing Aid*, reiterating the conclusions of a paper by David Dollar & Craig Burnside[3] , according to which aid is more effective in countries with better policies. This paper, strongly debated in the academic literature, aimed at providing econometric evidence directly supporting the PBA, and propelled a renewed interest for the PBA as the right allocation methodology for the concessional windows of the Multilateral Development Banks (MDBs). Soon after, most of the MDBs, as well as some other multilateral agencies which had adopted the PBA, gathered in a kind of PBA club: 1999 for African Development Bank, 2000 for Caribbean Development Bank, 2001 for Asian Development Bank, 2002 for Inter-American Development Bank and 2005 for International Fund for Agricultural Development.

However, these various PBA formulae have not remained the same for all this time, which may be seen as a natural consequence of the shortcomings of such a restrictive formula. First the design of the formula has changed, either in the way by which the performance indicator is built or in the coefficients applied to the variables of the formula. Second, PBA formulae appeared to be not flexible enough to deal with some special attributes of recipient countries — too small, too big, highly indebted, fragile, conflict-afflicted, or post-conflict countries to name a few which warranted special treatments and tend to escape the general PBA. This led most MDBs to add an extended list of exceptions and special funding windows to the PBA to deal with particular cases, while performance was kept as the main guiding principle for aid allocation (or was supposed to be). Nevertheless, the main reason for it has changed over time: 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 feeling that giving more aid to countries considered as the "best performers" will drive other countries to become more virtuous. This is a significant change from the PBA initial philosophy, in which aid effectiveness depended on the quality of economic policies and not the other way around. Since better policies are good for growth, encouraging them could become an indirect driver of growth.

Although the impact of governance on aid effectiveness has been challenged in the academic literature, there is a consensus that aid effectiveness depends on some specific characteristics of recipient countries (see a survey in Guillaumont & Wagner, 2013). Among these characteristics, vulnerability to exogenous shocks has received increasing attention. These exogenous shocks are of various origins: economic (e.g., deterioration of terms of trade), climatic (e.g., drought), security (e.g., violence imported from neighboring countries), health (e.g., deadly epidemic breaks out). The structural vulnerability resulting from the recurrence of these shocks are handicaps to growth and development, that generate *aid needs*, as does low income. Moreover, vulnerability to shocks is a factor that also improves *marginal aid effectiveness*, as good governance is supposed to do. In this framework, aid can have a macroeconomic impact on growth thanks to its stabilizing effect. More broadly aid dampens the negative impact of shocks on development.

2. The Country Policy and Institutional Assessment (CPIA) rates IDA countries, on a 1–6 scale increasing with the quality of governance, against a set of 16 criteria grouped in four clusters: economic management, structural policies, policies for social inclusion and equity, and public sector management and institutions.
3. Initially a 1997 World Bank working paper, then published in the *American Economic Review* in 2000.

Why to Introduce Vulnerability in a PBA?

The allocation of concessional funds involves a trade-off between performance criteria and need criteria, the main difficulty being that those countries with the greatest needs (the poorest and most vulnerable countries) are often countries deemed to be the least performing. To overcome this difficulty and tackle other issues that escape the performance-based allocation (PBA), specific facilities have been added to the basic allocation framework. However, the specific funding windows for countries facing a specific kind of vulnerability (either to climate change or for state fragility, for instance) do not allow for the different degrees of vulnerability to be taken into account, either between countries that are said to be the most vulnerable and benefit from the funds, or between other countries that are also vulnerable to some extent. Specifically, the most vulnerable countries, especially to natural disasters whose recurrence severely limits borrowing and debt capacity, are not always the poorest. Similarly, countries most vulnerable to the effects of climate change or subject to unfavorable regional dynamics (i.e., cross-border terrorism) are not clearly identified through the three indicators of the PBA formula (Performance, GNI pc, Population). A reason why, as noted above, the major development banks have elected to multiply dedicated windows rather than integrate indicators reflecting these new challenges directly into the PBA.

A "Performance and Vulnerability Based Allocation"

A simple and coherent solution, however, is to recognize the structural vulnerability of countries, which does not depend on their current policies, as a criterion for allocating concessional funds. This can avoid resorting to categories of countries that are always debatable, and in no way leads to abandoning the traditional criteria of performance (or governance), which can be improved, and income per capita. Due to many developing countries being hindered by acute and multidimensional vulnerabilities (economic, environmental, social), it has become essential to help them deal with their vulnerabilities in a preventive manner, knowing that almost all of them, albeit in varying forms and degrees, are vulnerable to exogenous shocks and stressors. This would mean moving from a "Performance Based Allocation" to a "Performance and Vulnerability Based Allocation" (PVBA)[4]. In this case, the amount of aid allocated to a country *i* would be a function of, an assessment of public policy and institution (for "performance"), structural vulnerability, besides income per capita and population size, such as:

$$Ai = f\,(\textit{Performance, Vulnerability, Income per capita, Population}).$$

Relying on fair, effective and transparent principles

Taking structural vulnerability into account in the allocation of aid relies on fair, effective and transparent principles. It is equitable because structural vulnerability in its various forms is a handicap for sustainable development and international justice aims at equalizing opportunities between countries. It is also effective, not only because, as recalled above, aid has a higher marginal effectiveness in situations of vulnerability, by helping to cushion shocks, but also and even more because it leads to a preventive treatment of vulnerabilities (enhancing resilience and limiting the higher costs associated to the ex-post handling of shocks). Finally, it is a way to improve the transparency of the allocation rules established in multilateral institutions, where to respond to specific country needs there has been a proliferation of exceptions to the basic rule of performance-based allocation, leading to its lack of transparency in

4. The same principle should guide the ex-post analysis of the selectivity of the various donors in judging the quality of the allocation of their aid between countries according not only to their governance and per capita income, but also to their structural vulnerability.

practice, and to the fact that it is applied only to a limited extent. Taking structural vulnerability into account in a logical and simple framework alongside performance makes it possible to better reward true performance while more equitably considering countries' needs.

And allowing to go beyond per capita income and categories

In the current architecture of development finance, the access to concessional finance is essentially based on the categorization of countries in a dichotomous way, mostly based on a per capita income threshold. However, the complexity of the issues combined with the multiplication of development objectives has led to a proliferation of instruments for which countries are eligible or not, without taking into account in any way the continuous nature and complexity of all the interactions between structural handicaps. Thus, the use of per capita income for eligibility purposes hides a very large heterogeneity in terms of structural vulnerability between countries, notably small island states, which although among the most vulnerable in the world, do not have access to concessional financing or debt relief mechanisms. Taking vulnerability into account not only as a criterion for allocation but also for access to concessional resources (i.e., eligibility) would allow for a more equitable distribution.

A Relevant Vulnerability Index

The challenge: assessing structural vulnerability

If there were to be agreement on the principle that vulnerability combined with low average income justifies relatively more aid and should simultaneously guide allocation between countries, one of the key challenges would be to agree on the best way to measure vulnerability. Such a consensus on an indicator should be possible, provided that its purpose and method are well established, particularly for its use as an allocation criterion. In this context, building an index that could be used for aid allocation is of critical importance.

For that, the needed vulnerability index should meet three specific criteria (Guillaumont and Wagner, 2022), in addition to the usual conditions that any composite indicator must satisfy with respect to the availability and reliability of the data, as well as its clarity and transparency. We briefly recall here these three specific criteria: the index should be multidimensional, universal and structural or separable (i.e., able to isolate structural from non-structural vulnerability).

The index should be truly multidimensional

While there may be a debate about the number and scope of the various dimensions of the vulnerability index, three main dimensions have emerged to ensure an optimal balance between the need for diversity and for simplicity: economic, environmental and social. These three dimensions correspond to three clearly identifiable categories of shock. The key is to avoid redundancy of components and to assess separately the three dimensions identified, keeping in mind they may be interrelated. The three dimensions are to be aggregated in such a way that a high vulnerability in only one dimension is adequately reflected, even if vulnerability appears low in another or the other two. This means that the three dimensions are not perfectly substitutable and that the index must aggregate them accordingly.

A first dimension is *economic vulnerability*, which is the traditional dimension of macroeconomic vulnerability illustrated by the Economic Vulnerability Index (EVI) that has been used since 2000 by the UN Committee for Development Policy as a criterion for identifying LDCs, revised several times, and recently renamed "Environmental and Economic Vulnerability Index" (EEVI), so that it is likely to capture the possible economic impact of various kinds of exogenous shocks (economic, environmental, health, etc.). A second dimension is *environmental vulnerability*, which has to be focused on vulnerability to climate change, because of the major and growing importance of this vulnerability, especially for SIDS, that it is logical and convenient to consider separately, through purely physical indicators, while the impact of other forms of vulnerability due to environment can be captured through the economic and social dimensions. Finally, the third dimension is *social vulnerability,* targeting recurring social shocks and their exposure to these shocks.

The index should be universal

The initial request from the UN General Assembly referred mainly to the vulnerability of small island developing states., with the intent to show the high vulnerability of these countries and to use the index as an argument for special support to them, especially with regard to development financing. For the index to provide such a support, it is necessary that the vulnerability of SIDS can be fairly compared with that of other developing countries, some of which may also be highly vulnerable, albeit in different ways. For this reason, the Commonwealth Secretariat proposed the concept and measurement of a Universal Vulnerability Index (UVI). It is precisely because the index is multidimensional that it should be universal. This leads to re-emphasizing the need to highlight the vulnerability of countries in their specific dimension. When in the MVI the different dimensions are aggregated, more impact will be given to those components that reflect higher vulnerability (thanks to the use of a quadratic average).

The index should be "structural", not including present policy factors

A country's vulnerability depends on the one hand on structural and other exogenous factors, i.e., factors that are beyond the present control of governments, and on the other hand on factors that are linked to their present policies. The vulnerability to be taken into account in order to justify a higher aid allocation (or a preferential treatment such as that given to LDCs) is only that vulnerability which does not result from the weakness of the present policy, which makes this criterion essential for the index to be used for aid allocation.

Disentangling the structural or exogenous factors of vulnerability from those due to current policy is not always easy, but absolutely necessary. The exogenous or structural vulnerability results both from the recurrence of shocks, which reflects their probability, and from the exposure to the shocks, which determines their potential impact and corresponds to structural features inherited from the past. As for resilience, i.e., the ability to cope with shocks, since it itself depends both on structural (or inherited) factors, and on the current policy, to guide allocation only (low) structural resilience must be considered, either within structural vulnerability or alongside it.

Meeting the principles with the "HLPMVI" or a "generic MVI"?

These three essential principles were included in the roadmap given by the President of the General Assembly to the High-level Panel that was established to develop a multidimensional vulnerability index and published its report in February 2024, referred to here as HLPMVI

(High-Level Panel Multidimensional Vulnerability Index) (United Nations, 2024).

The HLPMVI is based on a conceptual framework which captures two pillars or domains of vulnerability:(i) structural vulnerability, linked to a country's exposure to adverse external shocks and stressors, and (ii) (lack of) structural resilience, which is associated with the (lack of) capacity of a country to withstand such shocks. The conceptual framework elaborates the three dimensions (economic, environmental and social) of sustainable development both for structural vulnerability and structural resilience. While this work is an essential reference for researchers and policy makers who are concerned about the structural vulnerability of countries, there does not appear to be a full consensus around the structure, content and country results of the HLPMVI, notably when it comes to the main MDBs. However, as recognized by the UNGA Resolution, the HLPMVI should be seen as a "living tool" from which MDBs can develop their own vulnerability indices better reflecting "as appropriate" their mandates and sensibilities. For this reason, in what follows we use the word MVI in its generic meaning, as an index meeting the three principles underlined above (multidimensionality, universality, and exogeneity or separability), either the HLPMVI or an index "in the spirit of the MVI" specific to each MDB or common to several of them[5][6].

Choice of a Formula

To combine the criteria, in most cases GNI per capita (GNIpc), population size and performance, and derive each country's share in total allocation, the weighted average of the criteria can be arithmetic or geometric. Historically, PBA_i, the country's PBA score is given in most cases by a geometric average[7]:

$$PBAScore_i = Performance_i^{\alpha} \times GNI\,pc_i^{\beta} \times Population_i^{\varepsilon}$$

What in a "PVBA" would give:

$$PVBAScore_i = Performance_i^{\alpha} \times Vulnerability_i^{\delta} \times GNIpc_i^{\beta} \times Population_i^{\varepsilon}$$

The coefficients α, β, δ, and ε represent the weight given to each criterion. The higher the weights the higher impact each criterion has on the country's allocation score. The country's share in total allocation is given by $PBAShare_i = PBAScore_i \,/\, \sum_i PBAScore_i$[8].

With this formula the elasticity of allocation with respect to each criterion (for instance vulnerability) is constant and independent of the level of the other criteria (for instance policy), but the marginal contribution (or partial derivative) of a criterion depends both on the level of the criterion and on the level of the other criteria. (see Guillaumont, Guillaumont Jeanneney and Wagner, 2020). This has important policy implications as explained below.

In fact, it is the balance chosen between the coefficients of the three criteria that drives

5. In several works Ferdi uses an index called FSVI (Ferdi Structural Vulnerability Index), more parsimonious than the HLPMVI and intended to be more consistent with the three principles quoted above, in particular that of exogeneity.
6. Another example of an index trying to meet the three principles it the "Universal Vulnerability Index" of the Commonwealth Secretariat (2022).

7. Or by an arithmetic average $PBAScore_i = (\alpha Performance_i + \beta GNIpc_i) \times Population_i^{\varepsilon}$. While an arithmetic average seems simpler, the geometric one is preferable and closer to the present practices.
8. The PBA generates *relative allocations*: it means that $PBAShare_i$ for country i is not only a function of the three criteria for country i but also of the relative rank of those criteria compared to all other eligible countries.

the allocation. In the context of the PBA, the performance assessment has been given an overwhelming weight historically. However, as noted above, it also led to the introduction of a series of exceptions and special procedures to adapt the PBA and make it workable. We argue that a simpler and more coherent solution would be to recognize the structural vulnerability of countries as an additional criterion for allocating concessional funds. This prevents resorting to categories of countries that are always debatable, and in no way leads to abandoning the traditional criteria of performance (or governance), which can be improved, and income per capita. As stated above, this would mean moving from a "Performance Based Allocation" to a "Performance and Vulnerability Based Allocation" (PVBA) where:

$$A > 0, \delta > 0, \beta < 0 \text{ and } \varepsilon > 0.$$

One of the key questions would then be how to determine the right value for the weight, δ, given to vulnerability in the PVBA. It is obviously a choice of each MDB committed to use a vulnerability index in its PBA.

Another political choice for each MDB will be to determine which of the special windows or arrangements brought into its PBA in order to avoid its shortcomings can be phased-out, for the reasons recalled above (need of transparency and need to differentiate between unequally vulnerable countries). A sensitive issue is in particular the choice of the level of the base allocations (IDA) or minimum allocations (African Development Fund), precisely set up (and increased) to favor small (so vulnerable) countries[9].

9. "Base allocation" is added to the PBA, while the "minimum allocation" replaces the PBA when the PBA results in a lower amount than this minimum.

Responding to Possible Objections

Three main objections are sometimes raised against a reform of the PBA by including an index of vulnerability in the allocation process, and call for answers. These answers may rely both on political arguments and on a proper interpretation of the formula itself.

Does the PVBA imply to weaken performance considerations?

A PVBA allows for relative allocations to be redirected to some extent from least vulnerable to most vulnerable countries. Can it be done without really weakening the role of performance? Of course, the result depends on the average of the value given to the coefficients of the various variables of the formula. More important to note, with the PVBA formula, as it stands, vulnerability and performance reinforce each other: the marginal impact of vulnerability on allocation is higher the higher the level of performance (and the marginal impact of performance.is is higher the higher the level of vulnerability). Moreover, as shown by a simulation of a PVBA for the African Development Fund (see Guillaumont, Guillaumont Jeanneney and Wagner, 2020) it is possible to leave the share of best performers unchanged, by redirecting among best performers (from the less vulnerable to the more vulnerable), and similarly within the share of poor performers. The incentive part of the allocation model is maintained, while it becomes more equitable, and transparent.

Does the PVBA introduce distorted incentives?

Another concern, somewhat linked to the previous one, the moral hazard that would result from the inclusion of a vulnerability indicator in the allocation formula, namely the risk that the recipient countries weaken their effort to lower their vulnerability. This objection is unfounded insofar as the vulnerability index is designed to be independent from the present policies (the principle of exogeneity, as explained above, it is a structural indicator). And to go further and ensure a good coherence of a PVBA formula with regard to vulnerability, we suggest that the performance measurement should itself include an assessment of the quality of the resilience related policies implemented in the country.

Why introducing vulnerability may not be detrimental to low-income countries

A major concern expressed about the reform proposed (initially by the SIDS) is that the addition of the vulnerability criterion will lead to diverting part of the allocation to the benefit of vulnerable middle-income countries and to the detriment of LDCs and LICs. There are two answers to this. One is that the most vulnerable among middle-income countries are very small countries whose allocation can be increased through an improved eligibility without a significant impact on the bulk of other allocations. The other and more important answer is: if the PVBA is applied with the PBA current formulation, the marginal impact of the vulnerability criterion is higher the lower the per capita income. This is in line with the text of the UNGA resolution which emphasizes that the MVI is not a substitute but a complement to the per capita income.

The political economy issue: The pace of reform and its urgency

The difficulty with a reform of the allocation rules is that it may be politically difficult to implement on a constant budget basis, since, while it increases the share of some countries, it decreases that of others. The mobilization of increased resources could politically facilitate a reform of their allocation, so that the resulting decrease in the relative share of some countries may not correspond to an absolute decrease, if it is mitigated by an additional transitionary support provided to the countries concerned. It seems that the time is right to take advantage of the impetus given by the reform of the international architecture and the increase in concessional resources, if it is not threatened in the present context. The reform here proposed may even appear a minor one compared to the unexpected consequences of the ongoing changes in the international architecture of development finance, and a way to increase the role of transparent rules instead of discretionary allocation decisions.

Testing the Impact, a Condition for the Reform

In spite of robust academic work, stakeholders still need to be convinced of the rationale of a reform relying on an appropriate index of structural vulnerability taken into account both for eligibility (to concessional financing) and even more for its allocation between countries. A recent study by FERDI shows that ODA presently allocated by MDBs to individual countries is not significantly correlated to their MVI or a similar index (see Feindouno and Guillaumont 2025a).

The reform is not only desirable, it is also feasible, as shown by the fact that some multilateral development banks, such as the Caribbean one, already use an index in their allocation formula, that the European Union itself has been doing so for a decade, even if not with the best indices, and that at the bilateral level a country like France wishing to set up a list of priority countries has decided to retain the LDCs and a complementary list of vulnerable countries identified mainly through an index close to the MVI (see Feindouno and Guillaumont, 2025b)[10].

The institutions that already use a vulnerability index for allocation purposes and even more those that are invited to do so, may refer to the

10. Other institutions such as the African Development Bank or the Asian Development Bank use a vulnerability index as part of their allocation framework, albeit outside of their main allocation formula, mainly to better target small States.

MVI in a flexible way, as a "living tool" (as stated in the UNGA resolution), according to their objective and mandate, in other words they can only be led to use an index "in the spirit of the MVI", granted it is based on its three fundamental principles: to be multidimensional, universal and exogeneous, i.e., structural.

The issue is therefore now how MDBs that wish to improve their aid allocation criteria can agree to do so by introducing a relevant index of structural vulnerability into their allocation formula, making it a "PVBA" (Performance and Vulnerability Based Allocation). One key issue would be to show through clear and transparent simulations that a PVBA, for which the weights given to performance, vulnerability and income are appropriately balanced, can generate reasonable allocations while putting a more direct, consistent and transparent emphasis on vulnerability in its various dimensions and where it represents a major concern.

The improved framework would help to develop proactive and preventive strategies to assist vulnerable countries cope with external shocks. While ex-post interventions and humanitarian support are important tools, the international strategy to address structural vulnerability must also rely on policies aimed specifically at reducing exposure and improving resilience. A better and more transparent focus on vulnerability would enhance aid effectiveness by supporting countries to address the drivers of vulnerability, to measure related impacts and to strengthen resilience. The PVBA would generate an improved complementarity between the country allocation derived from the formula and additional funds targeting specific issues.

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n° ISSN : 2275-5055

Publication director: Patrick Guillaumont

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March
2025
note brève