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► **To cite this version:**

Patrick Guillaumont. Back to the rationale of a Multidimensional Vulnerability Index (MVI) and its components to enhance its consistency. FERDI Notes brèves / Policy briefs, 2022, Ferdi Notes Brèves, B239. hal-03782737

HAL Id: hal-03782737

<https://hal.science/hal-03782737v1>

Submitted on 21 Sep 2022

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Back to the rationale of a Multidimensional Vulnerability Index (MVI) and its components to enhance its consistency

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The MVI project was born from a UN General Assembly Resolution that gives it legitimacy, conditioned by its economic rationale (see the previous notes prepared for UNDESA-OHRLLS for their support to the work of the High-Level Panel on MVI: Guillaumont, Feindounou, Wagner, 2022; and Guillaumont, 2022).

Lessons from the past: The rationale when a vulnerability index was first introduced as a criterion for the identification of the LDCs

When the Economic Vulnerability Index (EVI) was set up in 2000-2005 by the UN CDP (Committee for Development Policy), its rationale was clear, and its components were discussed and selected with regard to this rationale. The rationale was that of the LDC category itself, identified since its beginning as poor countries facing structural handicaps to economic growth.

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... /... Structural economic vulnerability was then considered as one of the two main structural handicaps to growth, the weakness of human capital being the other one. The literature was giving a strong support to the relevance of these two main structural handicaps (see Guillaumont, 2009)¹. And in the discussion which at the CDP followed the adoption of the principle of the EVI criterion, each component was considered with respect to its link with the rate of economic growth or one of the main growth determinants².

While the (negative) link tested econometrically between each component and the rate of economic growth was unevenly significant, overall there were fairly good reasons to assert the presence of such a link. Of all the components, the instability of exports of goods and services generally had the most significant negative impact on growth. And it was even possible to investigate which measure of instability had the most significant coefficient, thus suggesting how to define the component. It was also true that the higher the export to GDP ratio (i.e. the more open the country is to foreign trade), the more exposed it is to external shocks. But on the other hand, openness to the outside world has long been considered in the literature as the result of a good policy and not as a structural handicap. The correct procedure then was to consider in the export to GDP ratio only what results from structural factors, the first of which is naturally a small population size. It is well established that the long-term economic growth rate, once the influence of other factors known in the literature is controlled for, is a positive function of population size. This is why

in the initial formulation of the EVI by the CDP the smallness of population size was recognised as the first component of the vulnerability index³. The reform of the index in 2011-2012, which consisted of reducing the weight given to population size to include a new environmental criterion, namely the proportion of the population living in low elevated coastal zones/ areas (LECZ), thus paradoxically resulted in a decrease in the relative vulnerability of several small island LDCs, particularly those that were mountainous, such as Vanuatu or Sao Tome and Principe (see Guillaumont, 2014).

The introduction of this LECZ component of vulnerability illustrates the need to have a logical framework to identify the basis of each indicator. Indeed, if we look for a correlation between the share of the population living in low elevated coastal areas (LECZ) and economic growth, it is not negative, but on the contrary positive, since it is in these areas that port activities, and related urban activities are established. It was indeed logical to redefine the category of least developed countries in relation to the objective of sustainable development and not only to economic growth, as well as the vulnerability indicator that serves as a criterion for the category. But this meant that the logical basis for the components was no longer to be found only in their past relationship with economic growth.

► What rationale with respect to climate change?

How then can we identify the logical underpinnings of new environmental components? It is of course necessary to look at the overall framework, where the different dimensions of vulnerability are considered specifically. As we have seen, it is possible to

1. More questionable was the view adopted since the beginning by the CDP, previously named Committee of Development Planning that the two structural handicaps were strictly complementary (facing the two was needed to be included into the LDC category). While this view found some econometric support over the period 1975-2000 (see Guillaumont, 2009), it was not clearly supported when tested over a longer and more recent period (1975-2011) (see Guillaumont (ed), 2019).

2. For instance, "remoteness from the world markets" was designed with respect to its impact on trade as estimated in a gravity model.

3. To better capture the structural factors of openness, an index of remoteness from world markets was also introduced as a component of the EVI, see explanations given in Guillaumont 2009, pp.181-183.

assess the risk that economic growth may be affected by this or that factor that has negatively influenced growth in the past. But the same cannot be said of the risk for sustainable development, in particular vulnerability to climate change, which is still a relatively new phenomenon, the economic effects of which are only gradually being felt. This vulnerability can only be assessed *ex ante*. And estimates of the future consequences of climate change on economic growth or even just on agricultural productivity are highly uncertain and questionable, if only because they depend on the policies that will be implemented and the technologies that will be available.

Therefore, the only reasonable estimate of a country's vulnerability to climate change should be based on the physical manifestations of climate change, which can already be observed or anticipated at the country level (and are likely to have deleterious effects of any kind). This is the approach followed in the construction of Ferdi "Physical Vulnerability to Climate Change Index", the components of which are all main shocks related to climate change or indicators of exposure to these shocks (LE CZ, tendency for increased aridity, intensification of temperature or rainfall shocks, or of cyclones, etc.)⁴.

► The rationale for the components of the third or social dimension

As for the indicators that it is desirable to retain as components of the third dimension (known as the social or socio-political dimension), their legitimacy must be sought in the impact of exogenous events likely to recur on the well-being of populations. As the phenomena of economic instability or manifestations of climate change, both exogenous and recurrent, have already been taken into account in the

two previous dimensions of vulnerability, components are to be identified that are both social in nature, and exogenous. This is the case for recurrent violence within a country, as well as violence at its borders, or global and regional epidemics. Ensuring the rational basis of the components selected for the third dimension of the MVI is important and needed, while this is the dimension where it is most difficult to distinguish between what is the result of the present policy of the state and what is imposed on it because it is inherited from the past or comes from outside, in other words between the *structural fragility* of the state and that which depends solely on its present choices or decisions. Anyway, the structural roots of the socio-political or fragility are well reflected by the growing literature about the "fragility trap" well evidenced by the Commission on State Fragility, Growth and Development (2018).

The components that best correspond to this criterion of social exogeneity are recurrent internal violence, which has been established in the literature as a risk for the future, as well as violence in neighbouring countries, because of the well observed risk of contagion. The same applies to the risk of epidemics: recurrent internal epidemics, as well as the presence of epidemics in neighbouring countries and in those with which the country trades, are exogenous threats to the health of a country's populations.

► The structural grounds of a low resilience

As was clearly established in the Commonwealth report (2021) and in the UN-OHRLS report (2021), vulnerability cannot be estimated without taking into account the weakness of resilience to exogenous shocks. This resilience is based on a series of factors which are largely the same whatever the dimension of vulnerability considered, what should lead to have only one measurement of resilience.

4. See the presentation of the index and the justification of its components in Feindounou S., Guillaumont P., Simonet C. (*Ecological Economics*, 2020).

The components of resilience must then be considered separately from the measurement of each dimension indicator. And they themselves must be separated into components that are structural in nature and components that depend on the current policies of countries.

As for the structural components of resilience, their potential list would be long, but can be reduced to two few synthetic variables whose logical basis is clear and could be supported by multiple references: these might be the level of human capital and the level of per capita income (to which the state of infrastructure is highly correlated and can possibly be added). Not surprisingly, human capital and per capita income are, alongside (structural) vulnerability, the other two criteria for identifying the least developed countries⁵. And both are the components of the Human Development Index (HDI). But it can be reasonably agreed not to include per capita income within the MVI, because MVI has been precisely requested and conceived to capture a development feature differing from income per capita. Another reason is that in many uses of the MVI income per capita will probably stay considered alongside. The basic factors of structural resilience then remain the level of education and health, i.e. the human capital, and possibly, if adequately measured as an exogenous factor, the physical infrastructure.

► **The MVI, with or without structural resilience, in a broader logical framework**

Two conceptual implications can be drawn from above conclusions, allowing the MVI to fit in the framework of the other development metrics progressively set up within the UN, and themselves likely to evolve.

Consider first the Human Development Index HDI (which includes both per capita income and human capital). Adding (negatively) the structural Multidimensional Vulnerability Index (MVI) (without its structural resilience components already included in the HDI) may lead to designing an “index of sustainable human development”. It brings in the essential elements of vulnerability/sustainability, with their three dimensions.

Second, in the process of identification of the LDCs by the CDP, the MVI could be a good candidate to replace the present EVI, again if measured without its structural resilience components, already taken into account in the other Identification criterion that is the Human Assets Index (alongside the GNI per capita). Or, when including its structural resilience components, it may replace both the EVI and the HAI, leading to consider the LDCs as countries both poor (income per capita criterion) and facing a high multidimensional structural vulnerability (MVI criterion).

Finally, if the levels of education, health (and possibly physical infrastructure) are included as components of structural resilience in the measurement of (structural) vulnerability, the resulting MVI indicator itself, considered alongside income per capita, becomes an indicator of (less) sustainable development, or to put it another way, an indicator of the risk of unsustainability of development. or, conversely, an index of less likely sustained development (for reasons beyond the control of present policy)⁶.

In brief, in choosing the components of MVI, it should be kept in mind that the new index could contribute to enhance the visibility and coherence of the concepts put forward within the UN system by UNDESA through the CDP, by the UNDP through the Human Development Office and now by the High-Level Panel on the MVI.

5. As for the logical measure of non-structural or policy weakness in resilience, this raises the general problem of measuring good governance and good policy in the face of shocks, what we do not address here.

6. What we had previously called “least likely to develop index” with reference to the economic vulnerability index alone (Guillaumont, 2009) and could be consistently extended to a multi-dimensional vulnerability indicator (Guillaumont, 2018; 2021).

From a more practical and operational point of view, the MVI is expected to be used for the allocation of concessional funds by institutions which take into account income per capita as a criterion. If they instead use the HDI components (not only income per capita, but also human capital) as allocation criteria, there would be no need to include low structural resilience in the vulnerability measure. When, as most often, they use income per capita, but not human capital, a measurement of the MVI including low structural resilience is needed. In any case, it would be necessary to have the multidimensional structural vulnerability index in two versions, with and without structural resilience.

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n°ISSN: 2275-5055

