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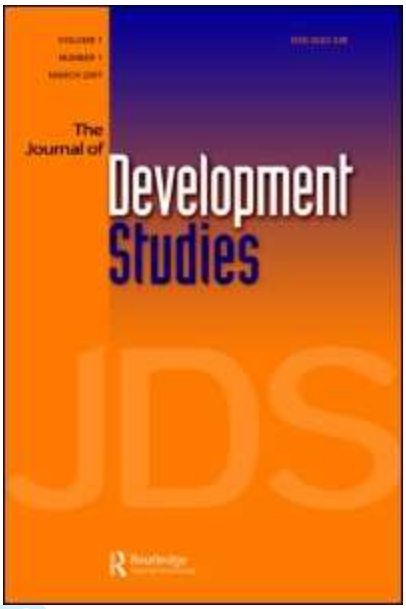

Assessing the Economic Vulnerability of Small Island Developing States and Least Developed Countries

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Assessing the Economic Vulnerability of Small Island Developing States and the Least Developed Countries

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Abstract

Macro vulnerability of the small island developing states (SIDS) as well as of least developed countries (LDCs) has been an increasing concern for the international community. This has led to the design of an economic vulnerability index (EVI) to assess the structural economic vulnerability resulting from natural or external shocks. We first explain how vulnerability affects growth, development and poverty reduction, particularly in small developing countries. We then examine how the EVI has been designed and how it can be used to compare SIDS and LDCs. We argue that EVI is a relevant tool not only for identification of LDCs, but also for geographical aid allocation to favour vulnerable countries, including LDCs and SIDS, even though not all SIDS qualify as LDCs.

I. Introduction

Vulnerability of people in developing countries has been extensively studied at the micro level in the broad framework of poverty analysis. Less attention has been devoted to the analysis of macro economic vulnerability of developing countries, which is often considered as a policy weakness rather than a structural feature resulting from exogenous factors. However in recent years the structural nature of macroeconomic vulnerability has been underlined for two categories of countries, the Least Developed Countries (LDCs) and the Small Island Developing States (SIDS), leading to international policy recommendations.

The aim of this paper is to assess the structural economic vulnerability of these two categories of countries, using an Economic Vulnerability Index (EVI) set up at the United Nations by the Committee for Development Policy (CDP). Relying on recent work on the effects of exogeneous factors on instability, and some of our previous papers on the design of such an index, we explain the rationale of the EVI. Then we use this index, as well as a new retrospective measurement of its value, to compare the levels of vulnerability in LDCs and SIDS and their evolution. We also argue that this index can be used not only for the identification of LDCs, but also, in a complementary manner, as one of the main criteria of aid allocation that makes it useful for SIDS as well as for LDCS.

In the next sections, we consider four successive issues. We first present the source of the concern about macroeconomic vulnerability and the meaning given to this concept. Second, we explain why economic vulnerability matters, particularly in low income small countries. Then we examine how to design an economic vulnerability index for comparing SIDS and LDCs. Finally we draw the main implications of this comparison for international cooperation policy, underlining how the economic vulnerability index can be used both for identifying LDCs and for aid allocation policy.

II. Sources of the concern and semantics

Several reasons account for the fact that during the last fifteen years a renewed interest has been focussed on macroeconomic vulnerability and related issues in developing countries. This interest may have been triggered by highly visible events such as the

sociopolitical problems that have disrupted economic growth in a number of African countries or the financial crises in Asian and other emerging countries. The renewed interest also reflects international concern about the structural characteristics of specific groups of countries, as has been expressed in various UN meetings and resolutions. Two groups of countries thus have been considered with respect to vulnerability. The first, and the only official group, is the category of the *least developed countries* (LDCs), established by the UN General Assembly in 1971. The second — a large and more informal group — is *small island developing states* (SIDS). The need to assess the vulnerability of both country groups through an appropriate indicator has been highlighted, in particular by UN bodies, including the General Assembly. The wish was expressed for an index of vulnerability, either to assess the vulnerability of the SIDS or to identify the LDCs. From 2000, such an index, the *economic vulnerability index* (EVI) has been set up, then refined by the Committee for Development Policy (CDP) to be used as one of the criteria for identifying LDCs (see more details in Guillaumont, 2008 and 2009).

SIDS and LDCs constitute two very different, although overlapping, country groups. At mid 2007, among the 50 LDCs, twelve (24 per cent) are SIDS; three of which have been graduated from the list or are graduating.[1] These twelve countries represent more than 35 per cent of the 37 independent SIDS (there are 52 SIDS when dependent colonies are included). Most of the SIDS countries (85 per cent) do not qualify as low-income; some, in fact, have very high income. Among the LDCs, the majority or 58 per cent (39 countries) are fairly small countries (with population sizes smaller than those of the larger SIDS; Cuba has a population of 11 millions). This also means that 45 per cent [(39-12)/(50-12)] of the LDCs not classified as SIDS are small countries. In brief, the two categories refer to countries that differ significantly in other characteristics but which face, to a large extent, problems associated with small size, in particular high economic vulnerability.

The economic vulnerability of a country can be defined by the risk of a (poor) country seeing its development hampered by the natural or external shocks it faces. Here we consider two main kinds of exogenous shocks as well as two main sources of vulnerability: (i) environmental or 'natural' shocks, such as earthquakes or volcanic eruptions, and the more frequent climatic shocks, such as typhoons and hurricanes,

droughts, floods, etc., and (ii) external (trade- and exchange-related) shocks, such as slumps in external demand, world commodity prices instability (and correlated instability of terms of trade), international fluctuations of interest rates, etc. Other domestic shocks may also be generated by political instability or, more generally, by unforeseen political changes. These shocks, however, are not considered here, as far as they seem less 'exogenous'.

Vulnerability can be seen as the result of three components:

i) the size and frequency of the exogenous *shocks*, either observed (ex post vulnerability) or anticipated (ex ante vulnerability);

ii) *exposure* to shocks;

iii) the capacity to react to shocks, or *resilience*.[2] Resilience depends more on current policy, is more easily reversed, and is less structural. But there may also be a structural element in the resilience component of vulnerability.[3]

Thus, a distinction can be made between *structural vulnerability*, which results from factors that are independent of a country's current political will, and the *vulnerability deriving from policy*, which results from recent choices. For instance, the vulnerability of the Asian countries in the mid-1990s, after the 1997 crisis, is very different from the vulnerability of small economies or that of small islands which export raw materials. It is less structural, more the result of policy, thus more transient. This feature is clearly evident when vulnerability is measured according the probability of a financial crisis that can be estimated mainly from financial and policy variables (see, for instance, Goldstein, Kaminski and Reinhart, 2000). If an index is to be used in selecting certain countries for the allocation of long-term support by the international community, what needs to be measured is naturally the structural vulnerability, which essentially results from the size of the shocks that can arise and the exposure to them.

For the purpose of this paper, another distinction needs to be made between economic vulnerability and *ecological fragility*. The UN's initial concern over vulnerability included both economic vulnerability and ecological fragility, but it quickly became clear that the two notions should be analysed separately. For instance, losses in biodiversity reflect ecological fragility and are not necessarily major elements of economic vulnerability. On the other hand economic vulnerability could be induced by natural factors, that is, by the environment ('the relative susceptibility of economies

to damage caused by natural disasters' UN 1999). Thus, environmentally-induced economic vulnerability can be considered either as economic vulnerability or ecological vulnerability'.[4]

III. Why vulnerability matters, particularly in small countries

This section summarizes the reasons why economic vulnerability may be detrimental to development, particularly in small countries (for a more extensive review, see Guillaumont, 2006, 2009). Here we refer to a dynamic definition of vulnerability—the risk of economic growth being clearly and durably reduced by shocks (or the risk of the long-term average rate of growth being reduced by shocks).[5] It is a handicap to growth. Another somewhat broader dynamic definition is the likelihood of negative and lasting effects of shocks on poverty reduction, either due to their impact on growth or direct effect on poverty. We review the links between vulnerability and growth according to the three main components of vulnerability explained above (shocks, exposure and resilience), and then add some comments on the direct effects on poverty.

III.1. Shocks: the negative impact of instability on growth

Focusing on instability and in particular on 'primary instabilities'

The negative impact of 'one-sided' natural shocks such as earthquakes, typhoons or floods is well recognised. The damage is often huge, first in terms of the number of deaths, and second in the destruction of physical capital, and the debate revolves about the measurement of the size of these losses. But when the shocks are 'two-sided' (up-and-down cycles)—as many, particularly external, shocks are—their overall impact may be less clear. Depending on the measurement method used, the positive and negative shocks tend to equalize. The very nature of instability is a succession of booms and slumps (of export prices, external demand, rainfall, etc.). This is why we consider here mainly the impact of instability rather than the impact of separate shocks. The impact of these successive up-and-down cycles is not neutral. Their impact may result either from an asymmetry of reaction to positive and negative shocks (even their time profile may not be symmetrical) or from the uncertainty generated by previous cycles. Thus, there are both ex post and ex ante effects of instability (as underlined by Gunning

2004). Ex post effects may be easier to evidence than the ex ante ones, as these depend on a perception of risk. Thus, most measures used in cross-section literature rely on ex post concepts.

Two empirical studies offer a test for macro vulnerability, considering the *instability of growth* but without a specific and separate examination of its main sources. One is the well-known study by Ramey and Ramey (1995). They show a significant link between the instability of the rate of economic growth and the average rate of growth itself (testing exogeneity of the instability). But this instability can be due to policy as well as to structural factors, which is why the volatility of growth cannot be an approximate indicator of *structural* vulnerability (cf. infra).[6] Another recent and systematic attempt to assess the link between output volatility and growth is by Hnathovska and Loayza (2004), who present findings of both a higher sensitivity of growth to volatility in low-income countries and a higher impact of volatility over the last two decades than during the previous ones. The authors also show that volatility is more detrimental when institutions are poor (through a multiplicative variable), but do not assess the impact of structural vulnerability as such.[7]

A main source of structural vulnerability in developing countries is *export instability*. Its effects have been examined over the years in the literature with growth regressions. There now seems to be a consensus emerging from several studies to conclude that export instability (or in some studies, terms of trade instability) has a negative effect on growth.[8] More significant effects are noted when the (positive) effect of export growth and the (negative) effect of export instability are tested simultaneously and when the export instability (size of the shocks) is either weighted by the average export to GDP ratio for the period (Guillaumont, 1994; Combes and Guillaumont, 2002) — a ratio which, *ceteris paribus*, is the higher the lower the population size — or is an instability of the export to GDP ratio itself (Dawe, 1996). Thus, the exposure to shocks is taken into account.

The effects of export-earnings instability are not the only kind of instability that have been tested. Several *primary instabilities*, mainly exogenous, have a negative impact on the rate of growth (Guillaumont, Guillaumont Jeanneney and Brun, 1999). This is evident in the instability of the terms of trade, weighted by the average export to GDP ratio, or that of the real value of exports, similarly weighted, and political instability.

The instability of agricultural value added (unweighted) also appears to be a negative factor (Guillaumont and Chauvet, 2001). In a recent study, rainfall variations in African countries during 1981-1999 are also shown to have an impact on growth and on the subsequent likelihood of civil conflict (Miguel, Satyanath and Sergenti, 2004).[9]

Instability channels to growth

The effect on factor productivity is greater than on investment. A large part of the literature on the effects of export instability has been devoted to its effects on savings, and these are ambiguous. Instability may enhance precautionary savings, an assumption mainly relevant for private savings, and dependent on the degree of risk aversion, but also generate ratchet effects mainly on public consumption. It can be a deterrent to private sector investment because of the perception of risk. This is not the case with the public sector, which is often pushed to invest in boom periods, possibly with the help of procyclical borrowing, resulting in higher public indebtedness. Not surprisingly, the net result on the overall rate of investment is ambiguous.

In contrast, the effects of instability on productivity growth are clearly negative and are a disincentive to GDP growth, as evidenced by several studies.[10] In the cross-section growth regressions mentioned earlier, instabilities—either the so-called 'primary instabilities' (Guillaumont, Guillaumont Jeanneney and Brun, 1999) or instability of the rate of growth (Ramey and Ramey, 1995)—essentially reduce the total factor productivity growth rate. In fact, instability of the terms of trade appears to increase, rather than reduce, the rate of investment (Guillaumont, Guillaumont Jeanneney and Brun, 1999) which makes the effect on the growth residual alone stronger than the total effect on growth.

Instability is channelled through intermediate economic instabilities. The primary instabilities (terms of trade, agricultural production, political instability) influence growth through two important intermediate channels, namely, instability of the rate of investment and of relative prices. These two intermediate instabilities have negative effects on growth and are related to policy, which is weakened in this manner by structural vulnerability.

First, instability of the rate of investment is a factor of lower average capital productivity (Guillaumont, Guillaumont Jeanneney and Brun, 1999). As a result of the

declining marginal productivity of investment, the gain in total output from a high level of investment is smaller than the loss resulting from a low investment level. This effect, illustrated during boom periods by projects that are oversized, under-prepared and of limited productiveness, mainly concerns public investment. But it also appears through the negative effects of volatile foreign direct investment (Lensink and Morrissey, 2006). [11]

The second intermediate instability, that is of the relative prices, proxied by the instability of the real effective exchange rate (REER), also appears to have a strong negative effect on the rate of growth. It is assumed to blur market signals and induce a misallocation of investment. This negative effect of the REER instability has been presented in several papers (for example, Aizenman and Marion, 1999; Guillaumont, Guillaumont Jeanneney and Brun, 1999).

Instability of real producer prices—whether due to macro policy resulting from REER instability or the passing of world agricultural prices fluctuations to farmers—is generally considered to be a factor in the lower average agricultural output, noticeably through its effects on the adoption of new techniques.[12] At a macro level, the effects of real producer prices instability on agricultural production growth have also been significantly tested on samples pooling several products in a number of countries.[13]

Thus it seems that external instability induces negative effects through shifts in the rate of investment and in the real exchange rate, either via its impact on public finance when retained at the government level or at the producer level when price fluctuations are passed through to producers.

Primary instabilities are high in both the SIDS and LDCs. Intermediate instabilities are high mainly in LDCs. For both groups the primary instabilities have been relatively high during the past decades in comparison to other developing countries. It seems that these high primary instabilities have been channelled more clearly to (intermediate) investment and real exchange rate instabilities in the LDCs than in the SIDS: whereas similar investment instabilities are observed, real exchange rate instabilities are significantly higher in the LDCs than in other developing countries, and significantly lower in SIDS (again in comparison to other developing countries)[14]. This might be a reflection of the small relative share of non-traded goods in the SIDS, suggesting different channels of transmission for primary instabilities.

Instability is also channelled to growth through political instability. The primary instabilities, and the induced intermediate ones, are a factor in political instability and civil war, and through these events also a significant factor in slower growth. Some studies have examined the economic factors influencing these events, the results of which can be re-interpreted or modified when economic instability is taken into account. A reasonable assumption is that the instability of exports, higher if exports are primary, exacerbates the frustration. When the instability of exports, weighted by the openness rate, is introduced in the Collier and Hoeffler (2004) conflict occurrence model, the coefficient of determination increases significantly, while the share of primary commodities in exports, supposed to reflect the risk of rent-seeking behaviour, becomes insignificant (Guillaumont et al., 2005). Other exogenous shocks may have similar effects on the risk of conflict.

Moreover, political instability, according to several definitions, appears to be higher in the LDCs than in other developing countries, which is not the case for SIDS compared to non-SIDS (Guillaumont, 2009).

III.2. Exposure: major influence of country size

A main structural factor in greater exposure to exogenous shocks is, of course, the smallness of a country. The size of a country can be measured in several ways, the most meaningful of which is the number of inhabitants. In some cases (possibly with regard to natural shocks) area size could be a more relevant measure of the exposure to shock, but for assessing the main economic consequences of the size of a country independently from its income per capita, the most common measure is its population.

The vulnerability issue is confronted with the old and renewed debate on the consequences of the size of nations.[15] Naturally country size has many consequences, not all of them related at first glance to vulnerability, as for example, scale economies in many sectors of activity, industry as well as government (the unit costs of public administration are expected to be higher in smaller countries). However, when investigating the channels through which size matters for development, the links with vulnerability become clear. There are at least three main channels (or intermediate variables) through which small size influences exposure to vulnerability: (i) trade intensity, (ii) government size and (iii) social cohesion.

The first variable—*exposure to external shocks*—is well-reflected by the export to GDP ratio. The smaller the (population) size, the higher (*ceteris paribus*) is the trade to GDP ratio (and the more 'dependent' the economy). Country size is the main structural factor determining the trade to GDP ratio, next are the main determinants of 'natural openness' and the main factor to be neutralized if an index of 'openness policy' is drawn from the observed ratios (Guillaumont, 1994). It is clear that the larger the share of exports in GDP, the greater the impact of a given export shortfall. This is why a better estimation of the impact of export instability (and of export growth as well) is obtained when the export instability variable (as well as export growth) is multiplied by the export to GDP ratio, that is when it is a 'weighted' instability. While natural openness, reflected mainly by smallness, increases exposure to trade shocks and subsequently the negative effect on growth, a policy of openness is not only a positive factor of growth but also of greater resilience (Guillaumont, 1994; Combes and Guillaumont, 2002).[16]

Moreover, the diseconomies of scale associated with smallness result in greater difficulties to diversify at low cost. As a consequence, in adopting protectionist measures, small low-income countries face a higher risk of implementing inefficient or costly policies. For the same reason, a global protectionist trend is likely to be more damaging for small countries. Alesina and Spolaore (2004) test this effect in a cross-section growth regression through a multiplicative variable of the (log of) population and openness. The coefficient of this multiplicative variable is found to be significantly negative, while the coefficient of each of the two variables added independently to the regression is significantly positive.

Another reason why smallness is considered to be a factor of slower growth is its assumed impact on the *size of government*. The assumption of a (negative) relationship between (population) size and the relative size of government activities is successfully tested by Alesina and Spolaore (2004). An interpretation is given by Rodrik (1998) who argues that a high trade-to-GDP ratio (related itself to population size) leads to an extension of the role of the state in efforts to provide more insurance to its citizens. The relationship can also be linked to the stronger effect of public revenue instability on public consumption. If large-scale government activities induce higher costs, this may

again be the source of vulnerability resulting from smallness, and thus likely to hinder growth.

Third, country (population) size may impact on vulnerability and growth through *social cohesion*. Smallness may have the advantage of allowing greater social cohesion, that is less ethnic, linguistic or religious fragmentation. If social fragmentation is a negative growth factor and if fragmentation increases with population size, then smallness is an advantage, not a handicap. It needs to be noted that fragmentation as a handicap is not unrelated to vulnerability: it is assumed to negatively impact on growth because this structural factor influences the exposure or resilience to shocks (Rodrik, 1999). Reality may be more complex, and several studies indicate non-linear relationships where linear ones are assumed. In particular social polarization, rather than social fragmentation, may be a handicap (and a factor of vulnerability) (Arcand, Guillaumont and Guillaumont Jeanneney, 2002). Polarization does not increase with population size, but rather decreases with size (at least beyond a low threshold). Thus smallness may appear to enhance, not lower, vulnerability.

As indicated by several cross-country regressions, when appropriate control variables are used, the (log of) population size is a significant positive factor of growth (Alesina and Spolaore, 2004; Bosworth and Collins, 2003; Milner and Weyman-Jones, 2003) and a negative factor of export instability (Easterly and Kraay, 2000). The observation that smallness hampers growth may be due to higher vulnerability, scale diseconomies or a combination of both.

Other factors of exposure to shocks are to be considered in addition to smallness of population size. These are related to the structure of the economy and the location of the country, as primary economies and remote countries are more exposed to external and natural shocks. The extent of country exposure is examined in the next section. Let us note here that as in the case of smallness, remoteness is a structural handicap not only because it is a factor of vulnerability[17] but also because distance remains an important obstacle to trade in spite of decreased transport costs (Brun, Guillaumont and de Melo, 1999; Brun et al., 2005; Carrère and Schiff, 2004).

III.3. Resilience: policy, human capital and the poverty trap

Policy, shocks and resilience

First, *policy is weakened by structural vulnerability*: overall instability of income transmitted to public revenue is a factor of public deficit and indebtedness, of instability and low productivity of public investment, of real exchange rate instability, etc. The intermediate instabilities are policy variables that transfer primary instabilities to growth. The hypothesis of an impact of structural vulnerability on policy is supported by the inclusion of a vulnerability indicator in a model where the explained variable is a composite indicator of macro policy (Guillaumont and Chauvet, 2001). Also the effect of primary instabilities on political instability was noted above. Primary instabilities can also be expected to impact on the quality of institutions.

Nevertheless, *policy is a major determinant of resilience*. Structural vulnerability has an impact not only on the quality of economic policy, but its direct effects (on growth) also depend on policy. The main factors of *resilience* with regard to shocks are policy and institutions, in other words, the capacity of a country to cope effectively with exogenous shocks. This is why structural vulnerability needs to be distinguished from overall vulnerability, which includes an autonomous policy component essentially through the resilience. Indeed, institutions and policy themselves are influenced by other far-reaching factors, as Acemoglu et al. (2003) argue, in an explanation of their impact on the volatility of growth and the occurrence of crises.

One important policy-related element of resilience is the capacity of a country to maintain an appropriate level of competitiveness. Even if it increases a country's exposure to external shocks—as also small size does but only more significantly (natural openness)—outward-looking policy enhances its resilience. It means that in the growth regressions, the smaller the absolute value of the (negative) coefficient of the (weighted) export or terms of trade instability, the more outward-looking is the policy (Guillaumont, 1994; Combes and Guillaumont, 2002). Thus three effects of a more open trade policy can be identified: the well-known positive effect of the growth of exports, the negative effect of the increased exposure to instability (the export-to-GDP ratio weighting the export instability), and the positive effect of a smaller impact of a

given export instability, which means greater resilience. As argued in the last part of the paper, foreign aid can be another important factor of resilience.

Human capital, resilience and the poverty trap

Another important factor of resilience is the level of human capital. The capacity to react to shocks—whether through appropriate policy, the search for competitiveness, or the adaptation of activities—depends on the level of education and health. It appears that the lower the level of human capital, the higher impact of structural economic vulnerability on growth. In other words, vulnerability and weak human capital reinforce each other (Guillaumont, 2009): this may be considered as the empirical support on the rationale of the LDCs category, which defines low-income countries as being disadvantaged by structural weakness (high vulnerability) and low level of human capital. And because of this compounded handicap, they are likely to be locked in a poverty trap.

This characteristic clearly distinguishes the LDCs from the SIDS. The small size of the SIDS makes them often highly vulnerable, but with better resilience because the level of human capital is on average higher than in the LDCs. In fact, this country group has been able to grow faster and to reach a higher level of income per capita.

More on poverty effects of structural vulnerability

Instability from faltering growth has deleterious consequences on the pace of poverty reduction. Apart from its effects on growth, it also has direct social effects for two reasons. First, there is a feeling of frustration that is generated by income shortfall after a period of a rapid expansion that creates new needs and exaggerated expectations. This is illustrated above by the risk of civil war or crime. The other reason is due to poverty traps, linked to the asymmetry of reactions of health, education, and employment to income fluctuations. Insofar as instability lowers growth, it deters the reduction of poverty normally expected from growth, but in a given average rate of growth also induces an anti-poor bias.

First, *income instability lowers child survival*. Probably the best single indicator of the social development in low-income countries is child mortality under five, made available through demographic and health surveys. Child mortality is a sensitive

indicator, and is likely to reflect the strong asymmetric effect that can be expected from income instability. If a rise in mortality results from an income shortfall, it will not be compensated in future periods with an equal income increase. Also, due to the existence of a lower limit to child mortality, the best functional form, where the dependent variable is expressed as a logit (Grigoriou and Guillaumont, 2003), implies an asymmetry in the up and down effects of income variations for the relevant range of mortality values. From 1980 to 2000, the effect of previous income instability on child survival appears to be significantly negative (Guillaumont, 2006; Guillaumont, Korachais and Subervie, 2008).

Second, *income instability delays poverty reduction*. The macro vulnerability appears as a neglected factor in the cross-country research on the determinants of the level and evolution of poverty. The main concern has been the assessment of the growth and inequality elasticities of poverty,[18] but without a similar concern for the effects of income instability on poverty reduction (Guillaumont, 2006; Guillaumont and Korachais, 2009).[19] A reasonable assumption, however, is that income instability pushes people into a poverty trap (the poor encountering health problems, children leaving school, workers exiting the labour market, etc.) so that a rise in average income has less effect on poverty reduction than a fall in income (see, for instance, de Janvry and Sadoulet 2000 in the context of Latin America). This effect is expected to lower the absolute level of the average growth elasticity of poverty, and/or to increase poverty independently of income growth and inequality change: income instability must then be introduced both additively and multiplicatively with income growth. Measuring poverty change in a sample of multi-year spells and controlling for relevant factors (rate of growth of income per capita, initial level of poverty, etc), we obtain significant coefficients for the impact of income instability on poverty. This effect corresponds to an increase in inequality which is captured only partially by the change in the Gini coefficient (another control variable).[20] It is worth recalling that in addition to this distribution impact, volatility reduces the average rate of growth. Indeed, stability is good for growth, which is also ‘good for the poor’, but stability also makes growth better for the poor. Stability of growth makes it pro-poor.

IV. How the SIDS and the LDCs compare when a structural economic vulnerability index is designed

An indicator is needed to compare the structural vulnerability of LDCs and SIDS. Since the indicator is to be applied to both categories, we use the economic vulnerability index (EVI) which was initially designed and subsequently revised by the CDP.[21] After reviewing the rationale of this choice, we compare the two groups of countries with regard to the shock components of the EVI index, its exposure components, the EVI itself, and finally with respect to resilience elements not included in EVI. To test the significance of the difference we use the non-parametric Wilcoxon test. Whereas comparison of LDCs, as well as of SIDS, to other developing countries is unambiguous, comparisons between LDCs and SIDS raise a specific problem due to the fact that the two categories are partly overlapping. For that reason, the significance of the differences are tested by only comparing the 'LDCs not SIDS' and the 'SIDS not LDCs'. We also consider how the overlapping group of LDCs-SIDS compare to the LDCs not SIDS and to the SIDS not LDCs.

IV.1. Choosing an index: EVI

Here we refer to the present design of the economic vulnerability index (EVI), a composite index set up and applied by the CDP in 2000 as a criterion for the identification of LDCs, at the triennial review of the list of LDCs, and subsequently revised. It was applied in 2003 and 2006 (UN 2000, 2003, 2006). Revisions were made before the two last triennial reviews of the LDCs list (see UN 2005, and the recommendations presented in Guillaumont, 2004a, 2004b, 2006). Thanks to collaboration between the UN DESA and CERDI, a retrospective EVI has been calculated covering three decades according to EVI's last revision in 2006 (Guillaumont, 2007). The results, commented on below, are presented separately from the 2006 review figures (Table 1) and from the retrospective dataset (Tables 2, 3, 4).

The present EVI is a composite index calculated from seven component indices, made up of three shock indices (for external shocks, instability of exports of goods and services; for natural shocks, instability of agricultural production; and a homeless (due to natural disaster) index and four exposure indices (smallness of population size, remoteness, export concentration, share of agriculture, forestry and fisheries). Using an

arithmetic average, equal weight is given to the sum of shock indices and the sum of exposure indices. In the shock indices, equal weight is given to natural and external shocks, while in the exposure indices equal weight is given to population size and to the total of other indices[22]. Naturally, there are several other ways, some possibly more logical, how these component indices can be weighted and averaged (Guillaumont, 2006, 2009), but the arithmetic average has been chosen by the CDP for reasons of simplicity and transparency.

Here we consider a composite index rather than a single one, such as *growth volatility*, commonly used in econometric works. The volatility or instability of the rate of growth of income reflects ex post macro economic instability which depends on exogenous shocks and structural factors of exposure, but also on policy factors, either as a reaction to shocks or as autonomous policy shocks. There is clear empirical evidence of the influence of policy factors on growth volatility (Easterly, Islam and Stiglitz, 2001; Combes et al., 2000)[23], and thus growth rate volatility cannot be considered a good synthetic indicator of structural vulnerability. Moreover if costly insurance or compensatory mechanisms are at work, the negative impact of shocks on growth does not necessarily involve growth instability. Nevertheless, growth volatility, even though showing some decline in the 1990s, is high in the developing countries. And it has been higher in the SIDS as well as in the LDCs compared to other developing countries. It seems however higher in the LDCs than in the SIDS (section 4.5 below)[24].

IV.2. Shocks faced by the LDCs and the SIDS: permanently high

Natural shocks

Climatic and other natural shocks are a main source of vulnerability in many developing countries and these cover a large variety of disasters: earthquakes, typhoons or hurricanes, floods, droughts, insect invasions, etc. An indicator of the risk of natural catastrophes might be the frequency of such events, measured over a long period of time. But as evidenced by the recent Asian tsunami, the most severe and exceptional disaster does not comply with any measurable probability. The potential negative impact of these very different catastrophes differs, even within same type of disaster. Measuring the resulting economic losses in all the developing countries concerned seems impossible. A better approach is to take the number of people affected, if known,

but even then people may be affected with varying severity. Indicators of the average proportion of the population affected can be used specifying the way the population is affected (e.g., killed, displaced).[25] *The percentage of population displaced due to natural disasters (homeless index)* has thus been retained as a component of EVI since 2003 when comparable data became available.

Due to this data problem and to the fact that not all natural shocks (as for instance recurrent droughts in Sahelian countries) are registered as 'disasters', another proxy was needed. The answer was the *instability of agricultural production* measured with regard to its trend value. The trend of agricultural production can be assumed to depend mainly on a country's economic policy and other permanent factors. However, fluctuations around the trend can be hypothesized to be a reflection of the occurrence and severity of natural shocks, because these are likely to affect agricultural production.[26] This is why this indicator was retained as a component of the EVI.

Both in the LDCs and SIDS, the homeless index has been significantly higher than in the other developing countries (for all periods). It has not been significantly higher in the SIDS than in the LDCs in the last two decades, albeit higher over the first one (see Table 3).[27] The agricultural instability index has also been significantly higher in the SIDS than in the LDCs (and all other developing countries as well) only during the first two decades. This implies that the difference between the two country groups with regard to these two indices has decreased, and disappeared during the 1990s.

These previous two measures of natural shocks, which are not correlated, are only complementary proxies of the size of the natural shocks likely to affect growth prospects (likely to be aggregated in a single average level of natural economic shocks). They give a picture of the average size of *past* shocks which is only a proxy of the risk of similar future shocks. The risk of more severe or exceptional natural shocks, such as the December 2004 Asian tsunami, cannot be captured ex ante by any shock-probability index. It can only be reflected ex post in the measures here presented, and is more in the nature of a permanent damage, that is a structural handicap, than a risk. This difficulty suggests that more attention should be given to exposure indices.

Another caveat is needed. Instability indices are related to a trend or an average level. This one, even if predictable to some extent, can also reflect a structural handicap

(for example, lower rainfall levels in Sub-Saharan Africa), but is not retained here as a component of vulnerability.

External shocks

An indicator of *trade shocks* is given by the instability in real export proceeds surrounding the trend. It has to be applied to total exports of goods and services because shocks affect both types of exports, and often service exports in small (developing) countries account for a large part of total receipts. Some private transfers, such as migrant remittances, can also be included. It is assumed that for small countries this instability is structural, resulting from exogenous events such as fluctuations in world prices, in external demand and in domestic events that are not related to policy (for example, climatic shocks). Of course, some fluctuations in the real export values may be a reflection of the instability of policy itself, but it can be assumed that policy has greater influence on the trend than on the fluctuations of exports.[28] However, if we consider the terms of trade, their trend, to a large extent, seems to be beyond the control of the country. When the terms of trade deteriorate (as when the sea level rises), it may be a handicap, without being an (unexpected) shock.

The export-instability indicator, although decreasing in both groups, appears to have been higher in the LDCs than in the SIDS (Table 3).[29] Export instability has become increasingly significantly higher than in other developing countries over the decades in the LDCs (due to a slower decrease), and gradually less in SIDS (due to a faster decrease) so that levels no longer show a difference between the SIDS and other developing countries. According to the figures of the 2006 review of the list of LDCs, a large difference appears between the LDCs not SIDS (51.4) and the SIDS not LDCS (33.5), while the DLCs-SIDS exhibit the highest index (63.6).

As an average result (Table 2), the shock index in the LDCs appears to have become higher in the 1990s, and significantlly, than in the SIDS, what was the opposite in the 1970s, although unsignificantly. For both groups it is respectively higher than in other developing countries, although the difference is only weakly significant for SIDS in the 1990s.

Tables 1-4 about here

IV.3 Exposure to shocks: SIDS and LDCs highly exposed

Four indicators are used to measure the exposure to shocks:

i) Population size (in logs), based on the assumption that small size is a handicap due to vulnerability and other reasons listed above: it is clear that the SIDS, by their very definition, have a small average size, which is also the case with the LDCs, but to a lesser extent: as a result the SIDS not LDCs are significantly smaller than the LDCs not SIDS.

ii) Both in the SIDS and LDCs, the export concentration coefficient (as calculated by UNCTAD) is also higher than in other developing countries, but it has progressively become greater in the LDCs than in the SIDS, while the opposite was true in the 1970s, due to a strong decrease in SIDS, not in LDCs: in 2006 (Table 1) the difference is significant (index value of 52.6 versus 43.9, or, excluding LDCs-SIDS in both groups, 50.6 versus 34.4) .

iii) The share of agriculture, forestry, fisheries is quite higher in LDCs than in other developing countries, higher also in SIDS, but significantly lower in SIDS than in LDCs (due to a larger share of services) (index values of 53.4 versus 27.2 in 2006).

iv) The index of remoteness from world markets (adjusted for landlockedness) has been designed and calculated at CERDI and is used by the CDP for the measurement of EVI. According to Table 4, it has been significantly higher for the LDCs than for other developing countries, but curiously not so for the SIDS as a whole, then higher for the LDCs not SIDS than for the SIDS not LDCs (albeit unsignificantly in 2000-04). This is due not only to the landlockedness adjustment in the index of several LDCs, but also mainly because, while some SIDS are remote (as in the Pacific), many other are not (in the Caribbean). Moreover using a slightly different method of calculation of remoteness, as for 2006 review, cancels any difference between the two groups.[30]

As an average result (Table 2), the exposure index has remained significantly higher in the SIDS than in the LDCs, while it has stayed significantly higher in both groups than in other developing countries.

IV.4. Comparing synthetic indices

We compare the synthetic indices from two datasets: the official dataset of the 2006 review of the CDP list of LDCs (Table 1), and the tentative dataset of the 'retrospective EVI' mentioned above (Table 2). The results between the two datasets do not differ significantly and this allows us to draw a few observations:

- EVI is significantly higher both in the LDCs and in the SIDS compared to the other developing countries;
- the gap between LDCs and not-LDCs is increasing, while the gap between SIDS and not-SIDS is not;
- EVI, which was significantly higher in the SIDS (not LDCs) than in the LDCs (not SIDS) in the 1970s, is no longer so;
- while the exposure index is permanently and significantly higher in the SIDS than in the LDCs, the shock index is increasingly, and now significantly, higher in the LDCs;
- the diminishing gap between the LDCs and the SIDS is due to the shock index, as the gap between the average exposure indices has not changed;
- the SIDS-LDCs evidence a significantly higher EVI than that of the other SIDS and of the other LDCs, due both to shock and exposure indices with regard to other SIDS, essentially and very significantly due to exposure with regard to other LDCs;[31]
- as and when LDCs-SIDS with very high EVI will be graduated, the level of EVI may reappear higher in the SIDS (not LDCs) than in the LDCs (not SIDS).

IV.5. EVI and overall vulnerability: resilience of the SIDS

The previous indicators have been related to *structural vulnerability*, reflecting the size of the shocks and exposure to them. *Overall vulnerability* may also differ as a result of resilience. While we observe a slight (and insignificant) higher structural vulnerability (EVI) in the SIDS than in the LCDs, we do not observe a lower growth instability[32] (a debatable index, as seen above 4.1), but we do find a higher average growth, which have promoted higher levels of GNI per capita in the small island developing states. This higher resilience of the SIDS, as argued in section 3.3, may result from higher

human capital, which constitutes the major difference between the two country groups. The higher resilience can, of course, also be due to better policy reactions, but this fact may still reflect the level of human capital.

V. Some policy implications of the vulnerability assessment

Here we consider two main policy implications of the availability of the EVI. The more direct implication is related to the identification of the LDCs, the purpose for which the index has been created, and specifically the issue of SIDS exiting the LDCs list. The second issue, more indirect and general, is related to the use of EVI as an instrument in the design of aid policies.

V.1. The LDCs graduation issue: SIDS, although vulnerable, primarily concerned

As noted in the introduction, EVI is one of the three criteria used by the Committee for Development Planning for the identification of the LDCs: GNI per capita and the human assets index (HAI), a composite index of health and education indicators, are the two other criteria. For inclusion in the list, a country must be characterized by three complementary criteria: being a low-income country, with a low level of human capital, and high vulnerability. The complementarity between the three criteria is based on the assumption of a combined effect of vulnerability and human capital on growth.

Exit or graduation from the list, and related rules, were introduced only in 1991. These rules have been carefully designed to avoid premature departure from the list, such as countries, after exit, becoming again eligible for inclusion. Margins were imposed between the inclusion and graduation thresholds of the criteria. Exit eligibility is to be confirmed at two successive triennial reviews and, more important, to be eligible for graduation a LDC must show improvement not only in one, but in two of the benchmarks considered for inclusion.

Since the creation of the list in 1991 to 2007, only one country—Botswana—has graduated (1994). The graduation of Cape Verde and Maldives was ratified by the UN General Assembly in December 2004 for implementation three years later, in December 2007. This occurred for Cape Verde but was postponed for another three years for Maldives due to the tsunami. The graduation of Samoa, recommended in 2006 by the

CDP, has also been decided by the General Assembly in December 2007 for an application three years later. Kiribati, Tuvalu and Vanuatu, as well as Equatorial Guinea, were given the first-round eligibility clearance by CDP in 2006, but this needed to be reconfirmed at the 2009 review before any recommendation is made.[33]

It has to be noted that all the LDCs mentioned above as possible graduates are SIDS. They have resisted the recommendation, and resistance by the Maldives, then by Samoa, was particularly strong, based on the argument that these countries are highly vulnerable, as is evidenced by their EVI levels. Following this argument, some potential graduate countries have requested that an LDC could not be made to exit the list until it is no longer (highly) vulnerable, implying that (low) EVI would become a 'compulsory' criterion.

If this happens the asymmetry between the inclusion and exit criteria becomes even deeper. Inclusion is governed by poor ratings in the three benchmarks, and graduation could then be proposed only when there is improvement in all three criteria, instead of just one criterion (which symmetry would involve) or when two criteria no longer apply (present asymmetry). Such a solution would make graduation very unlikely, even for SIDS rated as upper middle-income countries, and this would lead to inequitable treatment of the developing countries.

If certain developing countries have been able to sustainably achieve a significant rate of growth, as well as high levels of human capital, they are not likely to be locked in a poverty trap, as LDCs are assumed to be. Even though they may be vulnerable, their high level of human capital is probably the cause. The vulnerability of these countries, however, is an issue of concern. This is why a smooth transition strategy for graduating countries has been proposed by the CDP and officially adopted by the UN General Assembly. Anyway economic vulnerability should also be considered, through EVI, as a relevant parameter of aid policies.

V.2 Dampening vulnerability by aid: a policy for SIDS as well as LDCs

Back to analytical basis

Although a negative factor of growth, structural vulnerability—sometimes captured only by (exogenous) export instability—has been found to increase the marginal effectiveness of aid (its marginal contribution to growth). The effect is more significant

than that of the quality of institutions and policy, so strongly put forward by Burnside and Dollar (2000) and the World Bank (1998). In other words, aid dampens the negative effects of vulnerability on growth (Guillaumont and Chauvet, 2001; Chauvet and Guillaumont 2004, 2007). These growth regression results are supported by the micro-macro analysis of the determinants of the rate of success of World Bank projects (Guillaumont and Laajaj, 2006). It follows that aid is potentially more effective in vulnerable countries such as the SIDS and the LDCs than in other developing countries.

The current concern about high aid instability (see, for instance Bulir and Hamann, 2003, 2005) is not contradictory with the above findings. First, it is not clear that aid is more often pro-cyclical than contra-cyclical with regard to the main exogenous flows (exports). As already suggested by Lensink and Morrissey (2001), economic vulnerability may be the source of aid instability. Second, either pro-cyclical or contra-cyclical aid may have a stabilizing impact, still with regard to exports, which can be captured by the difference between the export instability and the aid plus export instability. This stabilizing character is a significant factor of growth, confirming the previous results (Chauvet and Guillaumont, 2009).

Moreover, aid, through its stabilizing impact, has a twin effect on poverty reduction. First, it enhances growth, which is a major factor in poverty reduction, and second, it also makes growth more pro-poor by making it more stable (Guillaumont, 2006).

These briefly reviewed findings have three implications for aid policies.

Structural vulnerability (EVI) among the criteria for aid allocation

The first and easiest way to take economic vulnerability into account in the design of aid policies is to consider it as a relevant criterion of aid selectivity. The standard criteria for aid selectivity are the level of poverty (income per capita) and the quality of governance. But these do not include vulnerability, which can be easily added for at least two reasons, and which could lead to significant changes in aid allocation (Amprou, Guillaumont and Guillaumont Jeanneney, 2007). Both the LDCs and SIDS would benefit from the inclusion of a vulnerability measure (Guillaumont, 2008)[34].

First, as we have seen, aid effectiveness is increased by structural vulnerability; if aid is allocated according to vulnerability (among other criteria), its effectiveness will be

increased. This argument is also empirically (seemingly better) grounded than the similar argument used to support retaining governance as a major criterion.

The second reason is equity. If we acknowledge that the goal of aid is to compensate for handicaps in order to promote equal opportunities/chances, then it is also legitimate to retain structural vulnerability—the handicap to growth—as a criterion for aid allocation.

Finally, a practical matter has to be kept in mind. Retaining vulnerability, possibly EVI, as an ex ante aid allocation criterion would lead to the immediate dampening of unforeseen shocks. This may not be as easy with the other modalities now briefly considered.

Aid modalities to use aid as insurance

As these views have been extensively examined in other papers (Guillaumont, 2006; Guillaumont and Guillaumont Jeanneney, 2003), we focus here only on the core arguments (see also Collier et al., 1999; Sarris, 2003; Gilbert and Tabova, 2005). The challenge is to compensate negative shocks quickly and to simultaneously promote good governance, avoiding moral hazard. The solution is to offer automatic compensation once the rules of management (particularly in the case of positive shocks) have been agreed and implemented ex ante. This would combine the delivery of needed resources and the strengthening of ownership, and could be achieved through debt service regulation (increasing or decreasing) in accordance with the development of the terms of trade, or through a special fund for small indebted countries. Links between micro and macro variables need to be checked, to make the insurance scheme effective not only at the macro level, but also for the groups more severely affected by shocks, such as small farmers.

Support to operations aimed at lowering instability and its impact

This is a longer-term issue, as it involves structural transformation. Should its relative importance with respect to the SIDS be re-examined? Certainly not: we have seen, for instance, that the export concentration index has significantly decreased in the SIDS, more than in the LDCs. Any diversification policy has to balance costs and benefits. International support to promote regional integration will lower exposure and increase

resilience in the LDCs as well as in the SIDS. It can thus be a major factor in reducing vulnerability and making growth more sustainable.

VI. Conclusion

Structural economic vulnerability is a matter of concern, particularly for the SIDS and the LDCs, albeit in a different way for each group. Vulnerability can conveniently be captured through the economic vulnerability index (EVI) designed at the UN by the Committee for Development Policy, and its shock and exposure components. This index is a suitable instrument to guide international development policies in two fields.

The first is the identification of LDCs, which are the low-income countries most severely affected by structural handicaps to growth. Economic vulnerability is a major disadvantage that needs to be considered in tandem with a low level of human capital. In order to be considered for inclusion into the LDCs list, in addition to meeting the vulnerability criterion, a country needs to comply with the stipulations of having a low income per capita and a low level of human capital. The graduation rule is not symmetrical. For a country to be eligible to graduation, it should no longer meet not only one but two criteria. Once the income level of a country exceeds the low-income threshold and the country has a relatively high level of human capital, it is then likely to be graduated from the list even though it may still be vulnerable.

The second field where the use of EVI is needed is the geographical allocation of aid. For reasons of effectiveness and equity, structural vulnerability can constitute one of the relevant criteria of aid allocation; its application would favour vulnerable countries, LDCs as well as SIDS, even if the latter do not or do no longer comply with the LDCs qualifications.

In the two country groups, structural vulnerability should seriously be taken into account, but not exclusively. The identification of LDCs cannot rely solely on vulnerability, so that vulnerability cannot be a compulsory criterion for exiting the list of LDCs. Similarly, aid allocation cannot rely on vulnerability only.

Tables

Table 1 - EVI and its component indices compared, for LDCs and SIDS, from LDCs list (2006 review)

Components weights between brackets, under the name of the component

Average	EVI	Exposure index (0.5)	Shock Index (0.5)	Population smallness of (0.25)	Remoteness (0.125)	Share of agriculture, in (0.0625)	Export concentration (0.0625)	Homeless (0.125)	Agricultural instability (0.125)	Instability of exports (0.25)
Developing countries (122)	45.2	48.6	41.8	43.3	70.3	34.1	40.5	55.0	30.7	40.7
Least Developed Countries (50)	53.4	55.0	51.8	46.5	74.1	53.4	52.6	62.9	35.5	54.4
Non Least Developed Countries (72)	39.4	44.1	34.8	41.1	67.7	20.6	32.1	49.5	27.4	31.2
SIDS (31)	56.6	67.6	45.6	80.9	73.2	27.2	43.9	55.9	36.3	45.2
Non SIDS (91)	41.3	42.1	40.4	30.5	69.4	36.4	39.4	54.7	28.8	39.1
LDCS not SIDS (38)	49.7	49.4	50.0	35.1	73.7	56.9	50.6	62.3	34.9	51.4
SIDS not LDCs (19)	51.3	64.3	38.3	79.8	71.7	17.5	34.4	50.2	35.8	33.5
SIDS LDCs (12)	65.0	72.8	57.3	82.5	75.5	42.5	58.9	64.8	37.1	63.6
Wilcoxon-z / pvalue-z										
LDCs / Non LDCs	5.7	3.5	5.7	1.1	1.1	7.0	4.6	2.1	1.9	4.6
	0.000	0.001	0.000	0.262	0.254	0.000	0.000	0.037	0.059	0.000
SIDS / Non SIDS	5.3	6.8	1.5	7.4	0.9	-2.0	1.1	0.6	2.0	1.0
	0.000	0.000	0.126	0.000	0.354	0.040	0.263	0.580	0.047	0.299
SIDS not LDCs / LDCs not SIDS	0.6	4.0	-2.7	5.2	0.0	-5.1	-2.5	-0.8	0.7	-2.4
	0.565	0.000	0.007	0.000	0.973	0.000	0.013	0.397	0.488	0.015
SIDS LDCs/ LDCs not SIDS	3.5	4.5	1.1	4.7	0.7	-1.8	0.7	0.7	0.0	1.1
	0.001	0.000	0.266	0.000	0.510	0.073	0.481	0.510	0.982	0.280
SIDS LDCs / SIDS not LDCs	3.6	2.0	2.9	-0.2	0.8	3.0	2.2	1.3	-0.4	2.2
	0.000	0.043	0.004	0.837	0.405	0.003	0.029	0.208	0.685	0.026

Table 2 - Vulnerability composite indices, from a restrospective dataset

	Ex-post EVI				Shock Index				Exposure index			
	1970-79	1980-89	1990-99	2000-04	1970-79	1980-89	1990-99	2000-04	1970-79	1980-89	1990-99	2000-04
Average												
Developing countries (122)	46.8	44.2	43.5		41.2	40.3	40.6		52.4	48.1	46.3	45.0
Least Developed Countries (50)	52.8	51.6	51.3		46.2	47.8	49.0		59.4	55.5	53.6	51.9
Non Least Developed Countries (72)	42.7	39.0	38.0		37.8	35.0	34.8		47.6	43.1	41.3	40.2
SIDS (31)	59.4	55.7	53.9		50.2	46.8	44.2		68.6	64.7	63.6	63.9
Non SIDS (91)	42.5	40.3	39.9		38.2	38.0	39.4		46.9	42.5	40.4	38.6
LDCs not SIDS (38)	48.5	47.7	48.1		42.2	44.7	47.3		54.8	50.8	48.8	46.5
SIDS not LDCs (19)	54.9	50.5	49.0		44.6	40.0	37.6		65.3	61.1	60.5	60.5
SIDS LDCs (12)	66.5	64.0	61.6		59.0	57.6	54.6		74.0	70.3	68.6	69.1
Wilcoxon-z / pvalue-z												
LDCs / Non LDCs	3.6	4.5	5.6		2.4	3.7	5.2		3.7	3.9	3.8	3.7
	0.000	0.000	0.000		0.015	0.000	0.000		0.000	0.000	0.000	0.000
SIDS / Non SIDS	5.4	4.9	5.2		3.1	2.3	1.5		6.1	6.3	6.5	6.7
	0.000	0.000	0.000		0.002	0.020	0.131		0.000	0.000	0.000	0.000
SIDS not LDCs / LDCs not SIDS	1.9	0.8	0.5		0.6	-0.8	-2.2		3.0	3.3	3.4	3.7
	0.060	0.397	0.648		0.520	0.436	0.025		0.002	0.001	0.001	0.000
SIDS LDCs/ LDCs not SIDS	3.6	3.2	3.5		2.7	1.9	1.2		4.0	4.1	4.3	4.5
	0.000	0.001	0.000		0.006	0.063	0.212		0.000	0.000	0.000	0.000
SIDS LDCs / SIDS not LDCs	2.5	2.6	3.1		2.1	2.2	2.5		2.3	2.4	2.1	2.0
	0.013	0.008	0.002		0.032	0.026	0.013		0.023	0.015	0.032	0.043

Table 3 - Shock component indices, from a retrospective dataset

	Homeless				Agricultural instability				Instability of exports			
	1970-79	1980-89	1990-99	2000-04	1970-79	1980-89	1990-99	2000-04	1970-79	1980-89	1990-99	2000-04
Average												
Developing countries (122)	41.5	41.5	42.9		29.9	30.9	46.1	45.5	46.7	44.3	36.7	33.8
Least Developed Countries (50)	47.9	51.1	50.1		28.5	32.4	48.4	46.1	54.2	53.9	48.8	45.4
Non Least Developed Countries (72)	37.1	34.9	37.9		30.8	29.8	44.5	45.2	41.5	37.7	28.4	25.7
SIDS (31)	57.0	56.0	50.8		35.7	37.7	47.8	45.5	54.0	46.7	39.0	34.8
Non SIDS (91)	36.3	36.6	40.2		27.9	28.5	45.5	45.5	44.3	43.5	36.0	33.5
LDCs not SIDS (38)	41.1	44.6	46.0		28.3	30.8	49.1	47.6	49.7	51.7	47.0	43.5
SIDS not LDCs (19)	49.2	46.0	43.0		39.7	38.0	48.7	48.3	44.7	37.9	29.3	24.3
SIDS LDCs (12)	69.3	71.8	63.3		29.2	37.3	46.4	41.1	68.7	60.7	54.3	51.3
Wilcoxon-z / pvalue-z												
LDCs / Non LDCs	2.0	3.0	2.3		-0.2	0.4	0.8	0.0	2.9	3.3	4.4	4.1
	0.043	0.002	0.021		0.841	0.723	0.447	1.000	0.003	0.001	0.000	0.000
SIDS / Non SIDS	3.7	3.0	1.9		2.3	2.2	0.3	-0.1	2.1	0.8	0.2	-0.1
	0.000	0.003	0.060		0.023	0.026	0.775	0.881	0.036	0.402	0.830	0.955
SIDS not LDCs / LDCs not SIDS	1.7	0.3	-0.1		2.1	1.6	-0.2	0.0	-0.7	-1.7	-2.7	-2.7
	0.084	0.773	0.906		0.037	0.101	0.839	0.986	0.514	0.087	0.006	0.008
SIDS LDCs/ LDCs not SIDS	3.2	2.8	2.1		0.7	0.7	-0.3	-0.8	2.4	1.0	0.6	0.8
	0.002	0.005	0.036		0.510	0.453	0.750	0.440	0.015	0.340	0.525	0.413
SIDS LDCs / SIDS not LDCs	1.7	2.2	1.9		-0.8	-0.1	-0.3	-0.5	2.6	2.1	2.1	2.4
	0.081	0.030	0.056		0.417	0.935	0.792	0.626	0.009	0.032	0.035	0.015

Table 4 - Exposure component indices. from a retrospective dataset

	Population (smallness of)				Remoteness				Share of agriculture etc				Export concentration			
	1970-	1980-	1990-	2000-	1970-	1980-	1990-	2000-	1970-	1980-	1990-	2000-	1970-	1980-	1990-	2000-
Average																
Developing countries (122)	52.6	49.2	46.1	44.1	58.3	54.7	54.3	54.9	45.0	40.7	38.2	34.5	47.5	38.2	39.4	39.4
Least Developed Countries (50)	57.4	53.8	50.2	47.6	65.8	61.8	60.9	60.4	63.2	59.8	57.5	54.2	50.7	45.0	48.5	49.9
Non Least Developed Countries (72)	49.2	46.0	43.2	41.6	53.2	49.8	49.7	51.1	32.4	27.4	24.9	20.8	45.3	33.5	33.1	32.1
SIDS (31)	85.5	84.1	82.5	81.4	56.1	52.3	52.4	56.1	38.3	33.9	31.3	27.4	56.3	42.6	42.9	45.9
Non SIDS (91)	41.3	37.3	33.7	31.4	59.1	55.5	54.9	54.5	47.3	43.0	40.6	36.9	44.5	36.7	38.2	37.2
LDCs not SIDS (38)	47.2	43.1	39.2	36.3	66.5	63.2	62.4	61.0	66.2	63.4	61.0	57.8	50.2	44.1	48.4	46.8
SIDS not LDCs (19)	82.9	81.8	80.8	80.1	51.5	48.8	49.9	54.6	28.7	24.5	21.7	17.7	59.0	39.4	39.1	37.2
SIDS LDCs (12)	89.7	87.7	85.2	83.4	63.5	57.7	56.4	58.4	53.6	48.7	46.5	42.8	52.2	47.6	48.9	59.7
Wilcoxon-z / pvalue-z																
LDCs / Non LDCs	1.5	1.5	1.4	1.2	3.4	3.6	3.7	2.5	6.2	6.9	7.0	7.0	1.3	3.2	4.0	4.1
	0.132	0.130	0.158	0.217	0.001	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.183	0.001	0.000	0.000
SIDS / Non SIDS	7.1	7.2	7.3	7.4	-1.0	-1.3	-0.9	0.6	-1.6	-1.6	-1.7	-2.0	2.8	1.7	1.5	2.1
	0.000	0.000	0.000	0.000	0.294	0.203	0.360	0.551	0.116	0.109	0.083	0.051	0.004	0.094	0.131	0.034
SIDS not LDCs / LDCs not SIDS	4.8	4.9	4.9	5.1	-3.4	-3.6	-3.3	-1.1	-4.7	-5.0	-5.0	-5.1	2.0	-0.9	-1.6	-1.3
	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.271	0.000	0.000	0.000	0.000	0.041	0.388	0.101	0.210
SIDS LDCs/ LDCs not SIDS	4.5	4.6	4.6	4.7	-0.3	-0.7	-0.8	0.1	-1.7	-2.0	-1.8	-1.9	0.2	0.7	0.0	1.6
	0.000	0.000	0.000	0.000	0.785	0.481	0.440	0.946	0.097	0.043	0.069	0.062	0.820	0.467	0.964	0.102
SIDS LDCs / SIDS not LDCs	0.7	0.4	0.1	0.0	2.3	2.1	2.1	1.3	3.0	3.2	3.3	3.1	-1.3	1.1	1.6	2.8
	0.464	0.707	0.934	0.984	0.022	0.040	0.037	0.187	0.003	0.002	0.001	0.002	0.209	0.256	0.114	0.005

Notes

1 According to several decisions of the UN General Assembly, Cape Verde, the Maldives, and Samoa were to be graduated from the list, respectively at end of 2007, as achieved for Cape Verde, and January 2011 or end of 2010 for the two others (see details in Guillaumont, 2008).

2 The concept of resilience is largely used in studies more specifically oriented towards the environmental or natural sources of vulnerability (Kaly et al., 1999). A distinction close to environmental vulnerability is given in Rodrik (1999) who, in looking at the risk of social conflict in countries facing external shocks, separately considers the severity of the shocks, the depth of latent social conflict (likely to increase the impact of the shocks), and the quality of conflict management institutions.

3 Consider, for instance, a small country that is a primary commodity exporter. Its vulnerability to trade shocks results, first, from the world price fluctuations, reflected by the instability of its terms of trade; second, from the exposure to shocks expressed by the ratio of (commodities) export to GDP; and finally, from the capacity of the country to efficiently manage such shocks. The size of the shocks for a small price-taker country (its export price instability) is clearly an exogenous factor of instability. Resilience, or the capacity to manage instability, depends on the policy pursued. Exposure to shocks is more ambiguous: it is mainly a structural factor, but is also dependent, to some extent, on policy and this is all the more evident the longer the period considered.

4 The same ambiguity is evident in the concept of sustainable development which covers both sustainability of economic growth and sustainability of environment since the depletion of natural resources may threaten growth as well as the environment.

5 At first glance *vulnerability* (with regard to growth) may appear simply as the opposite of the *sustainability* of growth, a concept used even more extensively: the more vulnerable a country, the less sustainable its growth, *ceteris paribus*. But the sustainability of growth depends not only (negatively) on the vulnerability to shocks, but also results from other permanent factors, such as the rate of human and physical capital accumulation, and the preservation of natural resources.

6 Without attempting to distinguish between vulnerability resulting from structural factors or from policy sources, Rodrik (1999) also tests a negative influence on the change in the rate of growth between two 15-year periods of a multiplicative index of 'conflict', which multiplies an index of 'shocks' by an index of 'latent social conflict' (the ethnolinguistic fragmentation index or a Gini coefficient of income inequality), then by an index of the quality of conflict management institutions (namely, the lack of democracy or the quality of governmental institutions, as measured by Knack and Keefer 1995). Introduced alternatively, each of these appears highly significant. Rodrik also tests the respective effects of trade 'shocks' and of either an exposure index or an index of the capacity to cope.

7 They check the exogeneity of growth volatility through instrumental, mainly policy, variables.

8 See the review of the literature by Araujo Bonjean, Combes and Combes Motel (1999) and by Guillaumont (2006, 2009).

9 Actually the aim of their paper is to test the impact of negative growth shocks on the likelihood of civil conflict, and rainfall variations are used as an instrumental variable for economic growth.

10 Growth regressions on instability or vulnerability indicators either include or exclude the rate of investment in addition to other control variables. When the rate of investment

(investment to GDP ratio) is included, the coefficients of the instability or vulnerability indices express only their impact on the growth residual, whereas when it is excluded, the coefficient is assumed to assess their total effect, both through the rate of investment and the growth of factor productivity.

11 The instability of foreign direct investment may be considered as a primary instability as well as en intermediate one.

12 Newbery and Stiglitz (1981); see also UN (2001) for a review of studies on the impact of risk on agricultural productivity.

13 See Guillaumont and Combes (1996), Boussard and Gérard (1996), and Subervie (2007) for the effects of real border price instability.

14 For instance, from 1990 to 1999, the median value of real effective exchange rate instability has been 10.5 for LDCs (6.5 for other developing countries) and 5.1 for SIDS (9.4 for other developing countries) (CERDI calculations). Comparative data on primary instabilities can be found in Guillaumont (2009, chapter 6).

15 See recent work by Alesina and Spolaore (2004), Winters and Martins (2004).

16 With regard to natural shocks or disasters, insofar as they generally concern specific groups of the population, the larger the population, the smaller the aggregate exposure: in a large country, climatic shocks are likely to affect only a small part of the population.

17 The relevance of remoteness for vulnerability has been underlined by Encontre (1999).

18 See Adams (2004) for a recent illustration.

19 Guillaumont Jeanneney and Kpodar (2005), however, examine the effects of financial instability on poverty.

20 Consistent with the idea that instability increases inequality, as found by Breen and Garcìa-Peñalosa (2005).

21 There were several attempts earlier to propose a vulnerability index (in particular Briguglio 1995; Atkins, Mazzi and Ramlogan 1998; Crowards 1999), but these were not appropriate for the purpose of LDCs identification, as noted by the CDP (UN 1999). An overview can be found in Briguglio and Kisanga (2004). For a general discussion of the topic, see Guillaumont (2008).

22 Accordingly, weights given to each component are the following: smallness of population size (0.25), remoteness (0.125), export concentration (0.0625), share of agriculture, forestry and fisheries (0.0625), instability of exports of goods and services (0.25), instability of agricultural production (0.125), homeless (due to natural disaster) index (0.125).

23 For instance, Easterly, Islam and Stiglitz (2001) stress the negative effect (up to a point) of financial depth and the positive effect of openness on volatility. More specifically, with regard to the effects of openness, Combes et al. (2000) find that structural vulnerability (depending on structural factors, including population size) makes growth more unstable, whereas outward-looking policy has the opposite effect. Bleaney and Fielding (2002) examine the impact of the exchange rate regime on output volatility in addition to the impact of exogenous factors such as instability in the terms of trade.

24 The relative position of the SIDS and the LDCs has changed over the decades (volatility higher in the SIDS during the 1980s, but the situation reversing in the 1990s).

25 The main source of the data is the Emergency Events Data base, compiled by the Center for Research on Epidemiology of Disaster (CRED) at the School of Public Health, Université Catholique de Louvain, data also given and supplemented in the IRC annual *World Disasters Report*. Based on these data sources, a picture of natural disasters in each of the LDCs can be found in UNDP (2001). A previous use of these data for the measurement of vulnerability is in Atkins, Mazzi and Ramlogan (1998).

26 We use this indicator in several earlier studies (cf. Guillaumont and Guillaumont 1988; Guillaumont, Guillaumont-Jeanneney and Brun 1999).

27 And it is higher in the SIDS-LDCs than in SIDS not LDCs and LDCs not SIDS.

28 The use of instability indices as components of a vulnerability indicator raises measurement problems. Instability is always relative to a reference or trend value. It is measured, for instance, by the average absolute deviation from the reference or trend value, or more commonly, by the variance of this deviation. A critical issue is then the choice of this reference value, in particular the estimation of the trend. A deterministic trend has long been adopted, for instance, in the export-instability literature. This was often inappropriate due to the possible non-stationarity of the series. On the other hand, the series may not be purely stochastic, and the reference value can be conveniently estimated from a 'mixed' function, combining a deterministic element and a stochastic element: this is how instabilities of exports and of agricultural production have been estimated in the EVI and which we retain in the next simulations. Several other measures are used in the empirical literature on issues that concern us. For instance, measurements of growth volatility generally use the standard deviation of the rate of growth (which may not be appropriate when the rate of growth is not stationary). Other works on volatility (in particular, aid volatility considered in the next section) use empirical filters such as the Hodrick-Prescott filter, in which a series is divided into 'cycle' and 'trend' components. In most cases these measures, intended to be internationally comparable, reflect only ex post instabilities, that is, the deviations from a trend observed in the past, but not the risk variable perceived by economic agents, which would involve the specification of a model of anticipations, which could possibly differ among countries.

29 Although not significantly different between LDCs not SIDS and SIDS not LDCs during the first decade.

30 The difference in the methods used to calculate remoteness is essentially the following: for the retrospective EVI remoteness relies on the minimum average distance to reach one third of the world market, while the 2006 review retained one half of the word market. With one half threshold, Pacific Islands appear relatively more remote than with only one third.

31 The slightly higher level of EVI in the low-income countries compared to middle-income ones is due to a somewhat higher shock index, while exposure index is lower (data not reported in the tables).

32 According to data in Guillaumont (2009, chapter 6).

33 At the 2009 triennial review CDP only recommended the graduation of Equatorial Guinea, postponing its decision for Tuvalu and Vanuatu at the next review, and finding Kiribati no longer eligible.

34 Arguments are developed and simulations presented in this paper. Formulae are used that include EVI as an allocation criterion, and at the time take population with a 0.5 exponent and result in giving a higher share both to LDCs and SIDS than with actual allocation or with a formula relying only on the quality of governance and secondarily the level of income per capita, as with the so called "performance based allocation".

References

Acemoglu, D., Johnson S., Robinson J., and Thaicharoen Y. (2003). Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth. *Journal of Monetary Economics*, 50 (1), pp. 49-123.

Adams, Jr., R. H. (2004). Economic Growth, Inequality and Poverty: Estimating the Growth Elasticity of Poverty. *World Development*, 32 (12), pp. 1989-2014.

Aizenman, J., and Marion N. (1999). Volatility and Investment: Interpreting Evidence from Developing Countries. *Economica*, 68 (26), pp. 157-180.

Alesina, A., and Spolaore E. (2004). *The Size of Nations*. Cambridge, MA: MIT Press.

Amprou, J., Guillaumont P. and Guillaumont Jeanneney S. (2007) Aid Selectivity According to Augmented Criteria. *World Economy*, May, pp.733-763.

Araujo Bonjean, C., Combes J.-L. and Combes Motel P. (1999). The Economic Consequences of Export Instability in Developing Countries: A Survey. CERDI Etudes et Documents. Clermont-Ferrand: CERDI.

Arcand, J-L., Guillaumont P. and Guillaumont Jeanneney S. (2002). Ethnicity, Communication, and Growth. CERDI Etudes et Documents. Clermont-Ferrand: CERDI.

Atkins, J., Mazzi S. and Ramlogan C. (1998). A Study of the Vulnerability of Developing and Island States: A Composite Index. London: Commonwealth Secretariat.

Bosworth, B. P., and Collins S. M. (2003). The Empirics of Growth: An Update. *Brookings Papers on Economic Activity*, 2, pp. 113-207.

Boussard, J. M., and Gérard F. (1996). Price Stabilization and Agricultural Supply. In M. Benoit-Cattin, M. Griffon, and P. Guillaumont (eds), *Economics of Agricultural Policies in Developing Countries*, vol. 2. Paris: Edition Revue Française d'Economie, pp. 269-286.

Breen, R., and Garcìa-Peñalosa C. (2005). Income Inequality and Macroeconomic Volatility: An Empirical Investigation. *Review of Development Economics*, 9 (3), pp. 380-398.

Briguglio, L. (1995). Small Island States and their Economic Vulnerabilities. *World Development*, 23 (9), pp. 1615-1632.

Briguglio, L., and Kisanga E. J. (eds) (2004). Vulnerability and Resilience of Small States. Malta: Commonwealth Secretariat and Islands and Small States Institute of the University of Malta.

Brun, J-F., Guillaumont P. and de Melo J. (1999). La distance abolie? Critères et mesures de la mondialisation du commerce extérieur. In A. Bouet and J. Le Cacheux (eds), *Globalisation et politiques économiques: les marges de manoeuvre*. Paris: Economica.

Brun, J-F., Carrere C., Guillaumont P. and de Melo J. (2005). Has Distance Died? Evidence from a Panel Gravity Model. *World Bank Economic Review*, 19 (1), pp. 99-101.

Bulir, A., and Javier Hamann A. (2003). Aid Volatility: An Empirical Assessment. IMF *Staff Papers*, 50 (1), pp. 64-89.

Bulir, A., and Javier Hamann A. (2005). Volatility of Development Aid: From the Frying Pan into the Fire? IMF draft working paper. Washington, DC: IMF.

Burnside, C., and Dollar D. (2000). Aid, Policies and Growth. *American Economic Review*, 90 (4), pp. 847-868.

Carrere, C., and Schiff M. (2004). On the Geography of Trade. World Bank Policy Research Working Paper 3206. Washington, DC: World Bank.

Chauvet, L., and Guillaumont P. (2004). Aid and Growth Revisited: Policy, Economic Vulnerability and Political Instability. In B. Tungodden, N. Stern, and I. Kolstad (eds), *Toward Pro-Poor Policies—Aid, Institutions and Globalization*. Washington, DC: World Bank/Oxford University Press.

Chauvet, L., and Guillaumont P. (2009). Aid, Volatilities and Growth Again. *Review of Development Economics*, August, forthcoming

Collier, P., and Hoeffler A. (2004). Aid, Policy and Growth in Post-Conflict Societies. *European Economic Review*, 48 (5), pp. 1125-1145.

Collier, P., Guillaumont P., S. Guillaumont Jeanneney and Gunning J. (1999). Reforming Stabex. *The World Economy*, 22 (5), pp. 669-682.

Combes, J.-L., and Guillaumont P. (2002). Commodity Price Volatility, Vulnerability and Development. *Development Policy Review*, 20 (1), pp. 25-39.

Combes, J.-L., Guillaumont P., Guillaumont Jeanneney S. and Combes M. (2000). Ouverture sur l'extérieur et instabilité des taux de croissance. *Revue Française d'Economie*, 15 (1), pp. 3-33.

Crowards, T. (1999). An Economic Vulnerability Index for Developing Countries, with Special Reference to the Caribbean: Alternative Methodologies and Provisional Results. Barbados: Caribbean Development Bank.

de Janvry, A., and Sadoulet E. (2000). Growth, Poverty and Inequality in Latin America: A Causal Analysis. *Review of Income and Wealth* , 46 (3), pp. 267-287.

Easterly, W., and Kraay A. (2000). Small States, Small Problems? Income, Growth, and Volatility in Small States. *World Development*, 28 (11, pp. 2013-2027.

Easterly, W., Islam R. and Stiglitz J. (2001). Shaken and Stirred: Explaining Growth Volatility. In B. Pleskovic and N. Stern (eds), Annual Bank Conference on Development Economic. Washington, DC: World Bank, 191-213.

Encontre, P. (1999). The Vulnerability and Resilience of Small Island Developing States in the Context of Globalization. *Natural Resources Forum*, 23, pp. 261-70.

Gilbert, C. L., and Tabova A. (2005). Can We Link Concessional Debt Service to Commodity Prices? GRADE Discussion Paper No. 8. Trento, University of Trento.

Goldstein, M., Kaminski G. L. and C. M. Reinhart (2000). Assessing Financial Vulnerability. An Early Warning System for Emerging Markets. Washington, DC, Institute for International Economics.

Grigoriou, C., and Guillaumont P. (2003). A Dynamic Child Survival Function: Natural Convergence and Economic Policy. CERDI Etudes et documents. Clermont-Ferrand, CERDI.

Guillaumont, P. (1994). Politique d'ouverture, exportation et croissance économique : les effets de la croissance et de l'instabilité des exportations. *Revue d'Économie du Développement*, 1, pp. 91-114.

Guillaumont, P. (2004). A Revised EVI. UN Document CDP/2004/PLEN/16, 31/03/2004. New York, UN.

Guillaumont, P. (2006). Macro Vulnerability in Low-Income Countries and Aid Responses. In F. Bourguignon, B. Pleskovic, and J. van der Gaag (eds), Securing Development in an Unstable World. Proceedings of the Annual Bank Conference on Development Economics, May. Amsterdam. 65-108.

Guillaumont, P. (2007). A Retrospective EVI: Methodologial Aspects. CERDI Etudes et Documents. Clermont-Ferrand, CERDI.

Guillaumont, P. (2008). "Adapting Aid Allocation Criteria to Development Goals", United Nations ECOSOC Development Cooperation Forum, July, and Working Paper FERDI

Guillaumont, P. (2009). *Caught in the Trap. Identifying The Least Developed Countries*. Economica (forthcoming).

Guillaumont, P., and Chauvet L. (2001). Aid and Performance: A Reassessment. *Journal of Development Studies*, 37 (6), pp. 66-92.

Guillaumont, P., and Combes J.-L. (1996). The Effects of Producer Price Trends and Instability on the Growth of Agricultural Exports: A Cross-section Analysis. In M. Benoit-Cattin, M. Griffon and P. Guillaumont (eds), *Economics of Agricultural Policies in Developing Countries*. Paris, Edition de la Revue Française d'Economie, pp. 287-300.

Guillaumont, P., and Guillaumont Jeanneney S. (2003). Dampening Price Shocks. In I. Bannon and P. Collier (eds), *Natural Resources and Violent Conflict*. Washington, DC, World Bank, pp. 353-367.

Guillaumont, P., and Korachais C. (2008). When Unstable, Growth is Less Pro-Poor Growth. CERDI Etudes et documents. Clermont-Ferrand, CERDI.

Guillaumont, P., and Laajaj R. (2006). When Instability Increases the Effectiveness of Aid Projects. World Bank Policy Working Paper 4034. Washington, DC, World Bank.

Guillaumont, P., Guillaumont Jeanneney S. and Brun J. F. (1999). How Instability Lowers African Growth. *Journal of African Economies*, 8 (1), pp. 87-107.

Guillaumont, P., Korachais C. , and Subervie J. (2008). How Macroeconomic Instability Lowers Child Survival. UNU-WIDER Research Paper, 2008/51

Guillaumont, P., Guillaumont Jeanneney S. , Jacquet P., Chauvet L. and Savoye B. (2005). Attenuating through Aid the Vulnerability to Price Shocks. In F. Bourguignon and P. Jacquet (eds), *Economic Integration and Social Responsibility*. Washington, DC, World Bank.

Guillaumont-Jeanneney, S., and Kpodar K. (2005). Financial Development, Financial Instability and Poverty. CSAE WPS/2005-08. Oxford, CSAE, University of Oxford.

Gunning, J. W. (2004). Why Give Aid? Paper presented at the Second AFD-EUDN Conference on Development Aid, Why and How?, 25 November. Paris.

Hnathovska, V., and Loayza N. (2004). Volatility and Growth. World Bank Policy Research Working Paper No. 3184. Washington, DC, World Bank.

Kaly, U., Briguglio L., H. McLeod, Schmall S., C. Pratt and Pal R. (1999). Environmental Vulnerability Index (EVI) to Summarize National Environmental Vulnerability Profiles. SOPAC Technical Report 275.

Lensink, R. and Morrissey O. (2001), Aid Instability as a Measure of Uncertainty and the Positive Impact of Aid on Growth, *The Journal of Development Studies*, Vol. 36, No3, February, pp. 31-49.

Lensink, R. and Morrissey O. (2006) Foreign Direct Investment: Flows, Volatility, and the Impact on Growth. *Review of International Economics*, Vol. 14, No. 3, pp. 478-493, August.

Miguel, E., Satyanath S. , and Sergenti E. (2004). Economic Shocks and Civil Conflict: An Instrumental Variables Approach. *Journal of Political Economy*, 112 (4), pp. 725-753.

Milner, C., and Weyman-Jones T. (2003). Relative National Efficiency and Country Size: Evidence for Developing Countries. *Review of Development Economics*, 7 (1), pp. 1-14.

Newbery, D., and Stiglitz J. (1981). *Theory of Commodity Price Stabilization: A Study in the Economics of Risk.* Oxford, Clarendon Press.

Ramey, G., and Ramey V. (1995). Cross Country Evidence on the Link between Volatility and Growth. *The American Economic Review*, 85 (5), pp. 1138-1151.

Rodrik, D. (1998). Why Do More Open Economies Have Bigger Governments? *Journal of Political Economy*, 106 (5), pp. 997-1032.

Rodrik, D. (1999). Where Did All the Growth Go? External Shocks, Social Conflict and Growth Collapses. *Journal of Economic Growth*, 4 (4), pp. 385-412.

Sarris, A. (2003). Une assurance du prix des matières premières fondée sur le marché pour les pays en développement :vers une nouvelle approche. *Revue d Economie du Développement*, 2003 (1), pp. 5-41.

Subervie, J. (2007). The Impact of World Price Instability on Agricultural Supply According to Macroeconomic Environment. CERDI Etudes et documents. (forthcoming in *Journal of Agricultural Economics*).

United Nations (1999). Vulnerability and Poverty in a Global Economy. Report of the Committee for Development Policy on the First Session. New York, UN.

United Nations (2000). Poverty Amidst Riches: The Need for Change. Report of the Committee for Development Policy on the Second Session. New York, UN.

United Nations (2003). Local Developments and Global Issues. Report of the Committee for Development Policy on the Fifth Session. New York, UN.

United Nations (2006). Overcoming Economic Vulnerability and Creating Employment. Report of the Committee for Development Policy on the Eighth Session. New York, UN.

UNDP (2001). Disaster Profiles of the Least Developed Countries. Third UN Conference on Least Developed Countries, 14-20 May. Brussels.

Winters, L. A., and Martins P. M. G. (2004). When Comparative Advantage is not Enough: Business Costs in Small Remote Economies. *World Trade Review*, 3 (3), pp. 347-83.

World Bank (1998). *Assessing Aid: What Works, What Doesn't and Why*. New York, Oxford University Press.

Acronyms

CDP	Committee for Development Planning (of the UN; later renamed the Committee for Development Policy)
EVI	economic vulnerability index
LDCs	least developed countries
REER	real effective exchange rate
SIDS	small island developing states