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CONCEPTUALISING AND MEASURING ECONOMIC RESILIENCE

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Many small states[1] manage to generate a relatively high GDP per capita compared to other developing countries[2] in spite of their high exposure to external economic shocks. This would seem to suggest that there are factors which may offset the disadvantages associated with such vulnerability. This phenomenon is termed by Briguglio (2003) as the 'Singapore Paradox', referring to the fact that Singapore is highly exposed to external shocks, and yet this island state has managed to register high rates of economic growth and high GNP per capita. This reality can be explained in terms of Singapore's ability to build its economic resilience.

Economic vulnerability is well-documented in the literature from both the conceptual and empirical viewpoints (see for example Briguglio 1995, 2003; Crowards 2000; Atkins et al. 2000). Most studies on economic vulnerability provide empirical evidence that small states, particularly island ones, tend to be more economically vulnerable than other groups of countries, due mostly to a high degree of economic openness and a high degree of export concentration. These lead to exposure to exogenous shocks, which could constitute a disadvantage to economic development by magnifying the element of risk in growth processes. Cordina (2004a, 2004b) shows that increased risk can adversely affect economic growth as the negative effects of downside shocks are larger than those of countervailing effects of positive shocks. The high degree of fluctuation in GDP and in export earnings registered by many small states is considered one of the manifestations of such exposure (see Atkins et al. 2000).

THE 'SINGAPORE' PARADOX

As already explained, the 'Singapore Paradox' refers to the seeming contradiction that a country can be highly vulnerable and yet attain high levels of GDP per capita. Briguglio (2003, 2004) explains this in terms of the juxtaposition of economic vulnerability and economic resilience and proposed a methodological approach in this regard. In this approach, economic vulnerability was confined to inherent permanent or quasi-permanent features, while economic resilience was associated with man-made measures, which enable a country to withstand or bounce back from the negative effects of external shocks. Briguglio refers to this type of resilience as 'nurtured'. Cordina (2004a, 2004b) presents a conceptual application of this approach by showing that saving and capital formation in an economy, in response to a situation of vulnerability, can be important sources of resilience.

On the basis of this distinction, Briguglio (2004) identifies four possible scenarios into which countries may be placed according to their vulnerability and resilience characteristics—described as 'best-case', 'worst-case', 'self-made', and 'prodigal son'.

Countries classified as 'self-made' are those with a high degree of inherent economic vulnerability, but which adopt appropriate policies enabling them to cope with or withstand their vulnerability. They take steps to mitigate their inherent vulnerability by building their economic resilience.

Countries falling within the 'prodigal son' category are those with a relatively low degree of inherent economic vulnerability, but which adopt policies that expose them to the adverse effects of exogenous shocks. The analogy with the prodigal son is that these countries, though 'born in a good family', squander their riches.

The 'best-case' scenario applies to countries that are not inherently highly vulnerable and which at the same time adopt resilience-building policies. On the other hand, the 'worst-case' scenario refers to countries that are inherently highly vulnerable and yet adopt policies that exacerbate that vulnerability.

These four scenarios are depicted in Figure 3.1, where the axes measure inherent economic vulnerability and nurtured resilience, respectively. In this scheme, the best situation in economic terms falls in quadrant II. The vulnerable small island states that have adopted resilience-building policies would fall in quadrant I.

Figure 3.1   The four scenarios
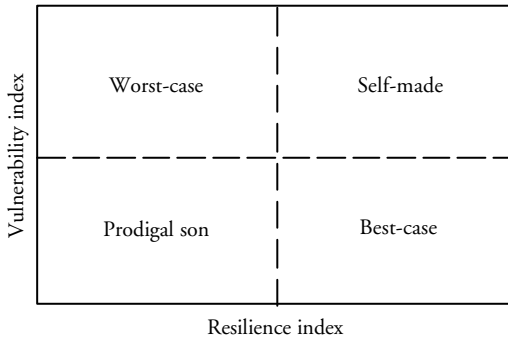
The method of defining vulnerability in terms of inherent features and resilience in terms of policy-induced changes has a number of advantages. First, the vulnerability index would refer to permanent (or quasi-permanent) features over which a country can practically exercise no control and therefore cannot be attributed to bad governance. As such, the index should not differ much over time. In other words, countries scoring highly on the index cannot be accused of inflicting vulnerability on themselves through misguided policy approaches.

Second, the resilience index would refer to what a country can do to mitigate or exacerbate its inherent vulnerability. Scores on this index would, therefore, reflect the appropriateness of policy measures.
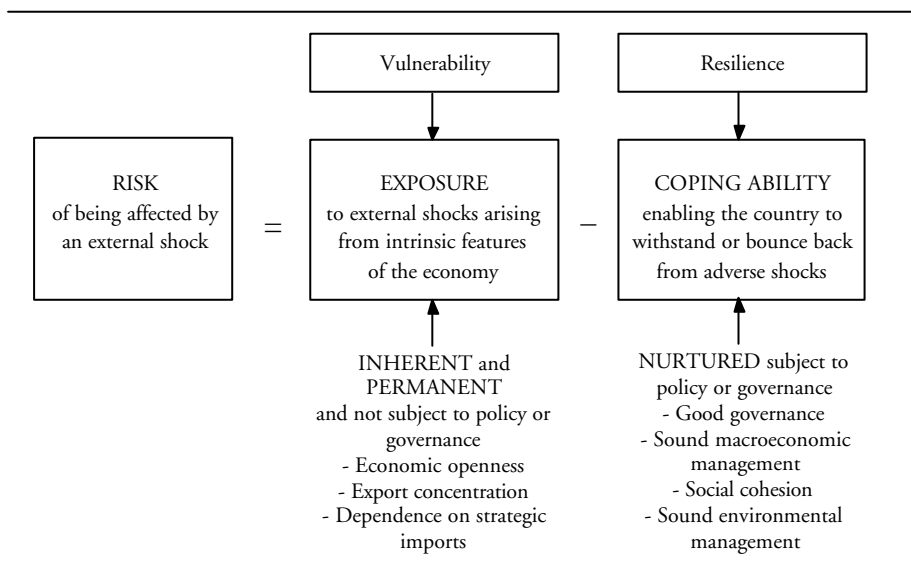
Third, the combination of the two indices would indicate the overall risk of being harmed by external shocks due to inherent vulnerability features counterbalanced to different extents by policy measures.

Given these conditions it is highly unlikely that countries will be able to move vertically on this schema, but they will be able to move horizontally. It would thus be possible for countries to switch between the 'worst case' and the 'self-made' classifications, or the 'prodigal son' and the 'best case' classifications by changing their economic policies.

By distinguishing between inherent economic vulnerability and nurtured economic resilience, it is possible to create a methodological framework for assessing the risk of being affected by external shocks (Figure 3.2).

Figure 3.2 shows that risk has two elements, the first is associated with the inherent conditions of the country that is exposed and the second associated with conditions developed to absorb, cope with, or bounce back from, external shocks. The risk of being adversely affected by the shock is therefore the

Figure 3.2   Risks associated with being adversely affected by external shocks

Vulnerability		Resilience

RISK of being affected by an external shock	=	EXPOSURE to external shocks arising from intrinsic features of the economy	−	COPING ABILITY enabling the country to withstand or bounce back from adverse shocks

INHERENT and PERMANENT
and not subject to policy or governance
- Economic openness
- Export concentration
- Dependence on strategic imports

NURTURED subject to policy or governance
- Good governance
- Sound macroeconomic management
- Social cohesion
- Sound environmental management

combination of the two elements. The negative sign in front of the resilience element indicates that the risk is reduced as resilience builds up.

ECONOMIC VULNERABILITY

Recent work on the economic vulnerability index (see Briguglio 1995, 1997; Briguglio and Galea 2003; Farrugia 2004) is based on the premise that a country's susceptibility to exogenous shocks stems from a number of inherent economic features, including high degrees of economic openness, export concentration and dependence on strategic imports.

Economic openness

Economic openness can be measured as the ratio of international trade to GDP. A high degree of economic openness renders a country susceptible to external economic conditions over which it has no direct control. Economic openness is, to an extent, an inherent feature of an economy, conditioned mainly by a country's ability to produce efficiently the range of goods and services required to satisfy its aggregate demand. If a country's productive base is limited to a narrow range of products, it has to rely on imports to service a substantial part of its needs and on exports to finance its import bill.

It may be argued that openness to international trade is influenced by policy. Practical experience has, however, shown that trade policies tend to influence the composition of a country's external trade flows, rather than their size. It can be further argued that openness to international trade could be a source of strength, in that it may indicate that a country is successfully participating in international markets. This argument, however, does not detract from the fact that, by participating more actively in international trade, a country exposes itself to a larger degree of shocks over which it has relatively little control.[3]

Export concentration

Dependence on a narrow range of exports gives rise to risks associated with lack of diversification, and therefore exacerbates vulnerability associated with economic openness. Again, this condition is to a large extent the result of inherent features in the production base of an economy. Export concentration can be measured by the UNCTAD index of merchandise trade (UNCTAD 2003:section 8), and Briguglio (1997) and Briguglio and Galea (2003) have devised an alternative index which also takes services into account.

Dependence on strategic imports

Another facet of the exposure argument relates to the dependence on strategic imports, which would expose an economy to shocks with regard to the availability and costs of such imports. This variable can be measured as the ratio of the imports of energy, food or industrial supplies to GDP. Again, this condition is inherent in that it depends on country size, resource endowments and possibilities for import-substitution.

All vulnerability indices utilising these variables come to the conclusion that there is a tendency for small states to be more economically vulnerable than other groups of countries.

ECONOMIC RESILIENCE

Economic resilience can be defined in many ways, but here the term is used to refer to the ability to recover from, or adjust to, the negative impacts of external economic shocks.

Usefulness of considering resilience building

The issue of resilience building is important for small states in view of the fact that such states tend to be inherently economically vulnerable, as already

explained. In addition, the discussion on resilience sheds light as to why a number of vulnerable small states have managed to do well economically, in spite of (and not because of) being highly exposed to external shocks. Consideration of resilience building also conveys the message that vulnerable states should not be complacent in the face of their economic vulnerability, but could, and should, adopt policy measures that improve their ability to cope with external shocks.

The meaning of economic resilience

Most dictionaries define resilience in terms of the ability to recover quickly from the effect of an adverse incident. This definition originates from the Latin *resilire* 'to leap back'. In economic literature, the term has been used in at least three senses relating to the ability to recover quickly from a shock, withstand the effect of a shock, and avoid the shock altogether.[4]

Ability of an economy to recover quickly. This is associated with the flexibility of an economy, enabling it to bounce back after being adversely affected by a shock. This ability will be severely limited if, for example, there is a chronic tendency for large fiscal deficits or high rates of unemployment. On the other hand, this ability will be enhanced when the economy possesses discretionary policy tools that it can utilise to counteract the effects of negative shocks, such as a strong fiscal position allowing discretionary expenditure or tax cuts to counter the shocks. This type of resilience is therefore associated with 'shock-counteraction'.

Ability to withstand shocks. This suggests that the adverse effect of a shock can be absorbed or neutered, so that the end effect is zero or negligible. This type of resilience occurs when the economy has in place mechanisms to react endogenously to negative shocks to reduce their effects, which we can refer to as 'shock-absorption'. For example, the existence of a flexible, multi-skilled labour force could act as an instrument of shock absorption, as negative external demand shocks affecting a particular sector of economic activity can be relatively easily met by shifting resources to another sector enjoying stronger demand.

Ability of an economy to avoid shocks. In this chapter, this type of resilience is considered to be inherent, and can be considered the obverse of economic vulnerability.

THE CONSTRUCTION OF A RESILIENCE INDEX

Underlying difficulties

In this section, we present the results of an attempt to construct a composite index of economic resilience. Some words of caution are warranted at this stage. The choice of variables as components of the index is somewhat subjective. Care was taken, however, to base the choice on a set of desirable criteria related to: appropriate coverage, simplicity and ease of comprehension, affordability, suitability for international comparisons and transparency. A more detailed consideration of these criteria is given in Briguglio (2003).

In addition, the summing of the components of the index also involves subjective choices, principally in selecting a weighting procedure. There is considerable debate in the literature on composite indices on this issue. Again, these questions are discussed in Briguglio (2003) and are not elaborated upon here.

The compilation of the index encountered a number of problems with regard to data collection, the most important of which were associated with lack or shortage of data and non-homogenous definitions across countries. Briguglio (2003) considers these problems, referring to the fact that data problems occur particularly in the case of small states.

Components of the resilience index

It is hypothesised that elements of 'shock-absorbing' and 'shock-counteracting' resilience in an economy can be found in the following areas
  * macroeconomic stability
  * microeconomic market efficiency
  * good governance
  * social development.

All of these areas feature variables which are highly influenced by economic policy and which can serve for an economy to build its economic resilience to meet the consequences of adverse shocks.

Macroeconomic stability. Macroeconomic stability relates to the interaction between an economy's aggregate demand and aggregate supply. If aggregate expenditure in an economy moves in equilibrium with aggregate supply, the economy is characterised by internal balance, manifested in a sustainable fiscal position, low price inflation and an unemployment rate close to the natural rate, as well as by external balance, indicated by the international current account position or by the level of external debt. All these variables are highly

influenced by economic policy and can act as good indicators of an economy's resilience in facing adverse shocks.

The macroeconomic stability aspect of the resilience index is thus constructed on the basis of three variables, namely
- the fiscal deficit to GDP ratio
- the sum of the unemployment and inflation rates
- the external debt to GDP ratio.

These variables are available for a set of 102 countries spread over a spectrum of stages of development, size and geographical characteristics. The relative data and country ranking results are presented in Table A3.1.

Fiscal deficit. The government budget position is suitable for inclusion in the resilience index because it is the result of fiscal policy, which is one of the main tools available to government, and indicates resilience of a shock-counteracting nature. This is because a healthy fiscal position allows adjustments to taxation and expenditure policies in the face of adverse shocks. The fiscal deficit, standardised as a ratio to GDP, is thus included in the resilience index proposed in this paper.

Inflation and unemployment. Price inflation and unemployment are also considered suitable indicators of resilience and at the same time they potentially provide information additional to that contained in the fiscal deficit variable. This is because price inflation and unemployment are strongly influenced by other types of economic policy, including monetary and supply-side policies. They are associated with resilience, because if an economy already has high levels of unemployment and inflation, it is likely that adverse shocks will impose significant costs. If, on the other hand, the economy has low levels of inflation and unemployment, it can withstand adverse shocks to these variables without excessive welfare costs. In this sense, therefore, unemployment and inflation indicate resilience of a shock-absorbing nature. The sum of these two variables, also known as the Economic Discomfort Index (or Economic Misery Index), is thus included in the resilience index proposed here.

External debt. The adequacy of external policy may be gauged through the inclusion of the external debt to GDP ratio. This is considered a good measure of resilience because a country with a high level of external debt may find it more difficult to mobilise resources to offset the effects of external shocks. Thus, this variable would indicate resilience of a shock-counteracting nature.[5]

It may be surprising to observe that the United States is not among the first 10 placed in the macroeconomic stability index, although it ranks at a relatively high place in 12th position. A number of small states, on the other hand, notably Hong Kong and Singapore, rank high on the index. In this regard, it should be borne in mind that this index is not a measure of economic development but instead represents the ability of the macroeconomy to absorb or counteract adverse economic shocks.

Microeconomic market efficiency. The science of economics views markets, and their efficient operation through the price mechanism, as the best way to allocate resources in the economy. If markets adjust rapidly to achieve equilibrium, then the effects of shocks can be easily absorbed in the economy and the relative adjustments be readily affected. If, on the other hand, market disequilibria tend to persist, especially in the face of adverse shocks, then resources will not be efficiently allocated in the economy, resulting in welfare costs, manifested, for instance, in outflows of capital, unemployed resources and waste or shortages in the goods markets.

As an example, consider the case of financial markets. If, in the face of an adverse shock, markets respond efficiently by increasing interest rates and decreasing asset prices, capital can be retained in the economy such that the adverse shocks are reflected in price variables rather than in the volume of physical investment, which would have an important influence on economic activity. If, on the other hand, prices in the financial markets fail to adjust properly, then it is more likely that capital will leave the economy in the face of an adverse shock, thereby affecting economic activity and employment. Similar considerations may be made for the way in which the labour and product markets equilibrate in the economy. These issues have important implications for resilience of the shock-absorbing type.

Not many indicators of market efficiency are available for a range of countries sufficiently wide for the purposes of this study. Following a search for suitable indicators, it was decided to use data contained in the *Economic Freedom of the World Index* (2005) published by the Fraser Institute. This is a project which commenced in 1986 led by Professor Milton Friedman, Rose Friedman and Michael Walker, and is aimed at measuring the extent to which markets are operating freely, competitively and efficiently in 126 countries. This index uses quantitative/objective data as well as data from independent surveys, and indirectly attempts to assess the effects of 38 government policies on economic freedom.

The index focuses on five major areas, with indicators relating to the size of government, legal structure and security over property rights, access to sound money, freedom to trade internationally, and regulation of credit, labour and business. For the purposes of the microeconomic efficiency component, the indicators selected is regualtion of credit, labour and business. This is chosen on the basis of their relevance to the resilience concept with regard to market efficiency.

Regulation. This component, which measures regulatory restraints that limit the freedom of exchange in credit, labour and product markets, is made up of fifteen indicators. Regulatory conditions in the domestic credit market, which are measured by assessing the extent to which the banking industry is dominated by private firms, whether foreign banks are permitted to compete in the market, the extent to which credit is supplied to the private sector and whether controls on interest rates interfere with the market in credit, measure the degree of interference by government in the financial market, which could preclude the economy from reacting flexibly to shocks.

Similar considerations apply in the case of the labour market, where unemployment benefits that undermine the incentive to accept employment, dismissal regulations, minimum wages, centralised wage setting, extensions of union contracts to nonparticipating parties and conscription, are viewed as the extent of disincentives to work in an economy, which could preclude work effort from allowing a country to recover from adverse shocks. A country would have a higher market efficiency score if it allows market forces to determine wages and establish conditions of dismissal, avoid excessive unemployment benefits that undermine work incentives, and refrain from the use of conscription.

Like the regulation of credit markets and labour markets, the regulation of business activities may inhibit market efficiency. This sub-component is designed to identify the extent to which regulatory restraints and bureaucratic procedures limit competition and the operation of markets. When regulatory activities retard entry into business and increase the cost of producing products, when prices are not market-determined and when governments use their power to extract financial payments and reward some businesses at the expense of others, they have a crowding-out effect on private sector involvement, and reduce the degree of autonomous resilience which freely-operating markets can produce.

The relative data and country ranking results are presented in Table A3.1. The data used in the index covered 2001 through to 2003. Small vulnerable countries can be found across the entire scale of placing in this index. This

indicates that such countries are adopting different policy approaches in terms of microeconomic efficiency towards meeting adverse shocks.

Good governance. Good governance is essential for an economic system to function properly and hence, to be resilient. Governance relates to issues such as rule of law and property rights. Without mechanisms of this kind in place, it would be relatively easy for adverse shocks to result in economic and social chaos and unrest. Hence the effects of vulnerability would be magnified. On the other hand, good governance can strengthen an economy's resilience.

The *Economic Freedom of the World Index* (2005) has a component which is focused on legal structure and security of property rights. This is considered useful in the context of the present exercise in deriving an index of good governance. The index covers the following indicators
  • judicial independence
  • impartiality of courts
  • the protection of intellectual property rights
  • military interference in the rule of law
  • political system and the integrity of the legal system.
The relative data and country ranking results for the years 2001–2003 are presented in Table A3.1. The highest rankings on the governance index are the more economically advanced countries, with the first five placings occupied by major industrialised economies. Singapore, which was among the most resilient economies on economic criteria, ranks fifteenth in terms of governance. Vulnerable economies tend to obtain lower rankings on this count, but it still appears to be the case that the vulnerable economies enjoying a higher per capita GDP also tend to have better systems of governance.

Social development. Social development is another essential component of economic resilience. This factor indicates the extent to which social relations in a society are properly developed, enabling an effective functioning of the economic apparatus without the hindrance of civil unrest. Social cohesion can also indicate the extent to which effective social dialogue takes place in an economy, which would in turn enable collaborative approaches to undertaking corrective measures in the face of adverse shocks. It is therefore hypothesised that social development is directly related to social cohesion—although this assertion cannot be tested empirically due to lack of data.

Social development in a country can be measured in a number of ways. Variables relating to income such as its dispersion and the proportion of the population living in poverty, the long term unemployment rate, the proportion of the population with low skills and inadequate employment prospects, and the proportion of the population with low levels of education could be useful indicators. Still another possible approach would be to measure the number and extent of instances of industrial or civil unrest. These approaches are interesting but rather narrow in scope and very difficult to measure across countries.

The index presented in this paper utilises the education and health indicators used to construct the Human Development Index (UNDP 2002, 2003, 2004).

Education. Education, as measured by the adult literacy rate and school enrolment ratios, is considered to be a good indicator of social development. Education is considered to be strongly positively correlated with social advancement and hence, is indicative of a social fabric which is conducive to economic resilience.

Health. Life expectancy at birth, which is the health indicator in the Human Development Index, is considered to be suitable for measuring the health aspects in society. This in turn is likely to be related to medical facilities, housing and degree of proneness to accident or risk of injury. Again, high life expectancy is considered to be conducive to economic resilience.

The relative data and country ranking results for 2000–02 are presented in Table A3.1. The social development index is very strongly correlated with the degree of economic development, with the countries in the first 20 places on the index having an annual per capita GDP of at least US$11,500. Small island states, including those with a high per capita GDP, rank from the twenty-fifth position downwards.

Correlation between the components of the index. The variables discussed above have been found to be positively related to each other, as shown in Table 3.1, but the correlation is somewhat weak, with the exception of good governance and market efficiency.

The question arises therefore as to whether or not the good governance index is redundant, given its high correlation with good governance. As the

correlation is not unduly high, it was decided to retain all components in the composite index.

Other determinants of economic resilience. Economic resilience can also be viewed to be determined by a plethora of other factors apart from those mentioned above. It may be argued, for example, that it could be useful to consider the effects of environmental management on economic resilience. The environment can be an important source of vulnerability by giving rise to shocks of an adverse nature, be they rapid events, such as earthquakes, or in the form of a gradual degradation over time. In turn, these would have important repercussions on the economy and society. In this regard, the efforts being undertaken to compile the Environmental Sustainability Index (Esty et al. 2005) are commendable. Data on these factors are however not readily and extensively available across countries of different sizes,[6] such that the utilisation of this index within the present exercise would have significantly reduced the countries covered by the resilience index.

In addition, there is the possibility that incorporating an environmental management index could lead to the problem of redundancy. That is, using indicators that are highly correlated which would add no new information but would render the procedure unnecessarily complex. In the case of environmental management factors, the socioeconomic resilience aspects covered by the variables discussed above are likely to be highly correlated with environmental management, although in the absence of data, this assertion cannot be tested.

The resilience index

The index was computed by taking a simple average of the four components just described, namely
  • macroeconomic stability
  • microeconomic market efficiency
  • good governance
  • social development.

Table 3.1   Correlation matrix

Macroeconomic stability	1			
Market efficiency	0.177526	1		
Good governance	0.284266	0.673311	1	
Social development	0.214263	0.385542	0.664492	1

All observations of the components were standardised using the well-known transformation

$$XSij = (Xij - Minj) / (Maxj - Minj)$$

where *XSij* is the value of the standardised observation *i* of variable *j*; *Xij* is the actual value of the same observation; *Minj* and *Maxj* are the minimum and maximum values of variable *j*. This transforms the values of observations in a particular variable array so that they take a range of values from 0 to 1. The results of the averaging of the four components are shown in Appendix 1. The results show that the countries with the highest GDP per capita, are, as expected, those with the highest resilience scores, as shown in Figure 3.3.

The relation between GDP per capita, resilience and vulnerability. An interesting finding is that GDP per capita of the different countries is to a very high extent explained by vulnerability and resilience. Using the OLS (ordinary least squares) method of regression, GDP per capita (standardised as explained above) was regressed on the vulnerability index (as proposed in Briguglio and Galea 2003: See Table 3A.3) and on the resilience index produced in this study. The results are shown in Table 3.2. All variables have been standardised as explained above, so that their values range between 0 and 1.

This result confirms the hypothesis in Briguglio (2004) and Cordina (2004a, 2004b) that the performance of countries depends on their inherent vulnerability and their nurtured resilience. This is not an extraordinary finding, because it validates a very plausible assumption. However the results of the

Figure 3.3   Per capita GDP and economic resilience
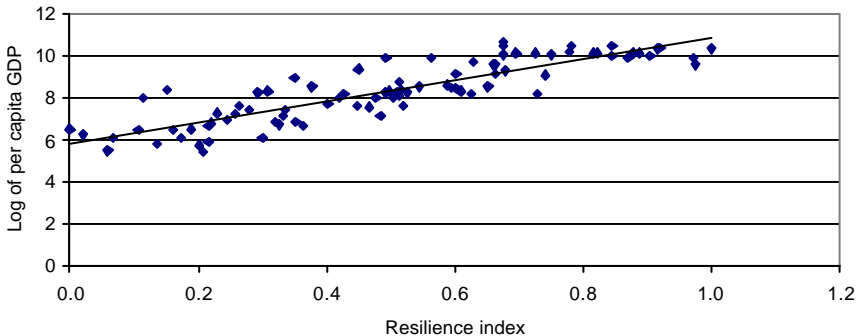
regression exercise have some interesting implications. In particular, the results show that the economic well-being of nations is more dependent on man-made policies rather than on inherent vulnerabilities. The results also confirm that adequate policy approaches can be used to overcome the handicaps posed by vulnerability.

The scenarios

Going back to the scenarios proposed in Figure 3.1, it is possible to place the countries included in the index in the four quadrants shown, using the resilience index proposed in this paper and the vulnerability index presented by Briguglio and Galea (2003). The results are shown in Figure 3.4.

It should be pointed out here that the cut-off values (represented by the dashed lines in Figure 3.4) chosen for the quadrants are the averages of the vulnerability and resilience scores for all countries. This decision is subjective and the classification of countries will change if different cut-off points are chosen. Consequently it was decided to allow a 'border-line' margin of +/-5 per cent for the resilience index (shown by the semi-transparent rectangle) and countries falling within this margin are classified as 'borderline' cases.

Table A3.2 shows which countries have been classified within the different quadrants.

The overall tendencies that can be derived from Table A3.2 are that
- countries which fall in the 'best-case' quadrant include the relatively large countries with a relatively high GDP per capita and relatively low vulnerability scores.
- countries which fall in the 'self-made' quadrant include a number of small states with a high vulnerability score.
- countries which fall in the 'prodigal son' quadrant include relatively large countries and others with a low resilience score.

Table 3.2   Regression results

G =   0.14 + 0.94R − 0.13V
T stats   (3.4)   (16.8)   −(2.6)

$R^2 = 0.77$
N= 87

Where: G=GDP per capita; R=Resilience Index; and V=Vulnerability Index

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- countries which fall in the 'worst case' quadrant include some small countries with relatively high vulnerability and low resilience scores.

THE USES OF THE RESILIENCE INDEX

Supporting decision-making, setting targets and establishing standards

Decision-making by the government and other authorities should lead to action which is systematic and coherent and based on transparent information. The Resilience Index may also be used to set the direction of action and to justify certain priorities. The index could also be useful for setting targets. For example, a country with low resilience scores in certain economic areas may set targets to step up its resilience with regard to that economic variable.

Monitoring and evaluating developments

Indices are of utmost importance to assess whether a given policy or decision is yielding the desired results and to assess whether changes of direction are needed. This is especially so if measured over time. In this way, decisions are not at risk of being taken blindly or based only on hunches and feelings, but would be based on scientific information presented in index format.

Figure 3.4   Economic resilience and economic vulnerability
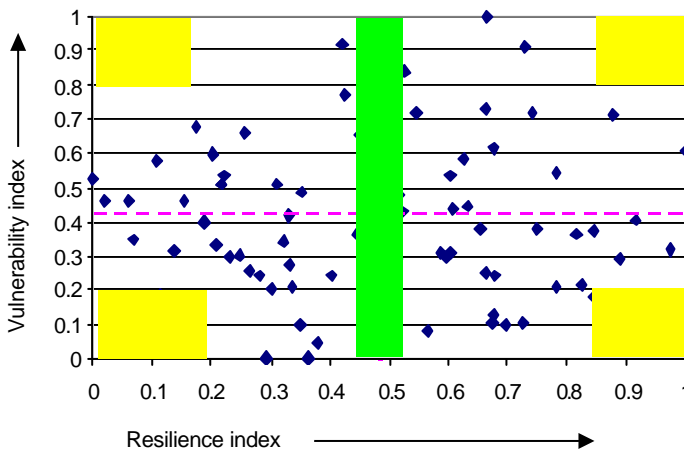
Deriving quantitative estimates

An index summarises complex phenomena, often yielding a single-value measure of the phenomenon under consideration. This is useful, if not essential, for donor countries and organisations when making decisions regarding the allocation of financial and technical assistance, or for assigning special status to vulnerable countries.

Dissemination of information and drawing attention to the issue

The resilience index can be used to make the public more aware of certain problems, and to give high profiles to certain trends that can strengthen resilience. In this regard, indices can be used for communication and for alerting stakeholders about issues, including dangers, failures and success stories.

An index is a very good instrument for drawing attention to the issue being investigated. Thus, for example, the exercise of computing an index of resilience may itself make decision-makers aware of the gravity of these problems. Such an exercise may also generate academic discussion and enhance awareness amongst scholars on the issues involved.

Focusing the discussion

Indices can help to develop a common language for discussion. One often finds that persons engaged in debate go off at tangents because of lack of common definitions. In the case of indices, the quantification of its components requires precise definitions, and this could help focus the discussion on matters directly relevant to the issue.

Promoting the idea of integrated action

Composite indices are generally constructed to measure multifaceted realities. This could help to foster an awareness of the interconnections between the components of the index. In the case of economic resilience, for example, it is often not enough, and may even be counterproductive, to take action in one area in isolation from others. The resilience index proposed here could therefore promote the need for an integrated action in this regard.

CONCLUSION

This chapter dealt with conceptual and methodological aspects associated with economic resilience and its measurement. The index developed here covers four areas of economic resilience; namely, macroeconomic stability,

microeconomic market efficiency, governance and social cohesion. Each of these areas contains variables considered suitable for gauging the extent to which the policy framework is conducive to absorbing and counteracting the effects of economic shocks.

The results of this exercise can provide an explanation as to why inherently vulnerable countries may register high levels of GNP per capita. It is argued that countries may be economically successful because they are inherently not vulnerable, or because they are resilient in the face of potential vulnerability. The obverse is also true, in that countries may be unsuccessful because they are not sufficiently resilient.

The chapter has also shown that GDP per capita is positively related to economic resilience and negatively related to inherent economic vulnerability. Furthermore, per capita GDP is found to be more sensitive to resilience than to vulnerability.

The index produced in this study is very preliminary, and the work should be considered as still at an early stage of development.

NOTES

[1]   In this study, the words 'state' and 'country' are used synonymously. There is no generally agreed definition as to which variable should be used to measure the size of countries and as to what should be the cut-off point between a small country and other countries. Generally speaking, population is used as an indicator of size. In this study, a country with a population of 1.5 million or less is considered to be a small one.

[2]   This finding is reported in many studies. See, for example, Briguglio (1995).

[3]   Farrugia (2004) elaborated further on these ideas by considering the economic strength of trading partners as a proxy for the probability of shocks to exports.

[4]   An analogy relating to an attack of influenza virus may help explain the three senses in which the term 'resilience' has been used. A person exposed to the virus may (a) get infected but recovers quickly; (b) withstand the effect of the virus, possibly by being immunised; and (c) avoid the virus altogether by staying away from infection sources.

[5]   It is, however, to be stated that certain countries may have external debt not because of a weak policy framework but due to a highly-developed international financial activity. This is a recognised weakness in the use of this indicator. However the inclusion of other variables related to market efficiency and governance would to an extent 'correct' this weakness, since these variables either exacerbate the effect of external debt in the presence of a weak policy framework or counteract it otherwise.

[6]   Esty et al. (2005) do produce some results for a few small states but they were reluctant to include them in the Environmental Sustainability Index.

Table A3.1   Data country and ranking results

Country	Macroecon. stability	Microecon. market efficiency	Social development	Good governance	Resilience index	Country ranking
Albania	0.249866	0.386534	0.765396	0.411278	0.453268	63
Argentina	0.533841	0.258845	0.868035	0.226565	0.471822	59
Australia	0.471526	0.80043	0.98827	0.970713	0.807735	9
Austria	0.692709	0.531446	0.956012	0.927846	0.777003	12
Bangladesh	0.635215	0.304511	0.222874	0.17407	0.334168	81
Barbados	0.631647	0.626714	0.914956	0.721573	0.723723	17
Belgium	0.661383	0.474074	0.982405	0.799757	0.729405	16
Belize	0.186241	0.670694	0.753666	0.607275	0.554469	49
Bolivia	0.46827	0.360133	0.618768	0.173626	0.405199	70
Brazil	0.388055	0.209704	0.721408	0.423359	0.435631	66
Cameroon	0.443272	0.451458	0.231672	0.343852	0.367563	77
Canada	0.632888	0.797511	0.97654	0.910253	0.829298	6
Chile	0.635734	0.561847	0.859238	0.610715	0.666883	28
China	0.653449	0.094953	0.703812	0.468426	0.48016	57
Colombia	0.417252	0.272723	0.753666	0.219628	0.415817	68
Costa Rica	0.608614	0.469847	0.853372	0.623045	0.63872	31
Cote d'Ivoire	0.421575	0.327188	0	0.236807	0.246392	87
Croatia	0.524189	0.516349	0.824047	0.450516	0.578775	40
Cyprus	0.360269	0.406994	0.88563	0.687058	0.584988	38
Czech Republic	0.570785	0.444326	0.856305	0.630779	0.625549	35
Denmark	0.716137	0.682179	0.944282	1	0.83565	5
Dominican Republic	0.656766	0.469506	0.653959	0.304935	0.521291	53
Egypt, Arab Rep.	0.587887	0.150975	0.504399	0.403256	0.411629	69
El Salvador	0.655256	0.484604	0.645161	0.351327	0.534087	52
Estonia	0.634994	0.705067	0.85044	0.673152	0.715913	18
Finland	0.638404	0.670794	0.970674	0.996864	0.819184	7
France	0.49435	0.525839	0.961877	0.743736	0.68145	23
Germany	0.550882	0.348942	0.947214	0.931598	0.694659	20
Greece	0.376219	0.289183	0.929619	0.550436	0.536364	51
Honduras	0.425194	0.38848	0.583578	0.1569	0.388538	72
Hong Kong, China	0.649945	1	0.865103	0.730719	0.811442	8
Hungary	0.435458	0.598013	0.829912	0.656447	0.629957	34
Iceland	0.722204	0.911862	0.967742	0.960131	0.890485	1
India	0.501144	0.309005	0.395894	0.555138	0.440295	65
Indonesia	0.419976	0.06043	0.633431	0.285343	0.349795	79
Iran, Islamic Rep.	0.594709	0	0.630499	0.555373	0.445145	64
Ireland	0.748274	0.631891	0.926686	0.854979	0.790458	11
Israel	0.598613	0.348255	0.932551	0.729831	0.652313	29
Italy	0.563878	0.27718	0.929619	0.668735	0.609853	36
Jamaica	0.403985	0.412831	0.782991	0.467962	0.516942	54
Japan	0.473191	0.530351	0.973607	0.74548	0.680657	24
Jordan	0.388433	0.480286	0.727273	0.637369	0.55834	48
Kenya	0.48918	0.470737	0.29912	0.282871	0.385477	74

Country	Macroecon. stability	Microecon. market efficiency	Social development	Good governance	Resilience index	Country ranking
Kuwait	0.578993	0.655568	0.747801	0.705003	0.671841	27
Latvia	0.522574	0.489853	0.824047	0.554741	0.597804	37
Lithuania	0.548288	0.39104	0.847507	0.470706	0.564385	46
Luxembourg	0.169854	0.751959	0.894428	0.910095	0.681584	22
Madagascar	0.362156	0.266086	0.255132	0.25639	0.284941	85
Malaysia	0.731697	0.493283	0.747801	0.624907	0.649422	30
Malta	0.484228	0.631271	0.870968	0.70835	0.673704	25
Mauritius	0.601564	0.370945	0.70088	0.624736	0.574531	43
Mexico	0.606521	0.281145	0.777126	0.294478	0.489818	56
Morocco	0.495981	0.372758	0.404692	0.566488	0.45998	61
Nepal	0.4917	0.457864	0.260997	0.309663	0.380056	75
Netherlands	0.482792	0.65624	0.979472	0.971333	0.772459	13
New Zealand	0.690428	0.882142	0.973607	0.950714	0.874223	2
Nicaragua	0.023774	0.48574	0.565982	0.18658	0.315519	83
Nigeria	0.471854	0.508743	0.231672	0.219478	0.357937	78
Norway	0.556971	0.549727	0.982405	0.909665	0.749692	14
Pakistan	0.394713	0.414384	0.205279	0.148316	0.290673	84
Panama	0.582466	0.536143	0.806452	0.384237	0.577324	42
Papua New Guinea	0.508531	0.433815	0.290323	0.310375	0.385761	73
Paraguay	0.578202	0.164149	0.730205	0.105776	0.394583	71
Peru	0.568293	0.401304	0.739003	0.315774	0.506094	55
Philippines	0.451332	0.387922	0.771261	0.284718	0.473808	58
Poland	0.56857	0.304017	0.8739	0.520459	0.566737	45
Portugal	0.59533	0.458159	0.914956	0.768367	0.684203	21
Romania	0.38811	0.290391	0.765396	0.408514	0.463103	60
Russian Federation	0.517208	0.092389	0.750733	0.348189	0.42713	67
Senegal	0.403354	0.225306	0.067449	0.342088	0.259549	86
Singapore	1	0.729691	0.876833	0.887539	0.873516	3
Slovak Republic	0.446169	0.445685	0.829912	0.535593	0.56434	47
Slovenia	0.660042	0.307871	0.903226	0.664043	0.633796	33
South Africa	0.576064	0.600028	0.445748	0.663719	0.57139	44
Spain	0.54459	0.556156	0.967742	0.624577	0.673266	26
Sri Lanka	0.318068	0.406613	0.750733	0.355834	0.457812	62
Sweden	0.473626	0.573594	1	0.948877	0.749024	15
Switzerland	0.556796	0.74385	0.950147	0.912063	0.790714	10
Thailand	0.398987	0.473332	0.733138	0.582446	0.546975	50
Trinidad and Tobago	0.640791	0.561979	0.780059	0.557279	0.635027	32
Tunisia	0.510781	0.484403	0.651026	0.682657	0.582217	39
Turkey	0	0.212651	0.674487	0.391459	0.319649	82
Uganda	0.515504	0.424067	0.199413	0.369793	0.377194	76
United Kingdom	0.062219	0.844121	0.970674	0.977112	0.713532	19
United States	0.646397	0.906787	0.944282	0.859822	0.839322	4
Uruguay	0.523452	0.375556	0.8739	0.537029	0.577484	41
Venezuela, RB	0.511099	0.09085	0.777126	0	0.344769	80

Table A3.2   The four scenarios

Country	Resilience Index	Vulnerability Index	Case	Borderline
Barbados	0.741	0.717	Self Made	
Costa Rica	0.609	0.436	Self Made	
Cyprus	0.526	0.840	Self Made	
Estonia	0.729	0.908	Self Made	
Hong Kong, China	0.877	0.713	Self Made	
Iceland	1.000	0.607	Self Made	
Israel	0.630	0.443	Self Made	
Kuwait	0.661	0.731	Self Made	
Latvia	0.546	0.718	Self Made	
Luxembourg	0.676	0.615	Self Made	
Malaysia	0.626	0.587	Self Made	
Malta	0.663	1.000	Self Made	
Norway	0.781	0.543	Self Made	
Singapore	0.974	0.971	Self Made	
Trinidad and Tobago	0.603	0.533	Self Made	
Croatia	0.516	0.480	Self Made	Borderline
Mauritius	0.509	0.632	Self Made	Borderline
Panama	0.514	0.837	Self Made	Borderline
Tunisia	0.521	0.426	Self Made	Borderline
Australia	0.872	0.184	Best Case	
Austria	0.824	0.216	Best Case	
Belgium	0.750	0.384	Best Case	
Canada	0.905	0.117	Best Case	
Chile	0.653	0.379	Best Case	
Czech Republic	0.589	0.309	Best Case	
Denmark	0.915	0.407	Best Case	
Finland	0.889	0.286	Best Case	
France	0.675	0.129	Best Case	
Germany	0.696	0.100	Best Case	
Hungary	0.596	0.294	Best Case	
Ireland	0.845	0.371	Best Case	
Italy	0.564	0.082	Best Case	
Japan	0.674	0.106	Best Case	
Netherlands	0.817	0.364	Best Case	
New Zealand	0.975	0.320	Best Case	
Portugal	0.680	0.242	Best Case	
Slovenia	0.601	0.307	Best Case	
Spain	0.663	0.250	Best Case	
Sweden	0.780	0.208	Best Case	
Switzerland	0.845	0.178	Best Case	
United Kingdom	0.725	0.106	Best Case	
United States	0.921	0.060	Best Case	
South Africa	0.505	0.147	Best Case	Borderline

Country	Resilience Index	Vulnerability Index	Case	Borderline
Uruguay	0.514	0.288	Best Case	Borderline
Cote d'Ivoire	0.000	0.524	Worst Case	
Dominican Republic	0.427	0.768	Worst Case	
Egypt, Arab Rep.	0.257	0.658	Worst Case	
Greece	0.450	0.655	Worst Case	
Honduras	0.221	0.534	Worst Case	
Iran, Islamic Rep.	0.309	0.508	Worst Case	
Jamaica	0.420	0.922	Worst Case	
Kenya	0.216	0.511	Worst Case	
Madagascar	0.060	0.465	Worst Case	
Nicaragua	0.107	0.578	Worst Case	
Nigeria	0.173	0.677	Worst Case	
Papua New Guinea	0.216	0.508	Worst Case	
Philippines	0.353	0.485	Worst Case	
Senegal	0.020	0.464	Worst Case	
Sri Lanka	0.328	0.415	Worst Case	
Uganda	0.203	0.597	Worst Case	
Belize	0.478	0.768	Worst Case	Borderline
Jordan	0.484	0.725	Worst Case	Borderline
Lithuania	0.494	0.466	Worst Case	Borderline
Albania	0.321	0.344	Prodigal Son	
Argentina	0.350	0.100	Prodigal Son	
Bangladesh	0.136	0.313	Prodigal Son	
Bolivia	0.247	0.299	Prodigal Son	
Brazil	0.294	0.001	Prodigal Son	
Cameroon	0.188	0.397	Prodigal Son	
China	0.363	0.000	Prodigal Son	
Colombia	0.263	0.254	Prodigal Son	
El Salvador	0.447	0.362	Prodigal Son	
India	0.301	0.201	Prodigal Son	
Indonesia	0.161	0.174	Prodigal Son	
Mexico	0.378	0.046	Prodigal Son	
Morocco	0.332	0.272	Prodigal Son	
Nepal	0.208	0.327	Prodigal Son	
Pakistan	0.069	0.349	Prodigal Son	
Paraguay	0.230	0.297	Prodigal Son	
Peru	0.403	0.242	Prodigal Son	
Romania	0.336	0.206	Prodigal Son	
Russian Federation	0.281	0.241	Prodigal Son	
Thailand	0.467	0.363	Prodigal Son	
Turkey	0.114	0.182	Prodigal Son	
Venezuela, RB	0.153	0.465	Prodigal Son	
Poland	0.497	0.175	Prodigal Son	Borderline
Slovak Republic	0.494	0.357	Prodigal Son	Borderline

Table A3.3   The Briguglio and Galea vulnerability index

Country	Vulnerability Index	Country Ranking
Albania	0.263	50
Argentina	0.077	81
Australia	0.141	71
Austria	0.166	67
Bangladesh	0.240	53
Barbados	0.549	12
Belgium	0.294	42
Belize	0.588	7
Bolivia	0.229	56
Brazil	0.001	86
Cameroon	0.304	41
Canada	0.089	78
Chile	0.290	43
China	0.000	87
Colombia	0.194	62
Costa Rica	0.334	37
Cote d'Ivoire	0.401	26
Croatia	0.368	31
Cyprus	0.643	5
Czech Republic	0.236	54
Denmark	0.311	40
Dominican Republic	0.588	8
Egypt, Arab Rep.	0.504	15
El Salvador	0.277	47
Estonia	0.695	4
Finland	0.219	60
France	0.099	77
Germany	0.076	82
Greece	0.501	16
Honduras	0.409	24
Hong Kong, China	0.546	13
Hungary	0.225	58
Iceland	0.465	19
India	0.154	70
Indonesia	0.133	75
Iran, Islamic Rep.	0.389	28
Ireland	0.284	44
Israel	0.339	36
Italy	0.062	83
Jamaica	0.706	3
Japan	0.081	79
Jordan	0.555	10
Kenya	0.391	27
Kuwait	0.560	9
Latvia	0.550	11
Lithuania	0.357	32
Luxembourg	0.471	18
Madagascar	0.356	34
Malaysia	0.449	21
Malta	0.765	1

Table A3.3   The Briguglio and Galea vulnerability index

Country	Vulnerability Index	Country ranking
Mauritius	0.484	17
Mexico	0.035	85
Morocco	0.208	61
Nepal	0.250	51
Netherlands	0.279	45
New Zealand	0.245	52
Nicaragua	0.442	22
Nigeria	0.518	14
Norway	0.416	23
Pakistan	0.267	49
Panama	0.640	6
Papua New Guinea	0.389	29
Paraguay	0.227	57
Peru	0.186	64
Philippines	0.371	30
Poland	0.134	74
Portugal	0.185	65
Romania	0.158	69
Russian Federation	0.184	66
Senegal	0.355	35
Singapore	0.743	2
Slovak Republic	0.273	48
Slovenia	0.235	55
South Africa	0.113	76
Spain	0.192	63
Sri Lanka	0.318	39
Sweden	0.159	68
Switzerland	0.136	73
Thailand	0.278	46
Trinidad and Tobago	0.408	25
Tunisia	0.326	38
Turkey	0.140	72
Uganda	0.457	20
United Kingdom	0.081	80
United States	0.046	84
Uruguay	0.221	59
Venezuela, RB	0.356	33

Source: Briguglio, L. and Galea, W., 2003. *Updating the Economic Vulnerability Index*, Occasional Papers on Islands and Small States 2003–4, Islands and Small States Institute, Malta.