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Economic Resilience and Vulnerability: Concepts and Indices

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Abstract

This paper examines the concepts and indices of *economic resilience* and *vulnerability*. The central notion in clarifying both resilience and vulnerability is that of an *adverse shock*. If a shock does not alter the growth path of an economy or cause a recession, the economy is considered “resilient.” Resilience refers to an economy’s ability to return to its pre-shock growth trajectory. A resilient economy, after experiencing a shock, resumes its long-term growth path. Endogenous growth can strengthen economic resilience, and resilient economies tend to experience sustainable growth. Macroeconomic stability and effective institutions are two principal indicators of economic resilience. Resilience stems largely from economic policymaking, while vulnerability is related to the inherent structural characteristics of an economy that expose it to adverse shocks. Export concentration, dependence on strategic imports and external financing, as well as geographical vulnerability, constitute the main indicators of economic vulnerability. The greater the capacity to respond to shocks, the lower the vulnerability. The paper explores the indices of economic resilience, including Briguglio, Centennial group and Oxford FM Global. In vulnerability indices, the paper discusses the Briguglio vulnerability index, Guillaumont and OECD indices.

Keywords: resilience, vulnerability, adverse shock, index.

JEL: C18, E66, E61.

1. Introduction

In this paper, the concepts of economic resilience and vulnerability are first examined, followed by a discussion of the indices associated with each one. During the global financial crisis of 2007–2009, economies fell into two categories: those resilient to external shocks and those non-resilient and vulnerable to external shocks. Although terms such as *resilience* and *vulnerability* existed prior to the 2007–2009 global financial crisis, their use became much more widespread thereafter. In this paper, the concept of the adverse economic shock is first explained as a key notion in the analysis of resilience and vulnerability. Economic resilience is then examined, followed by economic vulnerability.

2. Adverse Economic Shocks

Unforeseen events—whether favorable or unfavorable—that exert a significant impact on an economy are termed *shocks*. Economies are constantly exposed to shocks and disturbances that may disrupt their growth trajectory. The concept of resilience is derived from the reaction and recovery capacity of economies in the face of such shocks. To examine the response and recovery capacity of economies, clarification of the concepts of *resilience* and *vulnerability* is essential.

The main types of economic shocks include:

First, shock caused by economic recession: when the rate of economic growth declines for several consecutive quarters, recession is considered a shock.

Second, industrial shock: downturns in particular industries that constitute the export base of a region generate disruptions.

Third, other shocks: including natural disasters, climate change, and other non-economic events that exert adverse effects on the economy.

Multiple shocks may occur simultaneously within an economy, reducing output and employment, with effects that sometimes persist for several years.

Briguglio et al. (2009) distinguish between *economic resilience*, which results from deliberate and conscious policy choices, and *economic vulnerability*, which derives from the inherent characteristics of an economy. Economic resilience refers to the ability to absorb the effects of shocks and neutralize their adverse consequences. Absorption requires flexibility in the economy and its capacity for recovery. When an economy is resilient and flexible, its ability to neutralize shocks is enhanced. (Briguglio et al., 2009)

Three main factors are associated with adverse shocks: i) The size and probability of the shock; ii) exposure to the shock, and the economy's capacity for effective (policy) response to the shock, which depends on policymaking.

The first two factors are structural, while the third is policy-related.

Another classification of economic shocks is as follows:

First, Environmental shocks, such as natural disasters such as earthquakes, floods, storms, droughts and climate change (Mirjalili& Motaghian Fard, 2019)

Second, External shocks, such as financial and trade sanctions, oil price volatility, large-scale capital outflows, and exchange rate instability have been among the key challenges.

Third, Endogenous shocks, such as those resulting from unforeseen political developments or domestic instability (Guillamont, 2010).

Regarding external shocks, the impact of financial sanctions on Iran's economic resilience, Heydarian et al. have shown that such sanctions have led to reduced economic growth (2021), a decline in capital inflows and an increase in capital outflows (2022), exchange rate instability (2025), and a decrease in the import of capital and intermediate goods (2023), thereby weakening Iran's economic resilience.

In the context of fiscal uncertainty shock due to economic sanctions, Safari et al. (2024) demonstrated the adverse effects of fiscal policy uncertainty shock on industrial output in Iran. Similarly, Mirjalili and Safari (2025) found that uncertainty reduces provincial economic activities, which in turn has an adverse impact on productive resilience.

On the role of economic resilience policies in dealing with external shocks, Mirjalili (2016) emphasized the role of governance quality, the political economy dimensions of economic resilience, structural flexibility, capacity building for resilience, and macroeconomic policies to promote economic resilience (Mirjalili, 2016, pp. 125–194).

Furthermore, Heydarian et al. (2024), using a DSGE model, analyzed the relative effects of monetary and fiscal policies in mitigating the impacts of financial sanctions on an oil-exporting economy and their implications for Iran's financial stability and economic resilience. Their findings indicate that monetary policy has a stronger effect than fiscal policy in reducing the adverse impacts of financial sanctions on Iran's economic resilience (Heydarian et al., 2024, pp. 145–183).

Moreover, Mirjalili and Bozorgi (2018, 2019), by estimating the composite index of economic resilience and its trend in Iran's economy during the period 2005–2015, demonstrated a direct and positive relationship between the rate of economic growth, export diversification, and foreign exchange earnings with Iran's economic resilience index.

From a microeconomic perspective, the impact of shocks is assessed in terms of household welfare and poverty, while from a macroeconomic perspective, the focus is on their effect on economic growth.

When an adverse shock leads to a decline in the rate of economic growth, if the economy is able to recover and return to positive growth, it is considered *resilient*. If the negative growth persists and recovery does not occur, the economy is deemed *non-resilient* and *vulnerable*. Thus, if an economic shock cannot disrupt the growth trajectory or cause a recession, the economy is regarded as resilient. In this case, economic development continues without serious disruption to production or employment.

3. Economic Resilience concepts

Economic resilience refers to the capacity of an economic system to maintain its functioning and to recover its growth path following the occurrence of adverse shocks. The use of the term *economic resilience* has increased significantly in recent years, particularly in relation to adverse shocks stemming from *natural disasters*, *climate change*, and similar events.

Resilience is discussed in diverse contexts, such as resilience to climate changes, shocks to food security and agriculture, conflicts, water scarcity, resilient cities, and resilient infrastructures. In essence, the term *resilience* describes how a system responds to shocks and disturbances. The concept has long been used in *ecology* and *psychology*, and is now applied across a variety of disciplines. At present, resilience is regarded as a desirable attribute that scholars across different fields seek to cultivate. The concept of resilience is rapidly becoming part of the analytical and conceptual framework of economic policymaking.

Etymologically, resilience derives from the Latin root meaning “to spring back,” indicating recovery after a disturbance. In other words, resilience refers to the rebound or return of a system to its previous state following the impact of a shock, restoring the system to its earlier stable or equilibrium path.

This definition emphasizes the notion of *return to equilibrium*, borrowed from engineering and the natural sciences. It signifies the ability of a system to rebuild and restore its initial performance after experiencing a shock or disruption, highlighting efficiency, continuity, and predictability.

The idea of return to equilibrium also exists in mainstream economics. The assumption is that the normal state of the economy is an equilibrium condition; if a shock (such as a recession or financial crisis) pushes the economy out of equilibrium, the self-correcting mechanisms of the market become activated and restore the economy to equilibrium. Thus, resilience implies the active operation of market forces.

In ecological literature *ecological resilience*, refer to the ability of an ecological system to absorb shocks without changing its structure, identity, or function. Based on this view, resilience denotes the capacity of a system to absorb disturbances and reorganize while undergoing change, in such a way that it continues to retain its essential function, structure, identity, and feedbacks.

According to this concept, if the shock imposed on a system exceeds its absorptive capacity or surpasses its ability to return to its previous state, the system will shift toward a different equilibrium—typically one of lower desirability than the pre-shock state. Applied to economics, if a shock is sufficiently severe, it may alter the structure of the economy, as well as behaviors and expectations, preventing the economy from returning to its pre-shock path. Instead, it moves toward a new equilibrium trajectory. In such cases, the effect of the shock is not temporary but permanent, and delayed impacts may occur. This condition corresponds to the phenomenon of *multiple equilibria* in economics.

Adaptive Resilience is another concept of resilience found in behavioral psychology. It refers to an individual's capacity to maintain or regain psychological well-being in the aftermath of stress or crisis. Resilient individuals adapt themselves to new conditions, whereas those lacking adaptive resilience are adversely affected by life stresses.

In organizational studies, resilience refers to an organization's ability to maintain its core functions in the face of disruptions, adapt to changes, and recover when confronted with shocks. This form of resilience is also referred to as evolutionary resilience, since it implies a leap forward rather than a mere return to the prior state. In this sense, resilience enables the stability and continuity of structures and functions under shock.

Resilience is also discussed in the context of regional economics, where it denotes a region's ability to successfully recover from shocks that disrupt its growth path or pose the potential to do so. Regional resilience is conceived as both a "recursive process" and an adaptive capacity.

Recent findings in economics indicate that resilience affects the long-term growth pattern. The varying resilience of economies and regions to shocks suggests that the long-term growth trajectory is shaped by repeated shocks and subsequent recoveries. While shocks occur in the short term and economic growth unfolds in the long term, an economy's resilience in absorbing shocks and recovering depends on the extent of its resilience.

Impulse–response models typically consider the effects of shocks on the economy, but they treat shocks as temporary in nature. Yet, recessionary shocks may be strong enough to induce structural and functional transformations, leading to a permanent shift in the economy's actual and potential growth maxima. For example, a deep recession may

result in the closure of manufacturing firms and the failure of many economic activities, thereby contracting the production base and reducing growth and employment capacity. Moreover, a shock may have a hysteresis effect on unemployment. Thus, when a shock occurs, the economic growth path may be pushed downward, and the new growth trajectory may settle below its previous level. This is the negative hysteresis effect, in which the economy becomes smaller and generates lower income, output, and employment. Such an economy cannot be considered resilient.

Accordingly, if shocks are severe, they can have lasting effects on the long-term growth trajectory. When part of production and employment is lost, there is often little tendency to recover lost jobs, and the labor force may migrate.

Resilient economies experience stable growth, whereas non-resilient economies face volatile growth and tend to record lower growth rates due to shocks. Such conditions undermine economic stability and create an unfavorable investment climate. Hence, non-resilient economies exhibit lower average long-term growth.

Cerra and Saxena (2008) demonstrated that economies exposed to repeated and severe shocks experience lower long-term growth rates. Even when a common shock affects different economies, their responses differ depending on their degree of resilience. If a region fails to return to its pre-shock growth path, its economic base erodes, and growth, output, and employment decline. This was precisely the case following the 2007–2009 global financial crisis. The variation in regional economic performance during the crisis stemmed from differences in resilience across regions of the world.

It should be noted that the aforementioned effects result from adverse shocks. If a favorable shock occurs in the economy—for example, the discovery of a new technology, the adoption of a novel production method, or the use of new tools in the production of goods and services—this positive shock can lead to high growth, which Schumpeter termed “creative destruction.” Favorable economic shocks driven by new technologies can, through creative destruction, replace old low-technology industries with new high-technology, higher-output industries.

Resilience makes economic growth path-dependent. Positive path dependence can create self-reinforcing mechanisms and processes, preserving the growth trajectory. Therefore, economic resilience helps maintain the continuity of path-dependent economic growth. Conversely, if economic resilience is low, adverse shocks can disrupt path dependence and slow growth, necessitating structural economic adjustments. (Ron & Sunley, 2014)

Endogenous growth theory aligns with the objective of building economic resilience. Evolutionary economics also emphasizes the importance of diversification, innovation capacity, and institutional arrangements in fostering economic resilience. Appropriate economic policies can strengthen resilience.

4-Determinants of Economic Resilience

Generally, four economic factors play a key role in shaping economic resilience: economic structure, labor market, financial structure, and government policy.

a) **Economic Structure:** The economic structure—particularly the industrial structure—directly affects resilience. Structural diversity plays a fundamental role in enhancing resilience. A diversified economic structure mitigates the fluctuations caused by shocks, while innovative capacity enables the economy to adapt to new conditions. According to Davies and Tonts (2010), greater diversity of economic activities correlates with higher economic resilience.

Related variety is considered a sufficient condition for resilience. Connections among industries and research institutions increase resilience against shocks. The concept of diversified specialization has also been proposed, combining the innovation benefits of specialization with the spillover advantages of a diversified economic structure. Case studies, such as Munich's resilience, demonstrate the importance of a diverse industrial base in coping with recessions. Economic diversity is a necessary condition for resilience, but its sufficiency depends on relatedness: the stronger the connections among industries, economic activities, and scientific centers, the greater the economy's adaptive capacity in the face of shocks. The presence of related variety can therefore enhance shock resilience.

Some researchers (i.e. Fahrenher and Carroll, 2012) have introduced the concept of diversified specialization, in which specialization in several activities combines the innovation benefits of specialization with the externalities of a diversified economic structure, thereby increasing economic resilience. Evans and Karcha (2013) showed that Munich's economic resilience is largely attributable to its diversified industrial base. Similarly, Doran and Fingleton (2013) found that the resilience of major U.S. regions to economic recessions positively correlates with the structural diversity of their economies.

b) **Labor Market:** Adverse shocks affect the labor market and tend to increase unemployment. Labor market flexibility—regarding firms, wages, and unemployment insurance—can mitigate the negative effects of shocks on the rapid expansion of unemployment. Therefore, the labor market structure plays a critical role in economic resilience.

c) **Financial Structure:** The financial structure can function both as a shock absorber and as an amplifier of shocks in the financial sector. A well-designed financial structure enhances economic resilience, whereas a fragile financial system facilitates the transmission of shocks to the real economy.

d) Government Policy: Governments can enhance economic resilience through effective policies, including investments in infrastructure, technology, vocational training, and public services. Policy measures in the financial sector and public employment play a key role in economic resilience. Employment in the public sector can provide stability and resistance to adverse shocks.

Macroeconomic Stability and Efficient Institutions are two crucial indicators of economic resilience. Macroeconomic stability is generally measured by indicators related to economic imbalances, such as inflation control, debt levels, budget deficits, exchange rates, and unemployment. GDP fluctuations are indicative of a lack of resilience. Economic growth and instability are negatively correlated: instability hinders investment, and an unstable economy cannot withstand adverse shocks.

Briguglio (2009) measures macroeconomic stability using three indicators: First, government Budget Deficit to GDP Ratio. This indicator reflects the extent of fiscal imbalance. Higher deficits increase the risk of economic instability. Second, misery index which includes a combination of inflation and unemployment rates, this index captures socioeconomic pressures. High values indicate greater economic vulnerability to adverse shocks. Third, external debt to GDP Ratio. This reflects the economy's dependence on foreign financial resources. A higher ratio increases vulnerability to global fluctuations and exchange rate changes.

Collectively, these three indicators measure the economy's capacity to withstand external shocks based on domestic economic stability.

It should be noted that GDP fluctuations result from an economy's lack of resilience against adverse shocks. Such fluctuations have harmful effects, primarily through reductions in income and economic growth. Decreases in GDP may also have hysteresis effects, and recovery can be prolonged.

Numerous studies have shown that growth and instability are negatively related, and that instability undermines the level of investment. If efficient institutions are in place, the economy can be resilient in the face of adverse shocks. Weak institutions, however, hinder effective socio-economic management and even reduce investment attractiveness. Various studies by Acemoglu and others demonstrated the positive relationship between institutional capacity (quality) and economic growth.

Finally, the main challenges of studies on economic resilience include the following: lack of comprehensiveness in defining and analyzing the dimensions of economic resilience; failure to examine the post-shock consequences of economic crises; the need to analyze the short-term and long-term impacts of economic shocks and their effects on economic resilience; inadequacies in existing economic resilience indicators and the necessity of improving these indicators for more accurate assessment; and finally, the neglect of

political economy dimensions in the analysis of economic resilience, along with the need to consider the role of economic policies, structures, and institutions in strengthening or weakening economic resilience (Mirjalili, 2016).

5-Economic Vulnerability concepts

Vulnerability refers to the inherent characteristics of an economy that expose countries to external shocks. Resilience, by contrast, stems from economic policymaking that enables countries to minimize or withstand the adverse effects of such shocks. This implies that despite economic vulnerability, if appropriate policies are pursued, economies can achieve resilience and mitigate the negative consequences of external economic shocks.

The Latin root of the word vulnerability, *vulnerare*, means “to wound.” Economic vulnerability refers to a country’s susceptibility to being harmed by the economic shocks to which it is exposed. Vulnerability originates from the intrinsic features of an economy. However, a vulnerable country can adopt resilience-oriented policies to withstand these inherent risks.

Countries such as Singapore, despite their structural vulnerabilities, have achieved sustainable growth through appropriate economic policies. This phenomenon is often referred to as the “*Singapore Paradox*.”

Vulnerability denotes the risk of being harmed, injured, or adversely affected by unforeseen events in the economy. Economic vulnerability is specifically the vulnerability to shocks—whether natural or external. Thus, vulnerability represents the risk of incurring losses due to shocks (Guillaumont, 2010).

Structural vulnerability arises from the economic structure of a country, while policy-induced vulnerability results from policy choices. Both forms of vulnerability are considered macroeconomic in nature.

Natural and climatic shocks are the primary sources of vulnerability in many developing countries. Earthquakes, floods, and droughts are key examples. Another major source of vulnerability lies in external trade—for instance, dependence on global oil prices. Since most oil exporters are price takers, they remain highly exposed to such shocks.

Vulnerability reduces economic growth by generating instability and exerting adverse effects on investment. Exchange rate volatility and investment instability are direct outcomes of vulnerability. To address economic vulnerability, the *Economic Diversification Index* has been proposed (Guillaumont, 2010).

5-1-Macroeconomic Vulnerability

This form of vulnerability is closely tied to economic policy. From a macroeconomic standpoint, shocks exert a direct influence on growth. An economic or financial crisis represents a shock that adversely affects growth, and this constitutes macroeconomic vulnerability. One strand of the literature interprets macroeconomic vulnerability exclusively in the context of financial crises.

By contrast, other approaches emphasize that macroeconomic vulnerability heightens an economy's exposure to financial shocks. If an economy possesses only limited adaptive capacity in the face of such shocks, its growth trajectory is likely to be severely constrained and diminished. In this sense, both the degree of exposure to shocks and the ability to respond effectively are the decisive factors shaping macroeconomic vulnerability (Seth & Rajeb, 2012).

The scholarly debate on macroeconomic vulnerability generally revolves around two main perspectives. The first perspective highlights how macroeconomic imbalances—such as misaligned asset prices or exchange rates—may generate or accelerate financial, monetary, banking, or debt crises. The more severe these imbalances, the greater the likelihood of a financial crisis materializing. Moreover, beyond macroeconomic imbalances, two additional determinants of vulnerability are frequently identified: (i) the credibility of policy measures designed to correct imbalances, and (ii) the robustness of the financial system. Put differently, macroeconomic vulnerability is understood here as originating primarily from domestic policies and economic conditions, including excessive borrowing for unproductive purposes, a fragile financial sector, or a flexible exchange rate regime (IMF, 1998).

A second, broader approach situates macroeconomic vulnerability within the broader conditions that give rise to financial and economic crises. Trade and financial shocks, in particular, call for a comprehensive framework that can assess macroeconomic vulnerability in developing economies by explicitly addressing such external disturbances (Seth & Rajeb, 2012). Within this approach, research has predominantly concentrated on identifying the structural features and transmission channels through which economies become exposed to financial and economic shocks. Exposure to these shocks, in turn, exerts negative effects on economic growth. Accordingly, macroeconomic vulnerability is here conceptualized as the susceptibility of growth to adverse shocks (Seth & Rajeb, 2012)—a conceptualization also elaborated in the works of Briguglio (1995, 2009, 2016).

Taken together, these perspectives underscore that economic vulnerability reflects structural characteristics that increase an economy's susceptibility to external financial and economic shocks—for instance, dependence on oil revenues (i.e., export

concentration). By implication, macroeconomic vulnerability can ultimately be regarded as an outcome of the inherent features of the economy itself.

Macroeconomic Vulnerability, Shocks, and Growth: Natural disasters adversely affect economic growth by destroying the stock of physical capital. The response capacity of an economy refers to its ability to mobilize resources in order to replenish its capital stock. Research on macroeconomic vulnerability has largely focused on *growth instability* and *long-term growth* as indicators of an economy's susceptibility to shocks. As Guillaumont (2010) demonstrates, shocks reduce the average long-term growth rate in vulnerable economies.

According to Guillaumont (2010) unlike natural disasters—which typically occur as one-off shocks—economic shocks may be recurrent. Moreover, economic shocks can be two-sided, moving both upward and downward as a result of the boom-and-bust cycles of economic activity. Such shocks therefore heighten both *growth volatility* and *instability*. Importantly, growth volatility tends to be associated with lower average growth rates.

Several transmission channels link growth instability to lower long-run growth. Primary instabilities—such as fluctuations in export revenues, terms of trade volatility, and political instability—affect growth through *intermediate instabilities*, such as fluctuations in prices, productivity, and investment (Seth, 2012).

Accordingly, macroeconomic vulnerability is shaped by three interrelated factors: Growth instability, Exposure to shocks and A country's adaptive capacity in response to shocks.

Shocks, in particular, play a determining role in macroeconomic vulnerability. They reduce economic growth through their adverse effects on average investment rates and productivity (Guillaumont, 2010).

The extent to which a shock affects an economy depends on its frequency, magnitude, and origin. For example, a financial market shock generates distinct risks compared to a trade-related shock. If shocks are recurrent, they become a source of instability and exert persistent negative effects on growth.

Financial and economic shocks in the global economy are often transmitted to national economies through *international trade* and *private capital flows*. For instance, when international prices fall and export revenues decline, export-dependent countries experience adverse effects on growth. In this case, the transmission channel is international trade. Similarly, if global recession reduces foreign direct investment, countries dependent on such financing for development face a slowdown in growth. Thus, both international trade and capital flows are major transmission mechanisms for economic shocks.

Reducing macroeconomic vulnerability requires policies that enhance an economy's response capacity and support three objectives (Seth, 2012). First, policies aimed at strengthening adaptive capacity to withstand and respond to shocks. Second, policies designed to reduce exposure to shocks. Third, policies to lessen the recurrence and intensity of shocks at both national and global levels. However, most identified policy measures for building response capacity tend to emphasize only one or two of these objectives rather than addressing them comprehensively.

Several indicators are commonly used to assess economic vulnerability, including export concentration (both commodity and country-based), dependence on strategic imports, reliance on external financing, and geographical exposure to natural disasters. These indicators collectively reflect the extent to which an economy is exposed to external shocks.

Finally, a key concept in economic resilience is the impact of adverse shocks on the growth trajectory of an economy. If an adverse shock does not alter the growth path, the economy is considered resilient. If the shock temporarily reduces growth but the economy is able to recover and return to its previous trajectory, it is regarded as *economically resilient*. Conversely, if the economy fails to recover after the shock and the growth rate remains negative, the economy is considered *vulnerable*.

Section 2: Economic Resilience and Vulnerability Indices

2.1. Economic Resilience Indices

Economic resilience indices are generally divided into two categories: national and regional. National indices are based on macroeconomic data at the country level, such as the Briguglio et al. index, the Centennial Group index, and the FM Global Resilience Index. Regional indicators, in contrast, focus on resilience within specific geographic areas.

2.2. Briguglio's Economic Resilience Index

The economic resilience index was provided by Briguglio et al. in 2006. In 2008, they calculated their resilience index for 87 countries. This revised index was further developed in 2014 and 2016, assessing the resilience of countries using normalized scores ranging from 0 to 1. The components of Briguglio's Economic Resilience Index include: Macroeconomic stability, Market efficiency, Good governance, Social development. All of these domains and their associated variables are heavily influenced by economic policies. In 2014, Briguglio added environmental management as a fifth component.

A) Macroeconomic Stability: In describing the macroeconomic environment, five key indicators are emphasized: inflation rate, exchange rate, interest rate, fiscal balance, and balance of payments. If the budget deficit (as a percentage of GDP) remains within a reasonable range, inflation is low and predictable, the real exchange rate is competitive and near its equilibrium level, and both financial returns and the balance of payments are conducive to growth and development, then the macroeconomic environment can be considered stable. This description reflects the conditions typically found in developed economies. In contrast, developing countries—characterized by high inflation, increasing and unsustainable budget deficits, sharp fluctuations in the real exchange rate, and chronic balance-of-payments deficits—are generally not in a favorable position in terms of macroeconomic stability.

The components of macroeconomic stability related to Briguglio’s resilience index include three variables: The ratio of the budget deficit to GDP, The misery index (sum of the inflation and unemployment rates), and The ratio of external debt to GDP.

A government’s budget deficit is an appropriate indicator of a country’s degree of resilience, as it reflects fiscal policy outcomes and determines the capacity to counter shocks—one of the key dimensions of economic resilience. A government with a low budget deficit and sound fiscal health can use tax and expenditure policies to mitigate the adverse effects of negative shocks.

Inflation and unemployment are also useful indicators for measuring economic resilience. A country facing high inflation and unemployment will suffer heavy costs even from minor external shocks. Conversely, an economy with acceptable inflation and unemployment rates can withstand adverse external developments without bearing substantial welfare losses. Therefore, these two variables fall under the “shock absorption capacity” dimension of economic resilience. Consequently, their combination—the misery index—is another useful measure within the broader resilience index.

The ratio of external debt to GDP is also an appropriate measure of resilience, as high external debt can seriously constrain a country’s ability to reallocate resources in response to external shocks. A country with low external debt does not need to liquidate its domestic assets to offset the effects of shocks, linking this variable to the “shock-countering capacity” dimension.

Interestingly, contrary to expectations, the United States does not rank among the top ten countries in the macroeconomic stability sub-index, which is derived from these three variables. However, smaller economies such as Hong Kong and Singapore hold favorable positions in this regard. It should be noted that the stability index is not a developmental indicator, but rather reflects the ability of a country to absorb adverse economic shocks and to respond effectively (Briguglio, 2009).

B) Market Efficiency: Markets that can quickly return to equilibrium after a period of disequilibrium possess the ability to absorb economic shocks. Conversely, if disequilibrium persists, resources are not optimally allocated, imposing substantial welfare costs on society. Inefficient allocation of resources results in unsound investment across sectors, leading to the underutilization of production factors in some areas. The ultimate outcome of such conditions is either a shortage or surplus in goods markets.

In financial markets, external shocks are reflected in higher interest rates or lower stock prices. If markets respond optimally, these adjustments help preserve capital within the economy. In this case, the negative shock affects stock prices and possibly triggers reallocations within the market itself, rather than reducing the total capital stock. However, if price determination in financial markets does not function properly, external shocks can cause capital flight, which has adverse consequences for economic activity. Therefore, based on microeconomic principles, market efficiency has significant implications for economic resilience—particularly in terms of shock absorption.

To measure market efficiency, Briguglio employs the Economic Freedom Index developed by the Fraser Institute, which consists of five key components: Size of government, Legal structure and property rights, Access to sound money, Freedom to trade internationally, Regulation of labor, business, and credit. In the 2014 version, “regulation” was also added to the global index of economic freedom. Briguglio uses two of these components—size of government and freedom to trade—to construct his measure of market efficiency.

The size of government is measured by four indicators: i) The ratio of government consumption to total national consumption; ii) The ratio of subsidies and transfer payments to GDP; iii) The level of government investment in public institutions; iv) Income tax rates and the corresponding income brackets subject to taxation. Trade freedom can be assessed through government revenues from tariffs, legal barriers to trade, the share of trade in GDP, the exchange rate regime, and the degree of government control over capital markets (Briguglio, 2009).

C) Good Governance: To measure good governance, Briguglio (2014) relies on two sources: the “*Legal System and Property Rights*” component and the “*World Index of Economic Freedom*.” These indices emphasize the legal framework and the protection of property rights, consisting of five key elements: i) Judicial independence; ii) Impartiality and autonomy of courts; iii) Protection of intellectual property rights; iv) Absence of military interference in the rule of law; v) An integrated political and legal system.

D) Social Development: Social development is a vital component of economic resilience. It reflects the extent to which social relationships are developed and the capacity of economic institutions to operate without disruption from social instability. Although closely related to the concept of social cohesion, this component is difficult to measure

quantitatively due to data limitations. Nevertheless, several useful variables include: income levels and their derivatives, the proportion of the population below the poverty line, long-term unemployment rates, and literacy levels. Briguglio (2014) measures social development using indicators of education (mean years of schooling and expected years of schooling) and health (life expectancy). These variables are also integral components of the United Nations Human Development Index (HDI).

E) Environmental Management (Added in 2014): Environmental management refers to the set of institutions, regulations, practices, and processes that support the protection, conservation, and sustainable use of natural resources. To achieve these objectives, governments must establish and promote appropriate legal frameworks, educational systems, and socio-economic arrangements. The relationship between environmental management and economic resilience can be explained through the economy's ability to recover after external shocks. However, due to the lack of consistent data, this component was not included in the initial versions of the index. Briguglio et al. (2016) developed a revised version of the index that incorporated new variables, including the environmental management component.

2-3-Method and Steps for Calculating the Economic Resilience Index

To construct the Economic Resilience Index, three main stages are considered: Data Normalization: Due to differences in the scales of variables, the Max–Min normalization method is applied. For variables with a positive effect:

$$Z_i = \frac{X_i - X_{\min}}{X_{\max} - X_{\min}}$$

Where:

Z_i : Normalized value of each variable

X_i : Observed value of the variable in each year

X_{\min} : Minimum observed value of the variable

X_{\max} : Maximum observed value of the variable

Some variables—such as high inflation, exchange rate volatility, Gini coefficient, and the size of the informal economy—have negative effects on economic resilience. To adjust for these negative effects and align all variables in the same direction, the following formula is used:

For variables with a negative effect (e.g., high inflation, income inequality):

$$Z_i = 1 - \frac{X_i - X_{\min}}{X_{\max} - X_{\min}}$$

Weighting Variables: In this method, it is assumed that all components are equally important. Therefore, equal weights are assigned to all sub-indices and variables.

Calculating the Final Index: The simple arithmetic mean of the normalized scores for all components is computed. The final value ranges between 0 and 1, interpreted as follows:

Values close to 1 → High resilience and Values close to 0 → Low resilience.

In other words, the closer the index value is to 1, the greater the economic resilience; the closer it is to 0, the lower the resilience.

2-4- The Centennial Group Economic Resilience Index

The Centennial Group Economic Resilience Index consists of 52 variables grouped into 10 sub-indices, emphasizing institutional and structural factors.

Key Components include: i) Fiscal Health; ii) Monetary Health; iii) Government Effectiveness; iv) Governance; v) Banking Soundness; vi) Export Diversification; vii) Export Independence; viii) External Strength; ix) Private Sector Debt; x) International Reserves and Investment Position. This index is designed to evaluate countries' economic resilience by assessing macroeconomic policies, fiscal soundness, institutional structures, and external dependencies. In total, 52 variables are aggregated across the 10 sub-indices to compute the Centennial Resilience Index.

Table (1): Main Components of the Centennial Resilience Index

Component	Variables
Fiscal Policy Health	Ratio of public debt to GDP; three-year change in public debt ratio.
Monetary Policy Health	Success in inflation control; three-year standard deviation of inflation; inflation targeting by the central bank.
Government Effectiveness	Quality of bureaucracy; policy consistency and planning.
Good Governance	Corporate governance; legal aspects of governance; political transparency.
Banking Soundness	Asset quality; core capital; income risk.
Export Diversification	Export destination diversity; export concentration index; share of merchandise exports in GDP.
Export Independence	Ratio of exports to GDP

External Robustness	Current account balance; ratio of foreign reserves to short-term debt; months of import coverage; type of exchange rate regime.
Private Sector Debt	Domestic and external debt; growth of domestic bank credit; risk of sudden stops in foreign capital flows.
International Reserves and Net Investment Position	Ratio of international reserves to GDP; ratio of net investment to GDP

2-5-The FM Global (Oxford) Resilience Index

The FM Global (Oxford) Resilience Index is one of the most authoritative tools for measuring a country’s capacity to withstand economic shocks, natural disasters, and supply chain disruptions. Its primary objective is to assess national preparedness for crises and the ability to maintain economic stability. The Global Resilience Index is built upon three main pillars, each consisting of five key criteria, calculated using data from sources such as the World Bank and the World Economic Forum.

Economic Pillar includes: Economic productivity; Dependence on oil (exports and imports); Financial and administrative corruption; Corporate governance; and Macroeconomic stability.

Risk Quality Pillar includes: Exposure to natural hazards; Exposure to human-induced risks; Crisis preparedness; Risk response capacity; Safety and security infrastructure.

Supply Chain Pillar includes: Infrastructure quality; Distribution network efficiency; Access to key resources; Supply chain flexibility; Post-disruption recovery capability.

The country rankings in the FM Global Resilience Index reflect the degree of readiness to confront economic shocks and the capacity to sustain business continuity and economic stability in the face of disruptions.

Table (2): Comparative Insights Briguoglio Vs. Centennial indices

Feature	Briguoglio Index	Centennial Index
Origin	Academic (Italy)	Policy-oriented (US)
Scope	~87 countries	Global, with institutional depth
Method	Max-Min normalization, equal weights	Composite scoring, institutional metrics

Focus	Shock absorption capacity	Structural and institutional resilience
Governance	Legal system, property rights	Corporate, legal, and political governance
Social	HDI proxies	Broader inclusion of education, health, and inequality
Environmental	Added in 2014	Included via EPI (Environmental Performance Index)

2-6-Regional Economic Resilience Index

Regional economic resilience refers to the ability of a specific geographical area to withstand economic shocks, natural crises, and market fluctuations. Unlike national indices that focus on macroeconomic data, regional indices are based on local information, economic structure, and demographic and infrastructural characteristics of the region.

The main components in assessing regional resilience include: i) Economic diversification: lower dependence on a single industry; presence of multiple sectors (agriculture, services, industry); ii) Local infrastructure: transportation, energy, communications, and access to resources and markets; iii) Human capital and skills: education level and workforce skills, employment rate, and long-term unemployment; iv) Local governance and institutional capacity: crisis management ability, social participation, and local decision-making; v) Demographic and social dynamics: migration, population growth rate, social cohesion, and public trust; vi) Export and trade capacity: share of exports in regional output and diversification of export destinations.

Regional economic resilience is crucial for local policymakers, urban planners, and development institutions. These indices help identify regional strengths and weaknesses, design targeted development programs, and enhance preparedness for crises.

2-7-Economic Vulnerability Indices

Economic vulnerability reflects a country’s sensitivity to external shocks arising from structural or policy weaknesses. It differs from resilience. Resilience is the capacity to respond, whereas vulnerability is the degree of exposure to risk. Hence, vulnerability represents the risk of loss due to shocks (Guillaumont, 2010).

In economics, the concept of vulnerability is examined from both microeconomic and macroeconomic perspectives. In microeconomics, the focus is on household welfare, while in macroeconomics, the emphasis lies on the effects of shocks on economic

growth. The core of the microeconomic approach to economic vulnerability concerns the possibility that household income may fall below a defined threshold (such as the poverty line) due to adverse shocks (Alwang et al., 2001).

The experiences of industrial oil-importing countries over the past quarter-century show that these countries have managed to reduce their dependence on fossil fuels and the vulnerability of their economies to oil price shocks through a combination of policies such as: diversification of the energy portfolio; improving energy efficiency; substituting other inputs such as labor and capital for energy; managing consumption, and creating strategic reserves. For instance, several studies have indicated that the dependence of OECD economies on oil has declined over time, implying that fluctuations in oil prices have become a less significant source of external shocks for these countries (Duval et al., 2007).

However, while oil-importing countries have increased their resilience against severe oil price fluctuations through energy diversification, such measures have been rare among oil-exporting nations. For developing, oil-dependent countries, per capita income alone cannot serve as a sufficient measure of development but indices such as economic vulnerability, which also account for structural weaknesses, must be considered.

2-8-Dimensions of Vulnerability

A)Structural Vulnerability: Structural vulnerability arises from the inherent features of a country's economic structure. Natural and climatic shocks such as earthquakes, floods, and droughts are key sources of structural vulnerability in many developing countries. Another source lies in external trade, for instance, dependence on global oil prices. Since most oil exporters are price takers, they are exposed to such shocks (Mirjalili, 2016).

In structural vulnerability, the determining factors of economic vulnerability stem from a country's intrinsic characteristics (such as population size, geographic area, remoteness, and trade dependence — as in oil-exporting countries), which are typically independent of reform policies but nevertheless lead to vulnerability. Structural vulnerability generates instability and has a negative impact on investment. Exchange rate volatility and investment instability often result from this type of vulnerability.

To address structural vulnerability, the Economic Diversification Index (EDI) has been proposed (Guillaumont, 2010). The main sources of structural vulnerability include: Natural disasters (earthquakes, floods, droughts); Geographic and demographic constraints (small size, remoteness), and Trade dependence (as in oil-exporting economies). Its consequences include exchange rate instability and reduced investment. Reducing structural vulnerability is difficult through short-term policies, as it requires long-term diversification and capacity building.

B) **Macroeconomic Vulnerability:** Macroeconomic vulnerability is related to economic policy. From a macroeconomic perspective, shocks affect economic growth. Economic and financial crises are forms of shocks that adversely affect growth — this constitutes macroeconomic vulnerability. In some macroeconomic literature, vulnerability is examined only in the context of financial crises, while other approaches define it more broadly — as an economy’s exposure to financial shocks and its limited adaptive capacity. When an economy has little flexibility to absorb shocks, growth is significantly hindered (Seth & Rajab, 2012).

Two main perspectives are discussed in the literature on macroeconomic vulnerability: The first perspective relates to capital flows and financial markets. This line of research examines how macroeconomic imbalances — such as misaligned asset prices or exchange rates — can trigger or accelerate financial, monetary, banking, or debt crises. The greater the macroeconomic imbalance, the higher the likelihood of a financial crisis. Macroeconomic vulnerability often results from policy choices and macroeconomic conditions such as excessive borrowing for unproductive purposes, a fragile financial sector, or an inflexible exchange rate regime (IMF, 1998). Part of macroeconomic vulnerability also stems from trade and financial shocks, which make developing countries particularly vulnerable (Seth & Rajab, 2012).

Second, perspective relates to exposure to risk and response capacity. This approach focuses on identifying structural conditions and transmission channels through which economies become exposed to financial and economic shocks. Exposure to such shocks adversely affects economic growth. In this view, macroeconomic vulnerability refers to the susceptibility of economic growth to these shocks. This conception of macroeconomic vulnerability has also been underscored by Briguglio (1995; 2009; 2016). In essence, economic vulnerability captures the structural characteristics that make an economy prone to external financial and economic shocks — such as dependence on oil revenues or export concentration.

Natural disasters adversely impact economic growth by destroying the stock of physical capital. The economy’s response capacity reflects its ability to mobilize resources for rebuilding capital. Studies on macroeconomic vulnerability often focus on growth volatility and long-term growth as indicators of an economy’s exposure to shocks. As Guillaumont (2010) has shown, the occurrence of shocks reduces average long-term growth in vulnerable economies. Unlike natural disasters, which are typically one-off shocks, economic shocks may recur and increase both growth volatility and instability.

Growth volatility is generally associated with lower average growth rates. Therefore, macroeconomic vulnerability is determined by three factors: Growth instability; Exposure to shocks, and the country’s adaptive capacity in responding to those shocks. Shocks determine macroeconomic vulnerability by reducing investment rates and productivity, thereby lowering economic growth (Guillaumont, 2010). Financial and

economic shocks are often transmitted from the global economy to national economies through trade and private capital flows.

When international prices fall and export revenues decline in economies that rely heavily on such exports, losses in trade revenues exert adverse effects on growth.

Similarly, if global economic downturns reduce foreign direct investment, developing countries that depend on such inflows experience slower growth. Hence, international trade and global capital flows serve as major transmission channels for economic shocks. Reducing macroeconomic vulnerability requires the following types of policy measures to enhance response capacity (Seth & Rajab, 2012): i) Policies to strengthen adaptive capacity — enabling economies to withstand and respond to shocks; ii) Policies to reduce exposure — lowering dependence on volatile markets or sectors; iii) Policies to mitigate the frequency and intensity of shocks — at both national and global levels. Most identified policy frameworks, however, tend to emphasize only one or two of these objectives, rather than adopting a comprehensive approach.

2-9- Briguglio's Economic Vulnerability Index

Briguglio (1995) considered one of the pioneering works in assessing the economic vulnerability of countries. In his paper, Briguglio identified factors such as country size and exposure to natural disasters as major sources of vulnerability. In subsequent research — particularly Briguglio and Galea (2003) — he introduced and calculated the Economic Vulnerability Index (EVI). Briguglio et al. (2008) examined the relationship between vulnerability, resilience, and per capita income using a cross-sectional regression model for eight countries. Their results showed that vulnerability has a negative effect, while resilience has a positive effect on per capita income.

In another influential work, Briguglio et al. (2009) elaborated on the concept of economic vulnerability and developed composite indicators for 86 countries. Based on these measures, countries were categorized into four groups: worst case; self-made; prodigal son, and best case.

Later, Briguglio (2014) computed the Economic Vulnerability Index for more than 180 countries worldwide using cross-sectional data for the period 2009–2011. In this empirical framework, he analyzed the impact of country size on vulnerability. The regression model included only one explanatory variable — population, representing economic size. The findings revealed that smaller countries are more exposed to external shocks and therefore more economically vulnerable.

Key Components of Briguglio's Economic Vulnerability Index: The main variables used as components of Briguglio's economic vulnerability index are: economic openness; export concentration, and dependence on strategic imports. Economic openness is typically measured as the ratio of exports, imports, or their average to GDP. In

Briguglio's calculations, the openness index equals the average of exports and imports as a percentage of GDP.

Export concentration is usually computed using UNCTAD's export concentration index, which covers goods trade only. Briguglio (1997) argued that export concentration may also occur in services trade, especially in tourism and financial services. In his calculations, the index includes both goods and services exports.

Dependence on strategic imports measures a country's dependence and vulnerability with respect to imports of raw materials, intermediate goods, or food products. According to Briguglio (1997), it can be expressed as average imports as a percentage of GDP, and this same measure was adopted in later calculations (Briguglio & Galea, 2010).

Empirical Findings: Briguglio and Galea (2010) estimated the Economic Vulnerability Index for 117 countries, using population size as an explanatory variable. Their results demonstrated a negative relationship between population size and economic vulnerability (composed of the openness, export concentration, and import dependence sub-indices). As these variables are measured in different units, Briguglio used a Max–Min normalization method to make them comparable. The formula is as follows:

$$Z_i = \frac{X_i - X_{\min}}{X_{\max} - X_{\min}}$$

Where:

X_i : Observed value of the variable for country i ,

X_{\max} : Maximum observed value,

X_{\min} : Minimum observed value,

Z_i : Normalized value between 0 and 1.

Finally, the average of the normalized sub-indices represents the overall Economic Vulnerability Index (EVI) (Briguglio, 2009).

In Briguglio (2014), the EVI was computed cross-sectionally for over 180 countries for the period 2009–2011, and normalized between 0 and 1 — where values closer to 1 indicate higher vulnerability.

The regression model included only one explanatory variable — country size, represented by population. The results confirmed that larger economies are less vulnerable, as they rely more on domestic markets and less on external trade, thereby reducing exposure to external shocks.

Given the growing energy needs of developing countries in pursuit of their development goals, the ratio of energy imports to total energy consumption is considered a suitable indicator of dependence on strategic imports. Data for the openness index and import dependence are sourced from the World Bank, while export concentration data are obtained from UNCTAD.

The results indicate that higher values of these indices correspond to greater economic vulnerability. For instance, in the case of Iran, the export concentration indicator has the highest relative contribution to overall economic vulnerability.

Therefore, the key policy implication is that reducing export concentration — by diversifying exports and restructuring foreign trade relations — should be the primary objective of policymakers seeking to reduce economic vulnerability and enhance economic resilience.

Table (3): Features of Economic Resilience and Vulnerability Indices

Feature / Component	Economic Resilience Index (Briguglio)	Economic Vulnerability Index (Briguglio)
Primary Objective	To measure the economy's capacity to absorb and respond to external shocks	To measure the extent to which the economy is exposed to external shocks
Conceptual Nature	Capacity for reaction and adaptation	Degree of exposure to risk and structural weakness
Calculation Method	Data normalization (Max-Min) and averaging of components	Data normalization (Max-Min) and averaging of components
Index Range	A numerical value between 0 and 1; the closer to 1, the higher the resilience	A numerical value between 0 and 1; the closer to 1, the higher the vulnerability
Main Components	Macroeconomic stability, market efficiency, good governance, social development, environmental management	Economic openness, export concentration, dependence on strategic imports
Macroeconomic Indicators	Budget deficit, misery index (inflation + unemployment), external debt	Import dependence, export concentration, economic openness
Market and Governance Indicators	Economic freedom index, government size, trade freedom, property rights, judicial independence	Not included (focus on commercial and demographic structures)

Social and Human Indicators	Education, health, poverty, long-term unemployment	Not directly considered
Environmental Indicators	Natural resource management, environmental regulations	Rarely considered or not included
Population / Country Size	Indirect effect on reaction capacity	Key variable in explaining vulnerability; smaller countries tend to be more vulnerable
Relationship with Economic Growth	Resilience has a positive effect on growth	Vulnerability has a negative effect on growth
Data Sources	World Bank, Fraser Institute, UNDP, HDI index	World Bank, UNCTAD, international trade data
Iran's Ranking	Classified among low-resilience countries (rank 63 out of 86 in the 2008 version)	Classified among highly vulnerable countries (index 0.389 in the 2014 version)

2-10-Guillaumont's Economic Vulnerability Index

Guillaumont (2009) examined the Economic Vulnerability Index (EVI) across various countries. In this study, he demonstrated that, in addition to per capita income and human capital, the Economic Vulnerability Index can be used to indicate a country's relative status.

There are several methods for measuring the size of a country; however, the most common and significant indicator is its population. For assessing economic outcomes, the size of a country is usually measured independently of its per capita income, most commonly through population size. Country size is a structural determinant of the trade-to-GDP ratio (Guillaumont, 1989; 1994). The impact of export instability and export growth is more accurately estimated when the variable of export instability is weighted by the export-to-GDP ratio — that is, when instability carries greater weight.

Population size can influence vulnerability and growth through social cohesion. If social breakdown acts as a negative factor and increases with population size, it can lead to lower growth, since this structural factor affects exposure to shocks or the ability to recover from them.

Nevertheless, cross-country regression results indicate that when appropriate control variables are included, population size (in logarithmic form) is a significantly positive

determinant of growth (Guillaumont & Guillaumont, 1988; Guillaumont & Chauvet, 2001) and a negative determinant of export instability.

Guillaumont's Economic Vulnerability Index is a composite measure calculated from seven indicators — four representing *shocks* and three representing *exposure to shocks*. Equal weights are assigned to the aggregate of the shock indicators and the aggregate of the exposure indicators. Within the shock indicators, equal weights are given to natural and external shocks, while within the exposure indicators, equal weights are assigned to population size and the other indicators.

Climatic and other natural shocks are the main sources of vulnerability in many developing countries. These include various types of natural disasters such as earthquakes, severe storms or cyclones, floods, and droughts. The average proportion of the population affected can be used as an indicator, and the percentage of the population displaced due to natural disasters (the *homelessness index*) has been included as part of the EVI since 2003.

Given that not all natural shocks are officially recorded as natural disasters, an alternative proxy was needed. The instability of agricultural production, measured relative to its trend, was chosen. While the long-term trend in agricultural output may depend largely on a country's economic policies and other structural factors, deviations around that trend can reflect the occurrence and severity of natural shocks, which typically affect agricultural output. Therefore, this indicator was retained as part of the Economic Vulnerability Index.

The *trade shock indicator* is represented by the instability of export earnings around their trend, and it can be applied to both goods and services exports, since shocks affect both categories. In small developing economies, service exports often account for a substantial share of total revenue. Some fluctuations in export volume relative to trend may stem from policy instability, though policy generally affects long-term trends more than short-term volatility.

The *exposure to shocks* component is of particular importance for two reasons. First, the stronger the impact of a shock, the more exposed a country is. Second, the shock indicators depend on the frequency of past events. Several measures are used to capture exposure to shocks: i) The logarithm of population size; ii) The export concentration index — as calculated by UNCTAD for a long time and widely used in the literature since the first definition of the Economic Vulnerability Index — though it covers only merchandise exports, not services; iii) The share of agriculture (as opposed to manufacturing and modern services) in total output, included since 2003 to reflect exposure to both trade and natural shocks.

Considering all these indicators, it appears that, on average, *least developed countries (LDCs)* are more economically vulnerable than other groups of countries.

Table (4): Economic Vulnerability Index (EVI) Scores for Selected Countries

Country	EVI Score
China	0.000
United States	0.046
Germany	0.076
Turkey	0.140
India	0.154
Russia	0.184
Iran	0.389
Egypt	0.504
Singapore	0.743

2-11-OECD Economic Vulnerability Index

The OECD Economic Vulnerability Index divides vulnerabilities into six major domains: financial sector imbalances; non-financial sector imbalances; asset market imbalances; public sector imbalances; external sector imbalances; and spillover, contagion, and global risk factors.

(a) Financial Sector Imbalances: Financial sector imbalances are categorized into three groups: i) Leverage and excessive risk-taking — including indicators such as leverage ratios, capital adequacy ratios, and lending standards. ii) Currency and liquidity mismatches — which increase liquidity risk. This category includes the ratio of liquid assets to short-term liabilities, the loan-to-deposit ratio, and the foreign exchange position of the financial sector. iii) Exposure to market risks — such as banks' exposure to sovereign bond markets or housing markets.

(b) Non-Financial Sector Imbalances: This category focuses mainly on vulnerabilities arising from household and non-financial corporate balance sheet imbalances, which may trigger financial instability. Indicators include measures of credit and credit growth to households and non-financial corporations, as well as various debt indicators (e.g., gross financial liabilities, foreign currency debt, and short-term debt).

(c) **Asset Market Imbalances:** Asset market imbalances primarily relate to misalignments in housing and equity markets. Key indicators include real house prices, the house price-to-income ratio, disposable rent levels, and real stock prices.

In addition to their interaction with private sector balance sheets, housing price booms can significantly affect the real economy — particularly when accompanied by surges in residential investment, as observed in several European countries before the financial crisis.

To capture the housing–real economy linkage, the dataset includes indicators such as the share of residential investment in GDP and the share of employment in construction.

(d) **Public Sector Imbalances:** Public sector imbalance indicators primarily relate to sovereign default risk, including measures of fiscal solvency and debt sustainability. Short-term fiscal risk indicators include the budget balance, gross public debt, and the spread between sovereign bond yields and the potential GDP growth rate. Long-term fiscal risk indicators include projected public expenditure on pensions and healthcare, as well as the forecasted age-dependency ratio.

(e) **External Sector Imbalances:** External imbalances are captured through indicators such as the current account balance, external debt, foreign direct investment positions, liquidity mismatches, foreign reserves, and the real effective exchange rate.

Therefore, the most important indicators of economic vulnerability include: Economic openness; Export concentration; Dependence on strategic imports, and Exposure to natural disasters. To improve a country’s vulnerability index, policymakers can adopt strategies such as economic diversification, broadening the network of trading partners, and enhancing productivity to strengthen the production of goods and services.

All in all, reducing economic vulnerability requires enhancing shock absorption capacity — through the establishment of financial reserves, strategic reserves, and institutional flexibility; reducing exposure to shocks — by diversifying trade partners and export portfolios; shock mitigation strategies — by participating in international coordination mechanisms aimed at reducing the frequency and severity of global shocks.

Conclusion

This study provides a systematic examination of the concepts of economic resilience and vulnerability, alongside their operationalization through widely used indices. Economic resilience, conceptualized as the capacity of an economy to absorb, adapt to, and recover from external shocks, contrasts with economic vulnerability, which reflects structural weaknesses and the degree of exposure to such shocks. The comparative analysis of

Briguglio's indices highlights both conceptual and methodological distinctions: resilience indices emphasize adaptive capacities across macroeconomic, social, governance, and environmental dimensions, while vulnerability indices focus on structural dependencies, such as export concentration and import reliance. The evidence underscores that these indices are complementary rather than mutually exclusive, offering distinct but interrelated perspectives on an economy's stability. Furthermore, the study demonstrates that country-specific factors—particularly size, institutional quality, and structural openness—significantly shape both resilience and vulnerability profiles. For policymakers, this suggests that strengthening adaptive capacities, promoting diversification, and improving governance can simultaneously enhance resilience and mitigate vulnerability. Overall, a comprehensive understanding of economic resilience and vulnerability is critical for designing effective economic policies capable of sustaining growth under external shocks. Future research should aim to refine these indices by incorporating dynamic, shock-specific measures and integrating micro-level data to capture heterogeneous responses across sectors and regions.

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