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Theoretical and Empirical Analysis of Economic Resilience Index

Sadegh Bakhtiari*, Farzam Sajjadieh

Department of Economics, Isfahan (Khorasan Branch, Islamic Azad University, Isfahan, Iran.

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Abstract

Resilience is defined in different ways by different disciplines and different authors, but in general, resilience may be defined as the ability of a system and its component parts to anticipate, absorb, accommodate, or recover the effects of a hazardous event in a timely and efficient manner. Resilience is applicable at the micro level as well as macro level. Therefore, it is sometimes defined as the ability of an individual, a household (i.e., micro level), a community, a country or a region (i.e., macro level) to withstand, cope with, adapt, and quickly recover from shocks without compromising long-term development. In this paper economic resilience is defined as the capacity of an economy to resist shocks and withstand the effects of a shock and to avoid the shock altogether. The paper tries to follow the UNDP procedure in presenting Human Development Index. Thus, the same procedure will be followed to provide an Economic Resilience Index (ERI). This resilience index will be applied for a group of developing countries including Iran, and the findings will be analyzed.

1. Introduction

Countries of the world are subject to a wide range of adverse economic shocks, such as financial crises, debt crises, fluctuations in commodity prices and/or general fluctuations in the world economy. Such shocks tend to increase risks and uncertainties in households, investors and governments. While the scale of shocks increases, crises would be exacerbated. Thus, the economy deviates from its growth path, and would be directed towards a long-term recession. Meanwhile, setting a policy landscape needs identifying factors that improve economic resilience in confrontation with such shocks. In other words, it leads to an increase in the economic capacity while coping with the shocks. An economy is resilient when it can neutralize and/or minimize the marginal effects of shocks in addition to absorbing and/or recovering from their negative effects. Resilience and flexibility are correlated to each other in a way that a resilient economy can quickly recover after each negative shock; it can take an action to moderate adverse effects to minimize these negative effects.

* bakhtiari_sadegh@yahoo.com

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Accordingly, the present paper consists of six main sections; the introduction is the first section. In the second section, the concept of economic resilience will be analyzed at micro and macro levels. The third section separately explains the components of economic resilience, including macroeconomic stability, microeconomic market efficiency, human development, good governance as well as the indicators of each of the mentioned components. In the fourth section, a new framework, which is appropriate for developing countries, will be provided to measure economic resilience at a macro level. Furthermore, considering the empirical part and application of ERI, a somehow homogeneous set of developing countries, which are members of the organization of Islamic countries and are relatively similar in terms of human and social development and income levels are chosen for the time interval 2005-2014. In the fifth section, the findings will be analyzed, and finally a summary and conclusion will be presented.

2. Economic Resilience

[Caldera-Sanchez et al. \(2016\)](#), defined economic resilience as “the ability of an individual, a community or a country to reduce vulnerabilities, to resist to shocks and to recover quickly. It can be strengthened by exploring the role of policies that mitigate both the risks and consequences of severe crises. In the case of risks, this means developing adequate tools to detect the types of vulnerabilities that create the conditions for adverse shocks to turn into crises, and to take actions to stem the build-up of such vulnerabilities before it is too late.”

The issues of resilience and resilience building are important for households as well as nations. "Consideration of resilience building also conveys the message that vulnerable groups should not be self-satisfied in the face of their economic vulnerability, but could, and should, adopt policy measures to enable them to improve their ability to cope with the shocks" ([Briguglio et al., 2008](#)).

According to [Briguglio \(2014\)](#), there are two essential conditions for economic resilience:

- The ability to withstand shocks
- The ability to recover from the effects of adverse shocks

In fact, the ability to withstand shocks “relates to the ability to absorb shocks, so that the end effect of a shock is neutered or rendered negligible. This type of resilience occurs when the economy has mechanisms in place to reduce the effects of shocks, which can be referred to as shock absorption. For example, the existence of a flexible, multi-skilled labor 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 recover from the effects of adverse shocks is associated with the flexibility of an economy,

enabling it to bounce back after being adversely affected by a shock" (Briguglio, et al., 2008).

3. Components of Economic Resilience

Briguglio et al. (2005), developed a framework for measurement of economic resilience. The present paper follows the same structure but with different indicators and different procedures. The components related to absorbing and neutralizing shocks in the process of strengthening an economy are divided into five main components, including macroeconomic stability, market efficiency, good governance, human development and risk management. They are explained as follows.

3.1 Macroeconomic Stability

If a macro economy is not in a desirable status in terms of stability, fiscal and monetary policies not only will be inefficient in the use of resources, but also will be unable to protect the economy against the incurred shocks. 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 would be characterized by internal balance, as manifested in a sustainable fiscal position, low inflation and an unemployment rate close to the natural rate, as well as by external balance, as reflected in the international current account position or by the level of external debt (*Ibid*).

In order to measure the stability of the macroeconomic environment, and given the limitations of the statistical information, three main components, including the rates of unemployment, inflation and the gross domestic product (GDP), are used in this study. Inflation refers to the rate of change in the price index in terms of percentage over a given period; unemployment indicates a part of workforce who is unemployed but is ready to work and searches for a job opportunity with wages common in the labor market; GDP is the total market value of all final goods and services produced by a country's economy during a specified period of time, normally a year. While being strongly related to economic policies, the mentioned variables can be considered among appropriate components of economic resilience when facing with negative shocks. In case of acceptable inflation and unemployment rates, economic resilience will be associated with bearing lower welfare costs against unpleasant external changes. While being, by themselves, good indicators to measure economic resilience, inflation and unemployment can potentially contain implicit information about the variable budget deficit, too. This is because inflation and unemployment, in addition to being influenced by fiscal policies, are strongly influenced by monetary policies and fiscal policy of the government (*Ibid*).

3.2 Market Efficiency

Economics takes markets and their performance efficiency into consideration through the price mechanism as an appropriate method in resource allocation. If, in reaching a balance, markets have high speed and compatibility, the effects of shocks incurred on the economy will easily be neutralized. However, if the imbalance continues to exist in a market, especially when faced with negative shocks, resources available in the economy will not be effectively allocated, and as a result, the economy will witness welfare costs in the flow of capital unutilized resources, as well as deficiencies or dissipation in the commodity market (*Ibid*).

In this study, market efficiency includes three main components of “goods market, labor market and financial market efficiency, which are measured by business freedom, labor freedom and financial freedom index, respectively”. The averages of the three indices have been used to build the market efficiency index.

In what follows, each of them will be explained.

- a) Business Freedom: The ability to establish and run a firm without the intervention particularly of government is one of the most fundamental elements of economic freedom. By increasing the costs of production, regulations can make it difficult for the firms to succeed in the marketplace. According to [Miller et al. \(2018\)](#) “Although many regulations hinder business productivity and profitability, the ones that mostly inhibit entrepreneurship are often those that are associated with licensing new businesses. In some countries, as well as many states in the United States, the procedure for obtaining a business license can be as simple as mailing a registration form with a minimal fee. In Hong Kong, for example, obtaining a business license requires filling out a single form, and the process can be completed in a few hours” (*Ibid*).
- b) Labor Freedom: From supply point of view, finding work and employment opportunities is the essential element of the labor freedom, and from the demand point of view firms should be free to hire labors and could easily fire them whenever they are no longer needed. In fact, labor freedom occurs in a free market economy, in which the allocation of resources is determined only by the supply and the demand for them. The core principle of a free market economy is voluntary exchange. That is true in labor market as it is in other markets. Some economists consider resource allocation in a free market economy as Pareto efficient because no one can be made better off without making other individuals worse off.
- c) Financial Freedom: Financial freedom is considered as a measure of banking efficiency and a measure for financial sector to be independent from government interventions since it is generally believed that government intervention reduces competition, decreases

efficiency and lowers the level of available services. According to [Miller et al. \(2018\)](#) "In an ideal banking and financing environment where a minimum level of government interference exists, independent central bank supervision and regulation of financial institutions are limited to enforcing contractual obligations and preventing fraud. Credit is allocated on market terms, and the government does not own financial institutions. Financial institutions provide various types of financial services to individuals and companies. Banks are free to extend credit, accept deposits, and conduct operations in foreign currencies. Foreign financial institutions operate freely and are treated the same as domestic institutions".

3.3 Good Political Governance

Good governance means that using some mechanisms, processes and organizations, the authorities of a country should deal with establishing the rule of law, protecting property rights and delivering efficient public services in addition to managing the country's affairs.

Since 1996, in order to assess the quality of governance around the world, the World Bank has used six components to build the governance index: voice and accountability, regulatory quality, rule of law, government effectiveness, political stability, and control of corruption. The present study also used the average of the above six indices in order to build the governance index. The aforementioned indices are defined based on [Kaufmann et al. \(2011\)](#) as follows.

- a) Voice and accountability: They refer to citizen participation. All men and women should have a voice in all decision-making situations, directly or indirectly. Such broad participation is based on freedom of association, freedom of speech and independent media.
- b) Regulatory quality: This indicator may be defined as the ability of the government to provide and implement such policies and regulations that promote development of the private sector.
- c) Rule of law: It indicates that individuals and government should submit, obey and be regulated by law, and no arbitrary action by an individual or a group of individuals, the quality of contract enforcement, property rights, the police, and the courts should be subject to the rule of law.
- d) Political stability: It indicates the absence of any kind of treat against the state, violence or any form of political instability.
- e) Control of corruption: This indicator "captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of the state by elites and private interests" ([Kaufmann et al., 2011](#)).

3.4 Human Development

Human development is another component of economic resilience. This factor represents the level of development in a society and effective performance of economic systems without suppression of civil unrest. Effective social dialogs, their role in the economy, and collaborative approaches towards the undertaking of corrective measures in the face of negative shocks are among the elements of social cohesion and solidarity. According to [Human Development Reports \(HDR\)](#), the Human Development Index (HDI) consists of three main components, each of which covers a part of the dimensions of human development. These three components include long and healthy life, accessing knowledge, and enjoying a decent standard of living. To calculate the HDI, the United Nations Development Program (UNDP) used life expectancy at birth (as a measure of healthy and long life), adult literacy rate and the gross enrollment ratio (as a measure of accessing knowledge), and GDP per capita (as a measure of enjoying a decent standard of living). These components were used until 2010, and from that time, the component knowledge has been changed to mean and expected years of schooling (as a measure of accessing knowledge).

3.5 Risk Management (as a Resilience Strategy)

All economic factors at all levels from micro to macro face different types of risks. Risk management is the process of identifying, assessing, controlling and monitoring the risks that the economic factor faces with. It enables economic factors to act more effectively in confrontation with different types of risks. Thus, it reduces the costs of risks as soon as possible. The following figure, while explaining the four stages of risk management, brings up the specific problem of each stage in the form of a question.

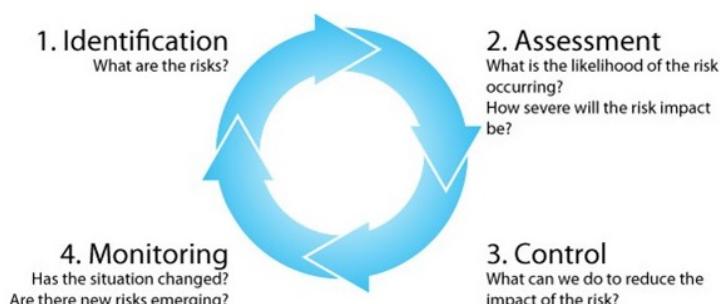


Figure 1. Conceptual framework of risk management analysis

If risks that the economy faces in the economic environment of a country are identified and accurately evaluated (Stages 1 and 2), appropriate policies are adopted, and correct implementation of policies is closely monitored in Stage 3.

The economy will be able to overcome such risks healthily. Thus, it witnesses the more resilient economy.

Of course, it should be noted that having knowledge about the risks requires an understanding of each point of this chain, which precisely encompasses damaging factors (e.g., incidents, events), damageable resources (e.g., staff, assets, liabilities and incomes), and the type of the effect of the first factor on the second factor (e.g., types of damages). Risk management helps humans protect themselves, their assets, and their activities against everyday incidents. It brings regulations and methods, while considering which individuals, economic (industrial and commercial) and non-profit institutions, as well as governments can perform their prospective tasks in assessing, controlling and financing damages. Accordingly, it sets up a systematic approach towards the risks. To this end, it always seeks the answers to two fundamental questions about possible contingencies in the future. The first question asks, "What will happen?", and the second one is "What has to be done?"

An index called the Risk Preparation Index (RPI) was introduced in the HDR (2014). However, unfortunately, it has not been possible to provide necessary information about it for the countries and the period under consideration.

Although an applicable risk management index could not be finalized yet, while enjoying the above five main components, it is supported that a resilient economy is an economy that can identify and assess different types of risks ahead before the occurrence, and can bring them under control and monitor them after the occurrence. Hence, the present paper considers risk management as one of the main components of resilience in a manner that will be explained.

4. A Framework to Measure Economic Resilience Index

The framework intended to measure economic resilience consists of the same procedure as the one used by the UNDP to measure the HDI. For this purpose, the UNDP first considers certain dimensions and introduces indicators for each one. Then, after standardization and determination of appropriate weights, the HDI is calculated. To follow this procedure, we will consider the diagram below for the ERI.

Table 1. The Components of Economic Resilience Index (ERI)

Dimensions	Macroeconomic stability	Market efficiency	Good governance	Human development
Indicators	Inflation	Business freedom	voice and accountability	life expectancy
	Unemployment	Financial freedom	regulatory quality	adult literacy rate
	GDP Growth	Labor freedom	rule of law government effectiveness	gross enrollment ratio
			political stability	GDP growth per capita
			control of corruption	
Dimensions index	Stability index	Efficiency index	Governance index	HDI

Based on the Table 1, in order to measure ERI, four main components, including macroeconomic stability, market efficiency, good governance, and human development were used. By following the UNDP to measure each of these four dimensions separately and considering the data limitations at hand, the indicators that had the highest power in the conceptual covering of the dimensions were used.

After aligning the inflation rate, unemployment rate, and GDP growth, the average was used to measure macroeconomic stability. In order to measure market efficiency, the average of three variables of labor market, financial market and commercial market efficiency were used. In the next stage, an average of the six indices forming good governance was considered as a measure of the quality of governance. Finally, the same method and procedure implemented by the UNDP to measure HDI was used in this study. At the first step (i.e., standardization), to create sub-indices for each dimension based on the maximum and minimum values (i.e. goalposts during the time period) goalposts were set in order to convert the indicators into indices with values between 0 and 1 using the following formula:

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

Considering the data limitations and the requirements to use information reported by accredited international organizations, the period between 2005 and 2014 was considered as the time span of the study. In addition, due to the

aforementioned constraints, twelve countries from the Organization of Islamic country (OIC) member states (i.e., Iran, Albania, Algeria, Azerbaijan, Kazakhstan, Malaysia, Tunisia, Egypt, Indonesia, Kyrgyzstan, Oman and Jordan) were considered in this study. In addition to their membership in the OIC, as it can be seen in Table 2, all selected member states were, more or less, within the same range in terms of income level and human development.

Table 2. The value of HDI and income level of the selected countries

OIC Members	HDI (10 years average)	Income Level
Iran	0.742	Upper middle income
Albania	0.757	Upper middle income
Algeria	0.716	Upper middle income
Azerbaijan	0.740	Upper middle income
Jordan	0.728	Upper middle income
Kazakhstan	0.762	Upper middle income
Malaysia	0.781	Upper middle income
Tunisia	0.723	Lower middle income
Egypt	0.668	Lower middle income
Indonesia	0.666	Lower middle income
Kyrgyzstan	0.647	Lower middle income
Oman	0.795	High income

Source: HDR (2014)

The theoretical and empirical aspects of the study were considered based on reliable sources, and a descriptive analysis was used to review the literature on the issue. Moreover, all the data and information needed in this study were extracted from the websites of the World Bank and WDI as well as the HDR.

The average HDI in the time interval considered in this study (i.e. from 2005 until 2014) and the respective income level of the member states are reported in Table 2.

5. Analysis

By following the same procedure which was explained in the previous section, the ERI were calculated for the twelve selected countries in the mentioned time interval; they are presented in Table 3. As it was explained, the aforementioned ERI are between zero and one, with zero being the lowest level of economic resilience.

Table 3. Economic resilience values

NO	OIC Members	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	Albania	0.38	0.53	0.68	0.63	0.43	0.47	0.43	0.46	0.39	0.55
2	Algeria	0.84	0.64	0.53	0.45	0.20	0.34	0.26	0.34	0.32	0.33
3	Azerbaijan	0.37	0.46	0.45	0.33	0.50	0.39	0.26	0.35	0.60	0.66
4	Egypt	0.68	0.61	0.68	0.75	0.63	0.58	0.38	0.37	0.30	0.31
5	Indonesia	0.43	0.42	0.69	0.54	0.18	0.47	0.53	0.58	0.65	0.71
6	Iran	0.75	0.65	0.67	0.37	0.27	0.47	0.43	0.33	0.44	0.49
7	Jordan	0.96	0.73	0.74	0.57	0.44	0.22	0.26	0.30	0.35	0.38
8	Kazakhstan	0.52	0.79	0.74	0.53	0.42	0.54	0.57	0.49	0.48	0.74
9	Kyrgyz	0.24	0.39	0.57	0.50	0.28	0.39	0.62	0.54	0.81	0.63
10	Malaysia	0.58	0.54	0.66	0.30	0.36	0.43	0.44	0.52	0.54	0.79
11	Oman	0.48	0.48	0.57	0.76	0.64	0.64	0.25	0.56	0.50	0.56
12	Tunisia	0.58	0.78	0.77	0.57	0.41	0.45	0.29	0.57	0.47	0.51

Source: Research calculations

In Table 4, the minimum, maximum and average value for each member state are shown.

Table 4. Min, max and average values of ERI

Rank	OIC Member States	Min	Max	Average
1	Kazakhstan	0.42	0.79	0.582
2	Oman	0.25	0.76	0.544
3	Tunisia	0.29	0.78	0.540
4	Egypt	0.30	0.75	0.529
5	Indonesia	0.18	0.71	0.520
6	Malaysia	0.36	0.79	0.516
7	Kyrgyzstan	0.24	0.81	0.495
7	Albania	0.38	0.68	0.495
7	Jordan	0.22	0.96	0.495
8	Iran	0.27	0.75	0.487
9	Azerbaijan	0.26	0.66	0.437
10	Algeria	0.20	0.84	0.425

Source: Research calculations

If countries are ranked based on the average, as Table 4 shows, Kazakhstan with the average value of 0.582 is ranked the highest while Algeria with the average value of 0.425 is ranked the lowest in terms of economic resilience. In this ranking, Albania, Jordan and Kyrgyzstan have the same average of 0.495. Thus, they are considered in the seventh place. Iran with the value of 0.487 has the eighth rank among the twelve member states under consideration.

Despite enjoying vast and rich natural resources such as uranium, chromium, zinc, lead, manganese, copper, coal, iron, gold, oil and natural gas, Kazakhstan has continuously emphasized the importance of moving away from oil revenues. In this regard, investing in residential and recreational centers and

preparing the necessary grounds for hosting international sport games and events were the most important actions taken by this country. This adds to the revenues obtained from natural resources. These aspects have improved the overall ranking of Kazakhstan to enjoy the highest ranking in this study.

Algeria is a country previously ruled under colonialism, and engaged in civil and interstate wars for several years. The people of this country have long been engaged in agricultural activities, and this profession is still an important part of the country's economy. However, the class contradiction in this country has been deterrent to the prosperity of the nation. Agricultural activities have been deteriorated over the years through the presence of sandstorm and other natural disasters and the lack of proper planning on behalf of the government to curb such natural phenomena. Despite multiple tourist attractions in Algeria, the tourism industry does not play an important role in the economic prosperity of this nation due to various factors, including political and cultural isolation following 1962 revolution. The combination of the above factors and the absence of an efficient management system are the reasons why Algeria is currently ranked last in economic resilience amongst the selected member states in this study.

From among these countries, Iran should be considered as special case, due to the following reason. In fact, during the period under consideration Iran confronted with a number of major difficulties and obstacles mainly economically. Figure 2 shows the descending trend during the mentioned years which have been accompanied with difficulties thereafter.

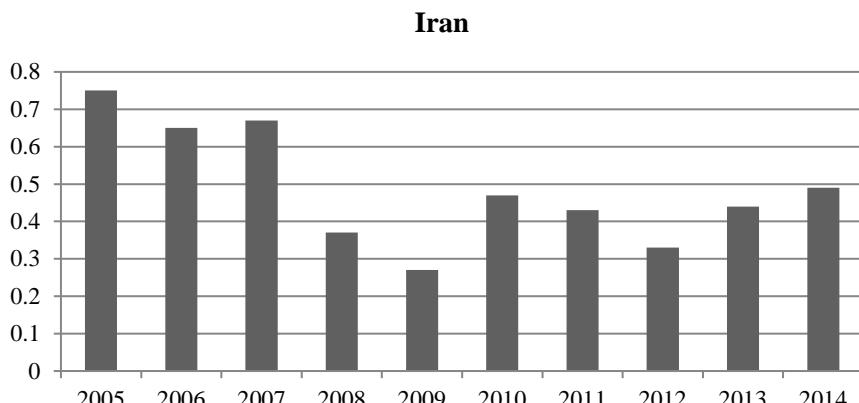


Figure 2. Economic Resilience Index of Iran during 2005-2014

The complex structure of international economic sanctions on Iran has become much more severe and complicated after the adoption of UN security council resolution 1696 in July 2006. Some of the economic impacts of the UN resolutions that appear during the time interval are as follows.

These resolutions have imposed various basic, yet important, sanctions, and has been the basis and the source of international legitimacy for the entire structure of many other international sanctions.

During this period, USA and EU's unilateral sanctions, which extended far beyond the UN sanctions, affected all major fields of the Iran's economy. In fact, USA pressure and encouragement led other governments to join the UN sanctions and to add their own unilateral sanctions as well. Particular emphasis has been put on the banks, insurance companies, and other business companies, which were trading with Iran. Thus, trading with Iran, dealing with Iranian banks and investing in Iran's oil sector has been much more difficult than before. The wide range and complexity of these sanctions have helped creating a situation which most likely was one of the main contributing reasons of Iran's rank in this study.

6. Concluding Remarks

Resilience has different meanings based on the considerations. Specifically, in terms of economics, it is applicable in micro as well as macro levels. Economic resilience is defined as the capacity of an economy to resist shocks, to withstand the effects of a shock and to avoid the shocks altogether.

The main dimensions or components of economic resilience which are related to the absorbing and neutralizing shocks in the process of strengthening an economy are classified to four main components, namely macroeconomic stability, market efficiency, good governance and human development.

To construct a resilience index, this study provided a composite index to cover the above four dimensions. The framework for this index is the same as the one UNDP uses for calculating HDI. After providing this measure, due to data limitations, it was applied for 12 developing countries during the period of 2005 to 2014.

The countries were ranked based on the average of calculated ERI. The first rank was Kazakhstan, and the last one was Algeria; Iran was at the 8th place. The study showed that the papers' findings are consistent with realities of the aforementioned countries. In case of Iran, the paper argued that during this period, Iran confronted with several major economic and political sanctions from various international players, such as the United States, European Union and other unilateral sanctions in many cases even beyond the UN security council resolutions; those have serious effects on all aspects of Iran's economy. In fact, those factors were the contributing factors to Iran's rank in this study.

Note: *It should be mentioned that the present paper is a modified version of the one, which was presented at the 2017 Australian Conference of Economists (ACE 2017), and we confirm that this work is original and has not been published yet.*

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