

A review and analysis of conducted researches in the field of economic resilience and the role of Fin-Tech in this field

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Abstract

Economic resilience has been defined as the measurement of a system's ability to absorb change, the rate at which a system returns to its original state, the capacity of a system to absorb turbulence and reorganize, and the ability of a system to withstand pressure. Several indicators have been designed and developed for measuring the resilience of a system.

It is necessary to mention that national economy resilient can be achieved by increasing the economic resilience and therefore after facing with internal challenges or external tensions, the economy will be returned immediately to its desired level.

Keywords

economic resilience, resistance economics, financial technology.

1. Introduction

In today's turbulent and uncertain world, economic and social systems face with many unpredictable dangers which our knowledge about their effects and consequences is low. The best way to deal with these risks is to promote national resilience. A resilient system can absorb temporary or permanent hazards and adapt to rapidly changing conditions without losing its function.

In fact, strengthening the national economy against changes, risks and internal or external threats for achieving the goals of country's vision is resilience.

For national resilience, economic, social, governance, technology and environmental subsystems should be designed in such a way that they can absorb internal and external risks and adapt themselves to the highly evolving environment while maintaining the stability and functions of the system.

Needless to say, the reason for emphasizing the importance of resilience is due to the dangers that the country faces. The risks posed by fluctuations in oil exports and international sanctions (as an example of external risks) on the Iranian economy warn that the resilience of the national economy to external disturbances is crucial. In the country's vision document, promotion of national resilience is crucial.

Assessing a country's resilience to global risks requires a definition of risks in their appropriate organizational context. Three types of risk are defined as follows;

- 1) Preventable hazards; Such as failure of processes or human error
- 2) Strategic risks; After evaluating them, they receive voluntary rewards and accept them voluntarily.
- 3) External hazards; Which are beyond the capacity to influence or control the individual.

It is suggested that conventional risk management approaches can be adopted for the first two types of risks. This can be achieved by focusing heavily on organizational culture and adhering strictly to regulatory, technical, or institutional guidelines. Given

the exogenous nature of external hazards, the preferred approach for the third type of hazards is resilience.

Measuring the amount of resilience is the first step for having a resilient economy. Many indicators have been presented and developed to measure the degree of resilience of an economy. In this paper, we will review the resilience indicators which have been defined by Berman et al. and Brigoglio et al.

2. Theoretical

2.1. Definition of resilience

Resilience has its roots in physics and means jumping backwards. Resilience is the speed at which the system returns to equilibrium. It can also be defined as the ability to resist against threats and to get rid of threats' consequences (Rafieian et al, 1390).

According to Brigoglio et al., resilience can be shown as three hidden abilities in an economy:

- 1) The ability of an economy to avoid the shocks when a negative external shock affects a sector of the economy. The ability of the economy to avoid shocks can be the opposite of the vulnerability of the economy.
- 2) The ability of an economy to withstand the effects of these shocks occurs when the adverse effects of shocks are absorbed or neutralized. This type of resilience is possible when the economy has mechanisms to reduce the effects of shocks and is associated with shock absorption. For example, having a flexible financial market and a multi-skilled workforce can be mentioned as a tool to absorb shocks.
- 3) The ability of an economy to recover quickly from destructive external shocks can be enhanced by using policy tools to counter the effects of negative shocks. For example, in strong financial conditions, policymakers can use tax cuts to counter the effects of shocks (Brigoglio, 2006).

3. Economic resilience indicators

3.1. The components of the resilience index in terms of Brigoglio

The resilience index proposed in this section is intended to measure the effect of shock absorption or shock counteraction policies across countries. It is hypothesized that the variables that capture these effects are the following:

- macroeconomic stability;
- microeconomic market efficiency;
- good governance; and
- social development.

Macroeconomic stability

Macroeconomic stability relates to the interaction between an economy's aggregate demand and aggregate supply. If aggregate expenditure in an economy moves in equilibrium with aggregate supply, the economy would be characterized by internal balance, as manifested in a sustainable fiscal position, low price 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.

These can be considered to be variables which are highly influenced by economic policy and which could act as good indicators of an economy's resilience in facing adverse shocks.

The macroeconomic stability component of the resilience index proposed in this study consists of three variables, namely (i) the fiscal deficit-to-GDP ratio; (ii) the sum of the unemployment and inflation rates; and (iii) the external debt-to-GDP ratio. The variables are available for a reasonably wide set of countries spread over a spectrum of stages of development, size and geographical characteristics.

Fiscal deficit

The government budget position is suitable for inclusion in the resilience index because it is the result of fiscal policy, which is one of the main tools available to government, and relates to resilience of a shock-counteracting nature. This is because a healthy

fiscal position would allow adjustments to taxation and expenditure policies in the face of adverse shocks. The fiscal deficit, standardized as a ratio to GDP, is thus included in the resilience index proposed in this study.

Inflation and unemployment

Price inflation and unemployment are also considered to be suitable indicators of resilience and at the same time they potentially provide additional information to that contained in the fiscal deficit variable. This is because price inflation and unemployment are strongly influenced by other types of economic policy, including

monetary and supply-side policies. They are associated with resilience because if an economy already has high levels of unemployment and inflation, it is likely that adverse shocks would impose significant costs on it. If on the other hand, the economy has low levels of inflation and unemployment, then it can withstand adverse shocks to these variables without excessive welfare costs. In this sense, therefore, unemployment and

inflation are associated with resilience of a shock-absorbing nature. The sum of these two variables, also known as the economic discomfort index (or economic misery index), is thus included in the resilience index proposed here.

External debt

The adequacy of external policy may be gauged through the inclusion of the external debt-to-GDP ratio. This is considered to be a good measure of resilience, because a country with a high level of external debt may find it more difficult to mobilize resources in order to offset the effects of external shocks. Thus, this variable would

indicate resilience of a shock-counteracting nature. The sources of the data and country rankings associated with the macroeconomic stability component of the resilience index are presented in Table 1A in the Appendix.

As can be seen, a number of small states, notably Singapore and Hong Kong, obtain relatively high scores on this component.

Microeconomic market efficiency

The science of economics views markets and their efficient operation through the price mechanism as the best way to allocate resources in the economy. If markets adjust rapidly to achieve equilibrium following an external shock, the risk of being negatively affected by such a shock will be lower than if market disequilibria tend to persist. Indeed, with very slow or non-existent market adjustment, resources will not be efficiently allocated in the economy, resulting in welfare costs, manifested, for instance, in unemployed resources and waste or shortages in the goods markets. These considerations have important implications for shock-absorbing resilience.

Not many indicators of market efficiency are available, which span a sufficiently wide range of countries as required for the purpose of this study. Following a search for suitable indicators, it was decided to use a component of the *Economic Freedom of the World Index* (Gwartney and Lawson 2005), entitled 'regulation of credit, labour and business' which is aimed at measuring the extent to which markets operate freely,

competitively and efficiently across countries. It is designed to identify the effect of regulatory restraints and bureaucratic procedures on competition and the operation of markets.

In the financial market this index assesses the extent to which (i) the banking industry is dominated by private firms; (ii) foreign banks are permitted to compete in the market; (iii) credit is supplied to the private sector; and (iv) controls on interest rates interfere with the credit market. All these relate to the degree of interference by government in the financial market, which could preclude the economy from reacting flexibly to shocks.

Similar considerations apply in the case of the labour market. Here interference relates to unduly high unemployment benefits (which could undermine the incentive to accept employment), dismissal regulations, minimum wage impositions, centralized wage setting, extensions of union contracts to non-participating parties and conscription. All these are

viewed as possibly precluding work effort, thereby limiting the ability of a

country to recover from adverse shocks. A country would have a higher market efficiency score if it allows market forces to determine wages and establish conditions of dismissal, avoid excessive unemployment, and refrain from the use of conscription.

Bureaucratic control of business activities is also thought to inhibit market efficiency. This subcomponent is designed to identify the extent to which bureaucratic procedures limit competition and the operation of markets. When such activities retard entry into business and increase the cost of production, when prices are not market-determined and when governments use their power to extract financial payments and reward some

businesses at the expense of others, private sector involvement is discouraged, thereby inhibiting the freely-operating markets to absorb shocks.

Good governance

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

The *Economic Freedom of the World Index* has a component which focuses on legal structure and security of property rights. The component covers five subcomponents, namely (i) judicial independence; (ii) impartiality of courts; (iii) the protection of intellectual property rights; (iv) military interference in the rule of law; and (v) political system and the integrity of the legal system.

Social development

Social development is another essential component of economic resilience. This factor indicates the extent to which relations within a society are properly

developed, enabling an effective functioning of the economic apparatus without the hindrance of civil unrest. Social development can also indicate the extent to which effective social dialogue takes place in an economy which, in turn, would enable collaborative approaches towards the undertaking of corrective measures in the face of adverse shocks.

Social development in a country can be measured in a number of ways. Variables relating to income, such as its dispersion and the proportion of the population living in poverty, the long-term unemployment rate (indicating the proportion of the population with low skills and inadequate employment prospects) and the proportion of the

population with low levels of education, could be useful indicators. Still another possible approach would be to measure the number and extent of instances of industrial or civil unrest. These approaches are interesting but rather narrow in scope and very difficult to measure across countries.

The social development component of the resilience index can be the education and health indicators utilized to construct the UNDP human development index (HDI).

Education: Educational advancement, measured by the adult literacy rate and school enrolment ratios, is considered to be a good indicator of social development. In addition, an improved standard of education could be indicative of an improved ability to cohere in the face of external shocks—a condition conducive to economic resilience.

Health: Life expectancy at birth is considered to be suitable for measuring the health aspects in a society. This in turn is likely to be related to medical facilities, housing and degree of proneness to accident or risk of injury. Again, advancement in health standards is considered to be conducive to economic resilience.

3.2. Dimensions and indicators of resilience according to Boorman

The Resilience Index provides a measure of the capacity of an economy to cope with and bounce back after having been hit by a shock.

Fifty two variables are grouped into 10 sub-indices. A measure of each country's overall resilience is then derived from those sub-indices. The rationale for the inclusion of each of its sub-indices and component variables in each sub-index is briefly described in the following:

Fiscal Policy Soundness

This represents the space policymakers have to adopt fiscal measures. Its component variables are the stock of public debt (this refers to the nonfinancial public sector or to the general government, depending on availability of data) in relation to GDP as well as the rate (and direction) of change of this variable as a measure of the overall deficit. A higher debt ratio or overall deficit decreases fiscal space and the room for maneuver that policymakers have to deal with shocks to the economy.

Monetary Policy Soundness

The greater the credibility the central bank has built up—for example, by such actions as successfully controlling inflation—the more room the central bank has to ease monetary policy in a slowdown, thereby supporting activity in the economy. The component variables that underlie this sub-index are the difference between domestic inflation and G-7 inflation; whether an inflation targeting framework is in place (as it has typically been associated with increased credibility); and a measure of the unpredictability of inflation, estimated by its historical standard deviation.

Government Effectiveness

The stronger the capacity of government officials to react and design policies, and the greater their credibility, the better and faster will be the implementation of these policies and thus the response of the economy. The greater the capacity of the government to follow through with its plans, the more likely the private sector will respond positively to stimulus measures, and thus the higher the country's resilience. Its component indices capture the quality of the bureaucracy and the ability to consistently implement forward-looking policies.

Overall Governance

Good governance is generally seen as a necessary underpinning to an efficient economy, with reliable and independent institutions, adherence to the rule of law (confidence in contracts, property rights, etc.), transparency, limits to corruption, press freedom, required bank and credit ratings, accounting disclosure, shareholder rights, and availability of both private- and public-sector standardized data. Its components are indices that attempt to capture the quality of corporate governance and of the legal system, as well as a measure of policy transparency, and are taken from the Index of Financial Development and Strength developed by Centennial Group International.

Bank Soundness

A more sound financial system with less risk of default, a strong capital base, well-provisioned assets, less-volatile income sources, and high profitability is less likely to amplify an external shock and thus makes the economy more resilient. Although this sub-index represents predominantly banks, it also includes some non-bank financial institutions, and therefore measures the broader financial sector. Its components are indices for asset quality, capital base, and income risk, derived from the IMF's Financial Soundness Indicators Compilation Guide and the just mentioned Index of Financial Development and Strength.

Export Diversity

The more diversified the export base, the more resilient the economy is likely to be. Its component variables measure export diversity by both destination and product.

Export Independence

The greater the dependence on exports, the less resilient an economy is likely to be to external shocks of a particular kind. Its component variable is the ratio of exports to GDP.

External Robustness

The stronger the external sector, the more resilient an economy is likely to be. Its component variables are the current account balance as a proportion of GDP, the ratio of international reserves to short-term debt, the stock of reserves in terms of months of imports, and a classification of the exchange rate regime. While some of these variables are not as relevant for members of currency unions as for other countries, Factor Analysis requires that any component variable be used for all countries.

Private Debt

The private debt sub-index includes external debt and domestic debt. Much domestic debt consists of local bank credit to the private sector, and its excessive growth can lead to destabilizing asset bubbles. Regarding external debt, the faster the expansion of externally financed credit to the private sector, the less resilient an economy is likely to be to a sudden stop in capital flows. Its component variables are the stocks and the changes over three years of the private credit by deposit money banks to GDP ratio and of the ratio of claims on the country's residents by foreign banks to GDP. To allow for financial deepening, credit expansion of up to 10 percent above the growth of nominal GDP was not considered risky. It would have been helpful and appropriate to include currency composition of private sector debt.

International Reserves and Net International Investment Position

At least up to some limit, the higher the reserve holdings the stronger the self-insurance they offer; in addition, a high stock of reserves provides policymakers with room for maneuver, and confidence to adopt expansionary policies in a downturn. Thus, a high stock of reserves constitutes a buffer against external shocks. While it would appear that the higher the stock of reserves, the better off the country is, there are important costs in such an approach. Moreover, a recent IMF study shows that the self-insurance aspect tapers off after a certain level of reserves. A positive International Investment Position also indicates room

for maneuver for both the private and public sectors. The component variables of this sub-index are the ratio of international reserves to GDP and the ratio of the net international investment position to GDP.

3.3. Global FM Resilience Index

This index has three components: "economic, risk quality and supply chain."

The Global Resilience Index provides an additional useful tool for traders as they assess supply chain risk with physical investments around the world. The index is a combination of nine key variables of equal weight that affect the resilience of trade to supply chain disruption.

Resilience components

Economic: This factor shows the political and macroeconomic effects on resilience. In order to construct this factor, three components are combined: productivity, political risk and oil intensity. Oil intensity indicates a country's vulnerability to oil shock (oil shortage, disruption or sudden increase in oil prices), which is measured by the ratio of oil consumption to GDP.

Risk Quality: A unique feature of this index is the use of data collected by the global team of FM risk engineers, who annually visit and evaluate a large number of locations around the world. The data in the Global Risk database have the advantage of being used continuously in all industrial sectors and regions. The risk quality factor consists of three components derived from the risk database: natural risk exposure, risk management quality, and fire risk quality management.

Supply chain: This factor consists of three components: corruption control, infrastructure, internal supply quality.

4. A review of a number of studies related to the resilience of the Iranian economy

Foroughizadeh (1393) calculates the resilience index of Iran's economy by calculating the resilience of five components in the economy, which are: public

sector resilience (government size, budget dependence, government budget stability), foreign trade resilience (balance Trade, import dependence, export stability), macroeconomic resilience (currency stability, foreign debt, employment-monetary stability), production sector resilience (production support, production efficiency, knowledge-based economy) and social resilience (Appropriate income distribution). The results show that despite the frequent fluctuations in the index over 20 years, the resilience index for the year 1370 and 1390 is similar and is 0.39.

Ghiasvand and Ramezani (1394) have evaluated the degree of economic resilience of Iran during the years 1375 to 1392 and have concluded that until 1383 the resilience was increasing; but from 1384 to 1390, it had a downward trend. Their resilience index consists of the components of the Bormann and Brigoglio resilience index, including macroeconomic stability, micro-market efficiency, good governance, social development, fiscal policy correctness, monetary policy correctness, sound monitoring, effectiveness monitoring, effectiveness, export freedom, external strength, private debt and net international reserves and the amount of international investment. The low degree of resilience of the Iranian economy means that after encountering with an external shock, the country's economy will be severely damaged and also the rate of return of the economy to normal conditions will be low.

Abu Nouri and Lajevardi (2016) estimate the resilience and vulnerability index for the 12 OPEC member countries in the time period from 1374 to 1392. Resilience index variables include financial strength, inflation standard deviation, annual inflation rate, debt-to-income ratio, budget deficit-to-GDP ratio, political stability, quality of regulation, and unemployment. The results show that Iraq, Angola, Libya and Nigeria have high vulnerabilities and UAE, Qatar, Kuwait and Saudi Arabia have lower vulnerabilities. Among these countries, Iran ranks sixth with resilience of 0.4 and vulnerability of 0.6.

Afifa and Vosoughi (1395) calculated the index of resilience and economic vulnerability based on the Brigoglio index in the period 2000 to 2014 for 106

countries. In this study, Iran was ranked among the countries with low resilience and high vulnerability.

Abu Nouri and Lajouri (1395) estimated the indicators of vulnerability and economic resilience. In this article, the index of vulnerability and economic resilience of OPEC member countries for the period 1374 to 1392 (1995 to 2013) was estimated. The results of the study showed that; Iraq, Angola, Libya and Nigeria have high vulnerabilities and the UAE, Qatar, Kuwait and Saudi Arabia have lower vulnerabilities. Iran's ranking in the net resilience index among the OPEC members was estimated to be the 6th.

Mirjalili and Bozorgi (1397) have studied the combined index of resilience of Iran's economy during 1384 to 1394. Their index was consisted of inflation rate, unemployment rate, exchange rate, budget deficit to GDP ratio, share Oil in the budget, ratio of non-oil exports to imports, ratio of imports of intermediate and primary goods to total imports, ratio of total budget to GDP, ratio of government consumption to total consumption, ratio of exports and imports to GDP, underground economy, ratio Employees with higher education are calculated and interpreted to all government employees, Gini coefficient, literacy rate, number of main social security insured, economic resilience in accordance with Iran's economic conditions. The results show the increasing trend of Iran's economic resistance index with a gentle slope. The highest index is in 1393 and the lowest in 1384. The study of the relationship between resilience index and GDP per capita indicates the existence of a positive relationship in the period under review in such a way that with increasing economic resilience, the country's per capita GDP also increases.

Amiri et al (1397) In his article examines four aspects of macroeconomic stability, including microeconomic market efficiency, governance and social development, and the index of economic viability and vulnerability of Iran in the period 1375 to 1395. The results of this study show that during the years 1375 to 1383 and also 1385 to 1393 and 1395 net resilience was negative, but in 1384 and 1394, this index is positive. The most important reason for this

positive index this year has been good governance and human development. Both vulnerability and resilience indices have increased in recent years, but the vulnerability index is higher than the resilience index, which indicates an increase in the degree of vulnerability in the Iranian economy.

Ghasemi and Arabi Mazar (1398) The importance of the variables of government oil revenue growth rate, liquidity growth rate fluctuation, risk index, the ratio of banks' debt to the central bank to monetary base and the ratio of government debt to the banking system to liquidity as determinants of resilience, respectively. The monetary and financial sectors were identified and the time series of the resilience index of the monetary and financial sectors for the period 1355 to 1395 was calculated. Based on the obtained index, the vulnerability of this sector is evaluated from the place of exogenous shocks and based on the results, the reform of the banking system and the relationship of an effective institution as well as the government with the monetary and banking structure of Iran's economy are recommended To be.

4. Conclusion:

Conceptual models that have been proposed for economic resilience so far have provided indicators and components for measuring economic resilience, which are similar to the indicators that experts have mentioned in interviews and considered these indicators important in measuring economic resilience. These indicators are: business prosperity, productivity, economic growth, happiness, social solidarity, knowledge-based economy, popular economy, reducing dependencies, good governance, learning rate, entrepreneurship, income, investment and...

The general perception of the above research can be that the resilience of the economy is not favorable and this can be a threat to serious challenges in the face of adverse events and factors affecting the country's economy. In order to increase economic resilience and prevent challenges that could affect the economy and even the society of the country, it is proposed that the orders of the Supreme Leader and other high-ranking officials of the system in relation to

the resistance economy, which exogenously endogenously. The existence and popularity of the economy have been emphasized in practice by the relevant authorities in such a way that by considering, focusing and supporting entrepreneurship and production while using the scientific potential and human capital of the country in addition to providing goods and services required domestically or Minimize dependencies, provide a platform for more interaction with other countries in the world.

In this transition, the God-given resources and capital of the country can be used, including oil, gas and mines, and these underground capitals can be used as a platform and accelerator of further economic growth, and investments in infrastructure projects and Knowledge-based dedicated to increase the country's competitive advantage in the world and the country to take a more significant share of global production and trade.

Also, in this regard, by strengthening the relations and social solidarity of the people, friendship, empathy and unity among the people should be further promoted as the main supports of the country's system and economy.

In order to further promote economic resilience, strengthening the capital market in financing companies and informed and maximum participation of people in this market is also important, in this regard, with the promotion of financial literacy of individuals, the ground for this participation and activity should be provided. Also, the development of financial instruments and institutions has an important role in developing and strengthening the country's capital market, which should be given more attention.

Considering the important role of banks in providing capital (fixed capital or working capital) of enterprises, improving the performance of banks in the optimal allocation of resources to manufacturing enterprises with appropriate financial structure and supporting knowledge-based activities that can be used as an engine. The growth and development of economic activities is also important.

Value creation and strategic financial management as a new approach in the field of financial knowledge

with the aim of creating wealth through risk management at the enterprise level and through the analysis of financial assets to be considered by business actors.

Innovative technologies and financial technology (Fin-Tech) are making significant changes and developments in the field of financial services, including deposit and lending, investment, insurance, payment services and capital market development services, the use of these technologies reduces time and cost. And improving the quality of services in these areas, which will also have positive and important effects on economic growth and development, increasing data and information for analysis and greater transparency, as well as increasing economic resilience.

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