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Good Market Efficiency Panel Vector Error Correction Effects Analyses in Global Competitiveness Index on Asian Countries Economic Success

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ABSTRACT

Global competitiveness as a platform for economic success and access to higher levels of welfare and standards of living, has found a lot of importance among policymakers. Today, all developed or developing countries emphasize the importance of efficiency and productivity as one of the necessities of economic development and gaining competitive advantage in the international arena, because in the present world, competition in other world scenes has other dimensions and trying to achieve higher levels of efficiency and productivity is one of the main pillars of the competition. The purpose of this study is to analyze effects of good market efficiency as an important component of the Global Competitiveness Index in Asian countries on economic success in the form of a Panel Vector Error Correction Model (PVECM) over the period 2008-2016. The results of this study indicated that: The positive shock of investment and technology (investment and technology improvement), in the long run have positive impact on the good market efficiency. But the positive shock of trade (increase in trade), in the medium and long run, has a negative impact on the good market efficiency. In this model, the positive shock in good market efficiency (improving the good market efficiency) in the medium and long run, has a positive impact on the economic growth rate and has a negative effect on the unemployment rate. The most important factor influencing the good market efficiency is investment, which this variable has the most important effects on the good market efficiency in the medium and long run.

1. Introduction

In general, the efficiency is the comparison of outputs with regard to the amount of input. It also defines productivity as better use of existing resources for current or higher production. Productivity and efficiency are very close to each other so that, it can be claimed that the efficiency and productivity are necessary and necessary for each other and the success of one subject or object is another success. What is meant by efficiency in the economy is, a situation in which, resources are allocated optimally and a situation in the economy can be called optimal or an order that has efficiency, in which position, level of any economic activity cannot be increased by reducing the level of other activities. This requires that workers, machinery and land are not left idle and appropriately allocated, that is, the necessary condition for the economic efficiency of production is that the factors of production are fully utilized (Ebadi, 1991).

Success is a qualitative condition that is put forward in the face of poverty. The determinants of success are still controversial issues. Economic success is one of the key dimensions of success, a means to improve the quality of life. The economic success of countries depends on their ability to absorb or create economic activity, it means, that country can increase its income through good performance in the market. Measuring economic success is complex and difficult (Hamlainen, 2003).

In general, one of the main goals of each country is to have high economic growth and to reach developmental levels, which is the necessity of access to these goals, the optimal use of resources in the country and its solution is to improve efficiency and productivity. Therefore, identifying and analyzing the long run effects of the good market efficiency, a very important component of the global competitiveness index, has a special place in economic success. The purpose of this study is to analyze the long run effects of good market efficiency in the global competitiveness index on economic success with emphasis on effective variables on the efficiency with using Panel Vector Error Correction Model (PVECM) in Asian countries. In fact, this study seeks to answer the following questions: What are the long run effects of the good market efficiency on economic success? And what is the most effective variable affecting the good market efficiency and, ultimately, economic success?

2. Subject Literature

2.1 Theoretical Foundations

In today's worldview, competitiveness has become a fundamental force in the economy, like gravity in physics. The world today is a world of constant and rapid change, the result of such changes is intense competition between countries and only those who can survive in this particular world, that can compete with their counterparts. In an age that constitutes an age of knowledge, economics considers

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knowledge economy and competition as global, countries face fundamental challenges for survival and success. In such a situation, there is intense competition between countries to exploit global opportunities. The ability of countries at national level to maintain their current position in the first step and improve their position in the next step depends on their ability to compete and to have a sustainable competitive advantage (through the creation of new competitive advantages) and this is the only option for countries to advance. From the economic point of view, Michael Porter sees competitiveness as synonymous with the efficiency and productivity of using a nation of its production factor. In other words, a more competitive economy that has a higher level of efficiency and productivity, providing higher levels of income, provides more welfare for the people. In recent years, efficiency and productivity have become very important and as a strategic incentive for advancement, because in the time of shortage of resources and time, due to the speed of environmental changes, what determines the status of the country are the level of efficiency and productivity of the country. Therefore, competitive economies with an efficiency and productivity approach, are economies whose that factors enhancing efficiency and productivity, have a good place in them and future and present welfare will be built on these factors. Such an economic system will have the power to face downward cycles in the economy and will ensure a favorable economic performance. While the global economy faces considerable uncertainty in the current situation, it shows that competitiveness alone cannot be a graphical representation of the real situation of an economy. Therefore, at a modest look, competitiveness can be expressed, It is a more competitive economy that can grow in the medium and long run (Firoozan Saranaghi, 2014).

In fact, competitiveness is defined as a set of institutions, policies and factors that determine the level of efficiency and productivity of a country that is capable of delivering prosperity to its citizens. In fact, the claim is that if the level of competitiveness increases, the level of economic success in the community will increase and lead to the development and improvement of the welfare state. The Global Economic Competitiveness Report is one of the annual reports prepared by the World Economic Forum. Since 2005, the Forum has provided the Global Competitiveness Index (GCI) as the basis for its own analysis of countries' competitiveness. This index is a comprehensive and perfect tool for measuring national competitiveness in the microeconomic and macroeconomic of the countries. The global competitiveness index, in fact, includes the weighted average of the various components that measure the various aspects of the competition. These components fit into three general components of the "basic requirements, "factors of increasing efficiency" and "innovation factors". The three main components of its competitiveness are divided into 12 subcategories. However, each of the 12 components of competitiveness is also divided into several subgroups. The Global Competitiveness Index, by providing a weighted average for many components, each dedicated to an aspect of competitiveness, can examine this broad concept. All of these components are in the form of "Twelve Components of Competitiveness," including: institutions, infrastructure, macroeconomic environment, elementary health and education, higher education, good market efficiency, labor market efficiency, financial market development, technology readiness, the size of the market, the advancement of business and innovation, can be categorized (Schwab, 2010).

Productivity and efficiency in economic thinking in different schools are important and each of these schools has used these concepts in their own way.

In classical schools and in the view of Adam Smith, with the advent of trade and the expansion of the production market, the division of labor as the main variable of economic growth occurs more rapidly and by saving time, improving technology and increasing skills, to improve efficiency and productivity and then economic growth. Therefore, Smith's thinking, trade and technology improvement and labor training, which are the result of division of labor, are three factors that affect efficiency and productivity.

Ricardo's view, the pessimistic economist of the classics, population growth and land constraints and production factors, leads to a decline in land efficiency and productivity and the economic recession, which has increased with the expansion of trade and the improvement of technology, productivity and efficiency increased and the economy is out of recession. So in Ricardo's mind, trade and technology improvement are two factors that affect efficiency and productivity. In Marx's view, the underlying cause of the movement of society from capitalism to socialism is technological change, which, by increasing efficiency and productivity, leads to the replacement of capital in place of labor by the capitalist and the emergence of the unemployed and eventually capitalism is overthrown by them. Therefore, in Marx's thought, technological developments can affect productivity and efficiency.

In Rosto's view, at the outset, the intellectual and cultural transformations of society dominate the society, removing the community from brain drain and then, with the creation of technology, efficiency and productivity in the pioneering sectors improve. Therefore, intellectual and cultural developments will provide the necessary preconditions for improving the efficiency and productivity of the technology improvement pathway. In the institutional school and in Galbraith's view, technological advancement, the necessity of planning and the emergence of technical institutions leads to the improvement of efficiency and productivity in the new industrial system compared with the market system and the difference in efficiency is the main difference between the two systems. So in Galbraith's thinking, technology, planning and technical advancement will improve productivity and efficiency.

In the view of supply side schools economists, on the one hand, reduce tax rates by motivating individuals, to provide the necessary preconditions for improving productivity and efficiency through increased employment and investment and on the other hand, creative entrepreneurs improve efficiency and productivity with improve technology. Therefore, in the mindset of these economists, the incentive system provides the necessary preconditions for improving productivity and efficiency through an increase in employment and investment, and technology also influences efficiency and productivity. In the vicious circle theory of underdevelopment, low incomes in the country lead to a reduction in savings and a reduction in its investment, and because of the complementarity of capital and labor, with declining investment, the efficiency and productivity of labor is reduced and the share of labor in production is reduced and this will again lead to a reduction in revenue and will continue around the recession. Therefore, in this theory, investment has a direct impact on labor productivity and efficiency. According to the above-mentioned ideas, improving efficiency and productivity first requires basic and emerging requirements such as intellectual, cultural and

motivational developments that by providing them, improving some of the economic components such as technology,trade, investment, labor training and employment, that to improve productivity and ultimately economic growth (Imami Meybodi, 2000).

Countries with efficient commodity markets, due to the special conditions of supply and demand, have a good position to provide an optimal combination of goods and services and it is possible for them to supply their products with a highly effective supply. To make a healthy competition in the market, both domestic and foreign competition, is critical in promoting market efficiency. The good market efficiency also depends on the demand conditions, including the customer orientation of the firms and the complexity of the needs of the buyers. This creates an important context for creating competitive advantage, as it leads companies to more initiative and customer orientation and provides the framework for companies to achieve efficiency. This component includes the following subsets of the: intensity of domestic competition, the existence of dominant firms in the market, the effectiveness of anti-monopoly policies, the impact of taxes on investment incentives, total tax rates (based on percentage of profit), the number of steps and procedures necessary start of business, number of days needed to start a business, costs from policy making in the field of agriculture, the existence of tariff and non tariff barriers for import, tariffs (based on the percentage of customs duties), prevalence Foreign ownership, the effect of laws on foreign direct investment, the complexity of customs formalities, the ratio of imports to gross domestic product, the volume of customers, the knowledge and the complexity of the needs of the buyer (Mira Hassani, 2013).

Economic success is one of the key dimensions of success, a means to improve the quality of life. In fact, a socio-competitive society is a society that can achieve the balance of dynamism between the creation of wealth and cohesion. Measuring the economic success or economic performance of a society, which is a multifaceted proposition, is difficult and complex. But, while various criteria have been presented by economists for measuring this multivariate proposition, they often agree on several common criteria.

Hamalainen (2003) has used two indicators of the growth of per capita income and domestic per capita income as standard indicators of living and welfare of people, but at the same time acknowledges that the standard of living and welfare of people does not merely include their economic situation. As can be seen, the criteria used to derive these definitions for economic success include income indicators, growth and employment levels. Considering that the effect of the good market efficiency component on economic growth and per capita income is similar, in this study, two criteria, economic growth rate and unemployment rate will be used to measure the economic success.

2.2 Research Background

Regarding the analysis of the long run effects of good market efficiency in the global competitiveness index on the economic success of Asian countries, with emphasis on the variables affecting efficiency, in particular, no studies have been conducted with using econometric methods in the country and abroad. This study for the first time, presents a comprehensive study using econometric methods (panel vector error correction model) for analyzing the long run effects of the good market efficiency component in the global competitiveness index on economic success. Since there has not yet been an unannounced article, there is no article that directly examines the long run effects of the good market efficiency on economic success. Therefore, the following is presented to studies that are close to the subject:

Neuraei et al. (2014), in a paper entitled "Investigating the relationship between efficiency and wages in Iran", using the panel data techniques during 1996-2008, found that on average, 83% of industries had a positive relationship between efficiency and wages and in 17% of industries, this relationship has a negative relationship.

Jafari Samimi and Qaderi (2011) "in a paper entitled " The Efficiency Wage Hypothesis ", using panel data techniques during the period 2001-2006, found that there is a negative relationship between efficiency and wages in Iranian industries, in other words, by increasing wages, the efficiency and productivity of workers in the Iranian industry is reduced.

Nabi et al. (2015), in a paper entitled "Investigating Factors Affecting the Competitiveness Index of Countries with Emphasis on Iran's Economy", using the comparison of data during 2011-2014, found that components of the competitiveness index had a positive and significant effect on the index studied. Also, according to the World Economic Forum's annual report for 2013-2014, Switzerland, Singapore, Finland, Germany, the United States, Sweden, Hong Kong, the Netherlands, Japan and the United Kingdom are the world's first competitive economies. In this regard, the best rank among the indices for Iran is the market size index of 19, which is a figure of 5.14 which indicates the country's capacities and potential.

Firouzane sar Naghi (2014) in his dissertation entitled "Assessing the Interrelationship Between the good market and Financial Market Development in the Global Competitive Environment", an applied research and the method of data collection, is a secondary analysis and a non-experimental descriptive study and is of solidarity, for the 2013-2014 period, for 148 countries, Pearson Correlation test has received a great deal of solidarity with the development of the financial market and the good market efficiency (apart from a few cases). Findings indicate that there is a significant relationship between the good market efficiency and the development of the financial market and the good market efficiency and financial market development have a positive effect on each other.

In a paper entitled "Competitiveness Indexes of Iran and Some Countries of the World, from the Perspective of the World Economic Forum Report", Mira Hassani (2013) concluded that the countries of Switzerland, Singapore, Finland, Germany, the United States, Sweden, Hong Kong, the Netherlands, Japan, and the United Kingdom are the world's 10 most competitive economies during the 2013-2014. Among the countries of the Middle East, the best ranked countries ranked 13th in Qatar, the United Arab Emirates ranked 19th and Saudi Arabia ranked 20th. Among the 148 countries surveyed in the 2014 World Competitiveness Report, Iran's competitiveness rating was 82 and its index was 4.07, down from 16 last year.

Vares et al. (2012), in a paper entitled "The Impact of Global Competitiveness on the Success of Countries" in the period 2011-2012, using the correlation analysis method, found that the pillars of access to technology, infrastructure and academic and practical training are three very important pillars on the economic success of countries.

Khodad Hosseini et al. (2011) in an article entitled "Measuring the relative efficiency of Iran's competitive advantage based on Porter's quantitative model in comparison with selected countries" using the mathematical model of data envelopment and porter model for 2000, 2003 and 2006 and

finding that Iran has been ranked seventy in its classification, the country's Luxembourg presence is clearly indicative of its competitive strength.

Pourzamani et al. (2009), in a paper entitled "The Study of the Efficiency of Macroeconomic Indexes in Financial Crisis Forecast Models in the Economic Environment of Iran", using the Logit statistical method during the period of 1997-2006, found that only Tofler model has the ability to predict financial crisis, while the developed models of Tofler and Dicken do not have the ability to predict a financial crisis using economic indexes. Therefore, it can generally be concluded that the added economic variables to the main models do not improve the efficiency of these models.

Surri (2006), in an article entitled "Economic Efficiency and Government Size", using the Granger Causality method for the period of 1969-1999, found that between the efficiency index and the size of the government, which is calculated as the share of government consumption expenditure of GDP and the share of government employees of all employees, there is a negative and quite significant relationship.

Shahabadi (2004), in a paper entitled "Investigating the Effectiveness of Total Factors on Competitiveness", using the Vector Error Correction Model from 1959 to 2003, found that the relative price index and factor total productivity had a negative effect on the demand for import of goods. Gross domestic product and oil revenues have a positive effect on import demand and overall factor productivity has a positive impact on exports of goods and services.

Lee (2016), in a paper entitled "Comparison of the Effectiveness of the Healthcare System of the Countries with the Global Competitiveness Index", evaluates and compares the efficiency of the healthcare system in 28 countries over the 2014-2015 period using the Data Coverage Analysis Method. The results revealed that healthcare policymakers should seek to innovate in the field of hospital beds, medical equipment and nurses to increase the efficiency of the health system.

In a paper entitled "The Effects of Economic Freedom on Global Competitiveness," Gimia and Simona (2015), using panel data regression during 2010-2012, they concluded that there is a direct relationship between economic freedom and competitiveness, with high economic freedom, they are more competitive.

Paul et al. (2015), in a study entitled "Foreign Direct Investment and the Global competitiveness index in production sector of Indian" in the form of panel of 1989-2012, with the analysis of export competitiveness, the manufacturing sector played a key role in the Indian economy.

Xia et al. (2012) in a paper entitled "Is the Global Competitiveness Index measuring the standard of economic growth?" Using the Logit method in the period 2001-2008, the World Economic Forum in the measurement and indexation of global competitiveness has to add national culture as another variable. In this case, by adding this variable, the Global Competitiveness Index will be more suitable for forecasting economic growth.

In a paper entitled "Competition against Wealth," Podobkin et al. (2012) described how global competitiveness affects dynamic wealth in a country during the recession. They used the data analysis method in the 2008-2012 to define a new index called relative competitiveness as a ratio of global competitiveness to GDP.

Siggel (2007), in a paper entitled "International Competitiveness," presented the theoretical study of the potential of international competition and presented through economic and mathematical relations, a framework for measuring competitive power and its constituent resources, through which, the impact of Ugandan economic policies on the competitiveness of industries has been evaluated.

Maloney and Riberio (1999) found in a study entitled "Efficiency Wage and Effects of labor unions on Mexican Labor Demand" using the least squares method during the period of 1987-1992 that higher wages by workers equally with each other would outweigh the efficiency wage and not affected by labor unions. They found that, even in the absence of unions power and lower wages, the wage theory would have the efficiency of a specific category of labor in the Mexican labor market, as in other less developed countries.

Millea (1998), in a study entitled "Direct Test of Efficiency Wage Theory", based on evidence from the United States and the member countries of the Organization for Economic Cooperation and Development (OECD), has derived the relationship between wages and productivity using the linear feedback method of the Giuck . He also used the Garvey Frequency Analysis method to assess the relationship between linear payoff and productivity over different periods. His results confirm the efficiency theory of pay.

In a study entitled "Differences in Wages and efficiency Wage Models", Romaguera (1991) conducted a survey on wage differentials from the Chilean economy during the period 1969-1987. By examining efficiency wage models, he states that the predictions made by the efficiency wage models are consistent with the results of this research and industries and firms that pay more wages, will also benefit from higher average benefits.

3. Introduction and specification of the model

The statistical population of this study included 30 Asian countries (Armenia, Azerbaijan, Jordan, UAE, Indonesia, Bahrain, Bangladesh, Pakistan, Tajikistan, Thailand, Turkey, China, Russia, Japan, Sri Lanka, Singapore, Philippines, Cyprus, Kyrgyzstan, Kazakhstan, Qatar, North Korea, Kuwait, Georgia, Malaysia, Mongolia, Nepal, Vietnam, India and Iran) during the period from 2008 to 2016. The statistical data, based on the World Bank, IMF and World Economic Forum annual reports, for each of the variables concerned, as well as by reviewing documents and documents in a library (reference books and articles) will be used. Collection tools are, taking notes of resources and reports and the use of the internet and databases and statistics published by the World Bank, the International Monetary Fund and the World Economic Forum. The main tool for analyzing information is computer software.

This study examines the behavior of statistical data according to the relevant variables using the econometric method, which is one of the main methods in analyzing economic behaviors and policies, predicting and explaining economic variables.

Philips (1954) published articles in economic journals for the first time, introducing the Vector Error Correction Model to economic literature. The statistical basis for using Vector Error Correction Model is the co-integration between economic variables. Vector Error Correction Model provide the ability to determine long run relationships between variables. In addition, these models relate the short run behavior of variables to their long run equilibrium values. These unique features of Vector Error Correction Models that distinguish them from other structural and nonstructural econometric models have led them to rapidly develop their evolution in the 1990s (Enders, 1995).

Panel_VECM includes the conventional VECM method, except that the data is a panel type.

Lutkepohl (2005) describes the general form of Vector Error Correction Model as follows:

$$\Gamma_0 \Delta y_t = \alpha\beta' y_{t-1} + \Gamma_1 \Delta y_{t-1} + ... + \Gamma_{p-1} \Delta y_{t-p+1} + B_0 x_t + ... + B_q x_{t-q} + CD_t + u_t \quad (1)$$

In this case α is loading coefficients k×r matrix, which shows the adjustment speed to long run equilibrium. In fact, it shows how much of the imbalance in the previous period is corrected in the current period. β is co-integration k×r matrix that represents the long run part of this model. Γ_j is short run coefficients and u is also the vector of the error components with the mean of zero (Lutkepohl, 2005).

Co-integration between economic variables is based on the use of Vector Error Correction Model. Therefore, a more precise explanation of the concept is necessary. Basically, the use of conventional econometric methods in estimating the coefficients of economic models is based on the assumption that the model variables are stationary. If the variables are non-stationary, even if there is a lack of relation to the economic concept between the variables of the model, the coefficients of determination (R2) may be high and wrong results can be deduced from the relation of the variables.

Yule (1926) and Frisch (1934) determined in their studies that there is a strong correlation between variables with trend, even in cases where there is no significant economic relationship between them. This is in fact the starting point of a concept that is now known as the co-integration of economists. Yule and Frisch spent many years developing these themes, until the 1990s, after submitting papers of Granger and Engel (1990), the concept of co-integration was again widely discussed in scientific circles and a new way of modeling economic activities was founded. To avoid spurious regression, the difference of variables are used. But the use of first or higher difference of variables in the regressions leads to a loss of valuable information about the long run relationships of the variables. The application of the co-integration method leads to estimate a regression based on the level of variables and without the fear of being spurious regression. The Vector Error Correction Model is used to co-integration concept to stationary variables and information about long run equilibrium relations between variables is also preserved in the model (Enders, 1995).

One of the applications of the VEC model, which was used by Sims (1980) and others, is to detect a model response following shock in each of the endogenous variables that they also call Impulse Response Function. Impulse Response Function (IRF) analysis allows to be evaluated the effects of disturbances created in one of the variables, on other system variables in the VEC model.

The Forecast Error Variance Decomposition (FEVD) analysis is another tool that helps determine the volatility share of each variable against the shock to each of the other variables in the model. By analyzing the FEVD, we can measure the effect of each variable on other variables over time.

In this study, based on the theoretical foundations and views of the economics schools, as well as the subsets mentioned for the good market efficiency, technology, trade and investment, are the variables that affect the good market efficiency. This study, in the form of PVECM (Panel Vector Error Correction Model), examines the experimental data in the courses. First, using unit root tests, the stationary of the variables is investigated, then the long run relationship between the variables is proved by using co-integration tests.

In this study at first, the effects of variables affecting the good market efficiency, including technology, trade and investment, are measured and then, the long-run effects of the good market efficiency very important component in the global competitiveness index are examined on economic success. Finally, using IRF and FEVD, the effects of the shocks encountered on the variables will be tested and compared and the most effective variables on the good market efficiency and economic success will be determined by these two techniques.

The variables of this study are: good market efficiency (GME) is a good position to provide an optimal mix of goods and services in order to create competitive advantage in countries and data from this variable has been taken from the reports of the World Economic Forum, Gross Domestic Product rate (GDP) and Unemployment Rate (UEMR) as the variables of economic success: The value of the final goods and services produced and exchanged in a country over a economic period that is considered as economic growth, where its data has been taken from the World Bank and the unemployment rate is the ratio of the unemployed population to the total population where its data also has been taken from the World Bank. Technology (TE) can be used to define all the knowledge, processes, tools, methods and systems used in the production of products and services, which, for this variable is used the data of availability of latest technologies in the report of World Economic Forum. Trade (TR), which is commonly referred to as the exchange of goods or services and the data of this variable has been taken as a percentage of gross domestic product from the World Bank site. Investment (IN) means purchasing goods that are not currently consumed but needed by the individual or the country in the future and those goods will be profitable for them, the data of this variable, as a percentage of GDP, has been taken from IMF site.

Economic growth rate and unemployment are as economic success variables and target variable, good market efficiency is mediator variable, technology, trade and investment, are effective variables on the good market efficiency in this study.

The relationship in the form of a Panel Vector Error Correction Model to analyze the effects of good market efficiency on economic success is defined as the following matrix in the general model form:

$$\begin{bmatrix} \Delta LGDP_{it} \\ \Delta LUEMR_{it} \\ \Delta LGME_{it} \\ \Delta LTE_{it} \\ \Delta LTR_{it} \\ \Delta LIN_{it} \end{bmatrix} = \begin{bmatrix} \alpha_{11} \\ \alpha_{21} \\ \alpha_{31} \\ \alpha_{41} \\ \alpha_{51} \\ \alpha_{61} \end{bmatrix} EC_{it-1} + \begin{bmatrix} \alpha_{t,11} & \alpha_{t,12} & \alpha_{t,13} & \alpha_{t,14} & \alpha_{t,15} & \alpha_{t,16} \\ \alpha_{t,21} & \alpha_{t,22} & \alpha_{t,23} & \alpha_{t,24} & \alpha_{t,25} & \alpha_{t,26} \\ \alpha_{t,31} & \alpha_{t,32} & \alpha_{t,33} & \alpha_{t,34} & \alpha_{t,35} & \alpha_{t,36} \\ \alpha_{t,41} & \alpha_{t,42} & \alpha_{t,43} & \alpha_{t,44} & \alpha_{t,45} & \alpha_{t,46} \\ \alpha_{t,51} & \alpha_{t,52} & \alpha_{t,53} & \alpha_{t,54} & \alpha_{t,rr} & \alpha_{t,56} \\ \alpha_{t,61} & \alpha_{t,62} & \alpha_{t,63} & \alpha_{t,64} & \alpha_{t,65} & \alpha_{t,66} \end{bmatrix} \begin{bmatrix} \Delta LGDP_{it-1} \\ \Delta LUEMR_{it-1} \\ \Delta LGME_{it-1} \\ \Delta LTE_{it-1} \\ \Delta LTR_{it-1} \\ \Delta LIN_{it-1} \end{bmatrix} + \begin{bmatrix} c_{11} & c_{12} \end{bmatrix} \begin{bmatrix} C \\ it \end{bmatrix} + \begin{bmatrix} u_{1it} \\ u_{2it} \\ u_{3it} \\ u_{4it} \\ u_{5it} \\ u_{6it} \end{bmatrix} \quad (2)$$

In this case α matrix, is co-integration matrix which shows the long run part of this model and αi matrix, is short run coefficient and u, is also vector of the error components and cij, is predetermined variable coefficients matrix. "it" indices represent the panel data. In this case, variables differential form is presented in the form of VECM model.

4. Examining Experimental Results

This part of this study seeks to analyze the experimental results of Asian countries based on statistical data based on the proposed model using the PVECM model. This section is the most important part of the research, because the value of the results depends on the accuracy of the model estimation. At first the results of diagnostic tests of panel data, unit root, co-integration and then model estimation and ultimately IRF and FEVD analysis are presented.

4.1 Unit root Test

Among the topic that need to be considered before model estimation, is stationary of the variables.

In this study, we used Im Pesaran and Shin(IPS), PP Fisher and Aggmented Dickey Fuller(ADF) tests to test the stationary of the panel data. In the table below, the results of these tests are presented for the introduced variables.

Table 1. Unit root tests.

ADF	PP Fisher	IPS	variables
5.02(-0.00)	6.05(-0.00)	4.88-(0.00)	(GDPR)log
0.46 (0.67)	1.39 (0.93)	0.11-(0.45)	(UEMR)log
5.25-(0.00)	7.83-(0.00)	3.77-(0.00)	Δlog (UEMR)
0.86 (0.80)	1.07-(0.14)	0.97-(0.16)	log (GME)
2.11-(0.11)	4.88-(0.11)	3.49-(0.00)	Δlog (GME)
2.94 (0.99)	2.69 (0.99)	0.36-(0.35)	log (TE)
3.55-(0.00)	5.96-(0.00)	2.31-(0.01)	Δlog (TE)
4.28-(0.00)	4.58-(0.00)	2.61-(0.00)	log (TR)
0.73-(0.23)	1.85-(0.03)	0.09-(0.46)	log (TI)
6.16-(0.00)	10.14-(0.00)	3.90-(0.00)	Δlog (TI)

Source: Research findings

The numbers in parentheses represent the P statistics

According to the results of the IPS, PP Fisher and ADF tests, it is clear that the unemployment rate, good market efficiency, technology and investment are non-stationary and they are stationary with a first-order difference and economic growth and trade are stationary without differentiation. Therefore, since in the unit root tests, some of the variables were non-stationary and they were stationary with first-order difference, co-integration test is required to avoid spurious regression.

4.2 Co-integration test

To test the co-integration between variables, there are several tests. In this research, Pedroni and Kao tests are used. In both methods, the H0 hypothesis is no co-integration and the opposite hypothesis (H1) is co-integration between the model variables. If the co-integration between variables is determined, we can say that the equilibrium and long run relationship exists between the variables in this model. The results of these tests are needed to estimate the PVECM. The results of these tests are presented in the following tables for the model.

In the Pedroni method for the model, given that, the between the groups and within the group ADF probability statistic is less than 0.05, then the H0 hypothesis has been rejected. In the Kao method, in the model, according to the probability of the ADF, because this statistic is less than 0.05, the H0 hypothesis has been rejected in the model. Therefore, co-integration between variables is proven that shows there is long run relationship between the variables of the model. Therefore, the spurious regression problem will not exist in the estimated model.

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Therefore, co-integration between variables is proven that shows there is long run relationship between the variables of the model.

Therefore, the spurious regression problem will not exist in the estimated model.

Table 2. Pedroni Test.

Pedroni Residual Cointegration Test		
Series: LGDPR LUEMR LGME LTE LTR LTI		
Alternative hypothesis: common AR coefs. (within-dimension)		
Prob.	Statistic	
0.9909	-2.361171	Panel v-Statistic
1.0000	3.983156	Panel rho-Statistic
0.0004	-3.378045	Panel PP-Statistic
0.0090	-2.363617	Panel ADF-Statistic
Alternative hypothesis: individual AR coefs. (between-dimension)		
Prob.	Statistic	
1.0000	5.776849	Group rho-Statistic
0.0000	-10.41437	Group PP-Statistic
0.0000	-4.672183	Group ADF-Statistic

Table 3. Kao Test.

	Kao Residual Cointegration Test	
	Series: LGDPR LUEMR LGME LTE LTR LTI	
Prob.	t-Statistic	
0.0000	-4.454223	ADF

4.3 Estimate the PVECM

After the non-stationary proof of some variables in their level and their stationary in the first-order difference and co-integration, to investigate variables long run relationship, we are used to estimate the coefficients using the PVECM model. According to the obtained results, equation (1) is estimated using the software for the model, respectively. The estimated results are as follows:

The equation used to examine the long run relationship of the PVECM model with the economic growth rate target variable is as follows:

(3)

D(LGDPR)=C(1).(LGDPR(-1) – 0.492582688748.LUEMR(-1) - 14.0675715531.LGME(-1) + 10.7294112724.LTE(-1) + 0.495727319401.LTR(1)+1.39089332366.LTI(1)3.43685773663)+C(2).D(LGDPR(1))+C(3).D(LUEMR(1))+C(4).D(LGME(1))+ C(5).D(LTE(-1))+ C(6).D(LTR(-1)) + C(7).D(LTI(-1)) + C(8)

In this equation, the expression (4) represents the long run part of this model with the economic growth rate target variable. So the long run part of this model is:

(4)

D(LGDPR)=C(1).(LGDPR(-1) - 0.492582688748.LUEMR(-1) - 14.0675715531.LGME(-1) + 10.7294112724.LTE(-1) + 0.495727319401.LTR(1)+1.39089332366.LTI(1)3.43685773663)

c(1) is an Error Correction Term (ECT) or loading coefficients, which shows the adjustment speed to long run equilibrium. The ECT actually shows, how fast this model moves towards long run equilibrium. If c(1) is negative and significant, it shows that there is long run causal relationship from the exogenous and predetermined variables in the model (the good market efficiency and the variables affecting it) to the endogenous variable (economic growth rate and unemployment rate).

Therefore, in order to investigate the existence of long run causal relationship in the model from the good market efficiency and its effective variables (technology, trade and investment) and the unemployment rate to the economic growth rate, it is necessary to estimate all the coefficients of equation (3). The results of the estimation of the coefficients are as follows.

Table 4. Estimation of coefficients in the model with the economic growth rate target variable.

Prob.	t-Statistic	Std. Error	Coefficient	
0.0050	-2.815037	0.046784	-0.131699	C(1)
0.0012	-3.263600	0.074523	-0.243215	C(2)
0.0083	2.607916	0.415256	0.667697	C(3)
0.0052	-3.069409	1.328013	-1.420189	C(4)
0.0030	2.948869	1.131509	1.073654	C(5)
0.0018	2.951176	0.606114	0.576521	C(6)
0.0027	2.381843	0.436323	0.166607	C(7)
0.0020	-2.237996	0.057596	-0.013708	C(8)

Significance level 10% 1.282
Significance level 5% 1.645
Significance level 1% 2.326

According to the results of the above table, considering the P and t statistics, since the coefficient c(1) is negative and at 1% significance level is significant, it can be concluded that there is long run causal relationship from the good market efficiency and its effective variables and the unemployment rate to the economic growth rate in Asian countries. This means that, Error Correction Term (ECT), according to the results of the above table in the model with the economic growth rate target variable, is equal to 0.13, that is, the system moves to its long run equilibrium at a rate of 0.13 and variables in this system are able to eliminate 13% of existing imbalances in order to achieve long run equilibrium. The equation used to examine the long run relationship of the PVECM model with the unemployment rate target variable is as follows:

(5)

D(LUEMR)=C(1).(LUEMR(-1)-2.03011600457.LGDPR(-1) +28.5588021553.LGME(1)21.7819495437.LTE(1)1.0063839 6502.LTR(-1) - 2.823674797.LTI(-1) + 6.97721989654) + C(2).D(LUEMR(-1))+C(3).D(LGDPR(-1))+ C(4).D(LGME(1))+ C(5).D(LTE(-1)) + C(6).D(LTR(-1)) + C(7).D(LTI(-1)) + C(8)

In this equation, the expression (6) represents the long run part of this model with the unemployment rate target variable. So the long run part of this model is:

(6)

D(LUEMR) = C(1).(LUEMR(-1) - 2.03011600457.LGDPR(-1) + 28.5588021553.LGME(-1) - 21.7819495437.LTE(-1) - 1.00638396502.LTR(1)2.823674797.LTI(1)+6.977219896 54)

Table 5. Estimates of the coefficients in the model with the unemployment rate target variable.

Prob.	t-Statistic	Std. Error	Coefficient	
0.0004	-3.552089	0.004733	-0.016813	C(1)
0.0004	-1.150353	0.085168	-0.097974	C(2)
0.0096	-1.601935	0.015318	-0.024538	C(3)
0.0066	2.400121	0.264949	0.635910	C(4)
0.0039	-2.125245	0.228929	-0.486530	C(5)
0.0053	-1.138559	0.124224	-0.141436	C(6)
0.0062	-0.155853	0.089689	-0.013978	C(7)
0.0080	-2.370509	0.011799	-0.027970	C(8)

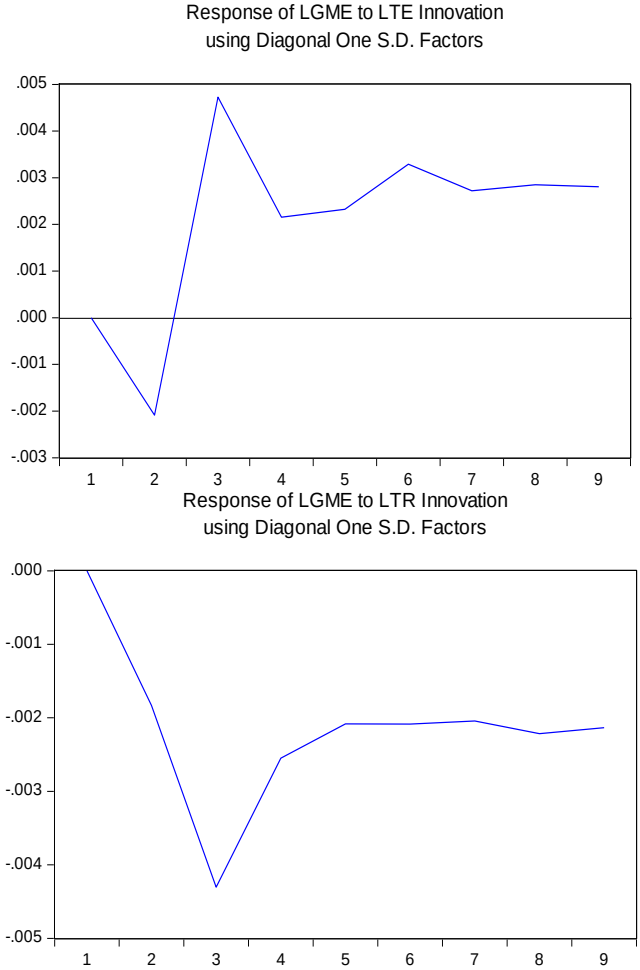
Significance level 10% 1.282
Significance level 5% 1.645
Significance level 1% 2.326

c(1) is also the co-integration (long-run) coefficient. In fact, c(1) is an Error Correction Term (ECT) or loading coefficients, which shows the adjustment speed to long run equilibrium. Therefore, in order to investigate the existence of long run relationship in the model from the good market efficiency and its effective variables (technology, trade and investment) and the economic growth rate to the unemployment rate, it is necessary to estimate all the coefficients of equation (5). The results of the estimation of the coefficients are as follows.

According to the results of the above table, considering the P and t statistics, since the coefficient c(1) is negative and at 1% significance level is significant, it can be concluded that there is long run causal relationship from the good market efficiency and its effective variables and the economic growth rate to the unemployment rate in Asian countries. This means that, Error Correction Term (ECT), according to the results of the above table in the model with the unemployment rate target variable, is equal to 0.01, that is, the system moves to its long run equilibrium at a rate of 0.01 and variables in this system are able to eliminate 1% of existing imbalances in order to achieve long run equilibrium.

4.4 Impulse Response Function Analysis (IRF)

Figures (1) describe the response of the good market efficiency to the shock in the variables that affect it in the model, taking into account 9 years, in the short, (1 year), medium, (2-5 years) and long-term, (More than 5 years).



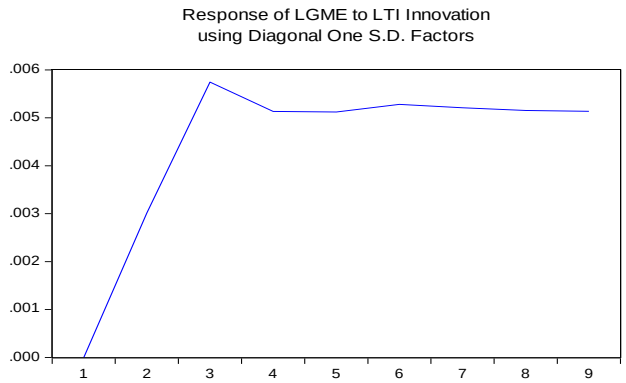


Figure 1. IRF Analysis of the good market efficiency to the shock in technology, trade and investment.

According to Lutkepohl and Reimers (1992) analysis, the results of Figures (1) show that technology and investment shocks in the medium and long run, have a positive effect on the good market efficiency. Trade shock in the medium and long run has a negative impact on the good market efficiency. Therefore, the impact of technology and investment shocks according to theoretical foundations and the impact of the trade shock on the good market efficiency is in contradiction with theoretical foundations in this group of countries.

The results of Figures (2) in the model show that the good market efficiency shock in the short, medium and long run has a positive effect on the economic growth rate and negative effect on the unemployment rate. Impact of the good market efficiency shock on the economic growth rate and unemployment rate in three periods is consistent with theoretical foundations.

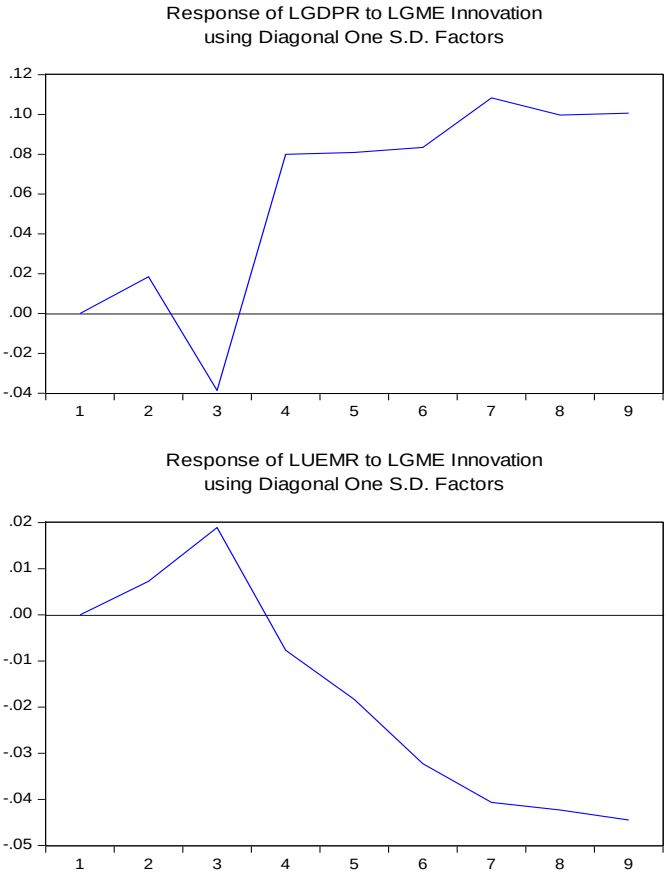


Figure 2. IRF analysis of the economic growth rate and unemployment rate to the shock in the good market efficiency.

The results of Figures (2) in the model show that the good market efficiency shock in the, medium and long run has a positive effect on the economic growth rate and negative effect on the unemployment rate. Impact of the good market efficiency shock on the economic growth rate and unemployment rate in the medium and long run is consistent with theoretical foundations.

4.5. Forecast Error Variance Decomposition Analysis (FEVD)

In order to evaluate the relative importance of the shocks to the economic growth rate and unemployment rate, first good market efficiency FEVD versus shock in effective variables on it, is investigated. Then economic growth rate and the unemployment rate FEVD versus shock in the good market efficiency, are examined. Finally, the share of these shocks of the variables affecting the good market efficiency on this efficiency and the share of the shock of the good market efficiency are presented in the variance of the economic growth rate and unemployment rate of the model. The FEVD results are presented in the following tables.

Table 6. Technology, trade, and investment FEVD analysis on the good market efficiency.

LTI	LTR	LTE	priods
0.00	0.00	0.00	1
0.33	0.09	0.18	2
1.95	0.51	0.53	5
2.67	0.48	0.64	9

Table 7. share of the technology, trade, and investment shocks on the good market efficiency.

LGME			priods
LTI	LTR	LTE	
0.16	0.04	0.09	Short run
1.14	0.30	0.35	Mediun run
2.32	0.49	0.58	Long ran

Table 8. good market efficiency FEVD analysis on the economic growth rate and unemployment rate.

LUENR	GDPRL	priods
E^{LGME}	E^{LGME}	
0.00	0.00	1
0.13	0.36	2
0.96	1.37	5
4.49	3.00	9

Table 9. share of good market efficiency shock on the economic growth rate and employment rate.

LUEMR	LGDPR	priods
E^{LGME}	E^{LGME}	
0.06	0.18	Short run
0.54	0.86	Mediun run
2.27	2.18	Long run

In the model, the share of the technology shock in the variance of the good market efficiency in the short run is 0.09%, in the medium run it more than 0.35%, and in the long run it will increase to 0.58%. The share of the trade shock in the variance of the good market efficiency in the short run is 0.04%, the medium run is more than 0.30% and in the long run it will increase to 0.49%. The share of the investment shock in the variance of the good market efficiency in the short run is 0.16%, the medium run is more than 1.14% and in the long run, it will increase to 2.31%.

The share of the good market efficiency shock in the variance of the economic growth rate in the short run is 0.18%, in the medium run it more than 0.86% and in the long run it will increase to 2.18%. The share of the this shock in the unemployment rate variance in the short run is 0.06%, the medium run is more than 0.54% and in the long run it will increase to 2.72%.

The general results of FEVD show that the largest share in the variance of the good market efficiency is related to investment shock, which this shock has the longest impact on the variance of the good market efficiency in the long run.

Therefore, the results of FEVD and IRF analysis of the good market efficiency on the economic growth rate and the rate of unemployment are compatible with each other.

5. Conclusion

From the viewpoint of economic theories and historical experiences, open, decentralized and competitive economies have had better performance than other economic devices. In general, competition in all aspects will improve the performance of the economy and increase its efficiency. Competition reduces prices, offers goods with different characteristics and quality and improves consumer access to goods and services. On the other hand, in the global economy moving at a fast pace to globalization, countries in the global market will succeed in boosting competitiveness in their domestic markets. In fact, countries that enter the global marketplace from a strong domestic competitive system, have a high chance of success in the global market due to the availability of low-priced products and the quality of the competition results.

The results of this study revealed that exist the long run al relationship from the good market efficiency and its effective variables (trade, technology and investment) and unemployment rate to the economic growth rate. In the model when the target variable is unemployment rate, there is long run relationship from the good market efficiency and its effective variables and the economic growth rate to the unemployment rate.

After the PVECM estimate, IRF and FEVD analysis were carried out. The results of these two techniques showed that: a positive shock of technology and investment (improving technology and investment), in the medium and long ran they have a positive impact on the good market efficiency. But the positive shock of trade (increase in trade), in the medium and long run has a negative impact on the good market efficiency. In this model, good market efficiency positive shock (improving the good market efficiency) in the medium and long run, had a positive impact on the economic growth rate and had a negative effect on the unemployment rate, which these results are consistent with theoretical foundations. According to the results of FEVD analysis in this model, the most important factor affecting the good market efficiency is investment.

Therefore, according to the results of this study, it is suggested that: Given the shock of the good market efficiency in the medium and long run, will lead to an increase in economic growth and lower unemployment rate in Asian countries, therefore, governments should be should be focused on the subsets of the good market efficiency in order to improve economic success in this group of countries. Government in these countries, must reduce the number of steps and procedures needed to start a new business, the cost of policy-making in the agricultural sector, the impact of tax on incentives for investors and the total tax rate, and instead increase domestic competition, foreign direct investment, customer orientation and awareness of buyers' needs, so that they can boost economic growth and reduce unemployment rate.

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