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The Effects of Economic Sanctions on Private Investment in Iran

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ABSTRACT

Every economy needs some production factors for its growth and development. No country can just rely on its internal resources to experience economic growth. But special attention should be paid to international resources to increase its domestic power production in economic sanctions, which lead to the loss of economic security for domestic and foreign factors of production and reduction of international and domestic sources. Then factors of production abroad do not enter the domestic economy of a country, and domestic resources start to leave the country. Sanctions, by creating economic insecurity (high risk), reduce willingness to invest and reduce swelling in the supply side of the economy at the macro level. Investment expenses are known as a stimulus force for economic growth and development. In fact one of the variables that can be changed by changing the macro variables is investment. Private investment, is a part of the total investment in which monetary policy can make many changes. The aim of this study was to evaluate the effect of economic sanctions on private sector investment in Iran by using ordinary least squares (OLS) between the years 1959 to 2008, respectively. Results showed a significant relationship between economic sanctions and long-term private investment in Iran.

KEYWORDS: Sanctions, private sector investment, investment expenditures, Iran, development.

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1. INTRODUCTION

Micro and macro effects of sanctions on the economy of the country can be analysed from two different aspects. First, an economy needs production factors (i.e. workforce, finance and entrepreneur) from different sources to develop itself. These production factors can possess an appropriate influence on economic growth in an economic process. In the other words, economy needs financial resources, cutting-edge technology, raw materials, suitable organization and management and trained workforce. These factors in the form of production factors can be combined with suitable methods to direct an economic activity in industry, agriculture and service. In a secure economy and in the absence of sanctions, these factors can lead to economic growth and development. On the other hand, one of the most important issues in today's economy is that no country in the world can experience economic growth only by relying on its own local resources and must pay enough attention to the international resources in order to improve its local production capabilities and should try to use external resources more than local ones. This is why economic sanctions cause the loss of economic security for both internal and external production factors and then in a macro level, an international and local resources loss is experienced, that is overseas production factors won't enter local economy and local factors also start leaving the country after a while(Salimifar and Ghavi, 2003). Sanctions, by creating economic insecurity (high risk), reduce willingness to invest and reduce swelling in the supply side of the economy at the macro level. As a result, the economy cannot rely only on its domestic resources which will cause more loss. If the growth is not due to increased efficiency in the economy, it would be unreal and for short-time. Also a healthy and productive economy without being in international markets do not have the opportunity for better competitiveness advantage. And if the economy of a country have no portion of the world market, it will lead to economic stagnation gradually. Away from the competitive environment, it also will lose its effectiveness (Salimifar and Ghavi, 2003). The share of international markets requires a normal (non-sanctions) in the political climate of the country and in the international arena in order to provide economic security. Obtaining a share of international markets requires a normal (non-sanctions) political climate in the country and in the international arena in order to provide economic security. If a country cannot have a proper share of international markets due to sanctions, it also loses its competitiveness. Reduction of the share of the Iran's economy from the global markets increases the distance between Iran and other neighboring countries gradually that these effects are visible in the reduction of economic growth obviously. The lack of economic security at macro and micro levels of the economy and consequently the reduction economic growth can be considered as the main economic impact of sanctions (Salimifar and Ghavi, 2003). Sanction means manipulate the relationships and economic cooperation in order to reach the intended political purposes. In fact, economic sanctions are a policy to enforce your political intentions to others. Non-economic sanctions often begin before economic ones to motivate the country to modify its trend. Depending on country and the issue, non-economic sanctions vary, but they mostly include: meeting cancellations, avoid issuing visa, political relationship decline, avoid admitting the country as a member state in international organizations, avoid admitting the country as the host for any international meeting, avoid financial and formal helps (which is specially for poor countries) and cutting telephone and radio communications and block all air, land and sea transportations (Adeli, 2008). On the other hand, investment in an economy means financing on modern machine and factories in order to develop the present capacities or strengthen available warehouses. Capital formation consists of two stages: saving and turn saving into investment. In the meantime, one of the most important economic issues that are of particular interest to economists and economic policy and according to them, one of the most important elements and impact on GDP is investment (Eghbali and Halafi, 2004). Each production in the economy at any level of production efficiency, requires prior investment and every investment needs to secure investment capital from the beginning until reach the output stage. In other words, a necessary condition for the realization of the investment, is security in all aspects associated with it. In fact, production, development and economic growth occurs only after this stage (2). So that, this paper looks for the economic effects of sanctions on private investment in Iran in the period 1959-2008 using OLS (Ordinary Least Squares) technique.

2. LITERATURE REVIEW

A review of research on private sector investment in Iran indicates that this issue has turned into a particular importance in the recent years. In this section some research and studies, within and outside the country related to this study are provided, as research background.

Karshenas (1990) in his study of the impact of the economy on private investment volume of bank credit in the period 1959-77 and the estimate by OLS, considers the following equation:

Relation 1 $$IP_t = \alpha_1 + \alpha_2 IG_t + \alpha_3 CR_t + \alpha_4 K_{t-1} + U_t$$

In which IP_t is private sector investment, IG_t is public investment, CR_t is the volume of bank credit to the private sector, K_{t-1} is capital of the previous period.

He used the time series data, the above pattern for the years 1960-87 which is estimated as follows

Relation 2 $$IP_t = 237 + 0.99IG_t + 0.36CR_t - 0.8K_{t-1}$$

Based on the above pattern, it can be seen that the volume of credit bank network had a significant impact on private investment in Iran.

TALEBI (2000) in his study analyses the effects of real and nominal variables on the level of private sector investment in Iran between 1959-1996**.** To achieve this goal, acceleration flexible model that was estimated by OLS method was used. The study concluded that private investment is positively related to public investment and monetary and banking privileges. Changes that directly affect the decisions of a private investor. Contractionary monetary policy usually takes place due to economic stabilization plans has a negative effect on private investment and reduce economic growth.

Ghavi (2003) had a study on "the effects of banking system credit on the private sector and explained its reasons" in the years 1961-99 and used the OLS model. At first he studied classical theory and then with regard to the situation in Iran and reviews other studies in this area, he developed a model for private sector investment where private sector investment is a function of the public sector, GDP, inflation, credit and banking system to the private sector. The results indicate a significant effect on private sector investment, credit and banking system, which causes structural causes of the economic system in Iran and the replacement of money is mentioned.

MAHMOUDGARDI (2009) He has used Auto Regressive Distributed Lag (ARDL) from 1967 to 2006 to study the effects of monetary and fiscal policy on private sector investment in agriculture. Also it can be influenced by positive and significant private investment in the agricultural sector of government investment in water resources department. If more government investment focuses on soil and water, facilities with low interest rates can be used as a complementary policy.

Table (1) some of the most significant local and overseas policies

Researcher(s)	Period	Methodology	Results
Karshenas	1959-1977	OLS	Bank credits affected Iran's private investment significantly

Talebi	1959-1996	OLS	Private investment has a positive relationship with public investment and monetary & bank credits
Ghavi	1961-1999	OLS	Significant impact on private sector investment, credit and banking system.
Mahmoudgardi	1967-2006	ARDL	Government policies (fiscal policy) and monetary policy (liquidity), respectively have positive and negative impact on private sector investment in agriculture in Iran.

3. THEORETICAL FRAMEWORK

3.1. A study of some investment patterns

3.1.1. "Sandra John and Thakur" pattern (1980)

Sandra John and Thakur on the issue of replacement through the non-precious algebraic emphasize and provide an econometric model that evaluates, the effect of government investment on private sector investment, productivity and savings. The pattern that they have taken, puts its stress on price controls and rationing the amount of the developing countries as a result. Because they say that in these countries which are financed by the investors, there is a major problem in developing countries. They have assumed that the private sector, the favorable capital gains from minimizing the total cost; the total cost also includes the discounted future costs and future costs of the production costs and the cost of capital. So the total cost is defined as follows:

Relation3

$$TC = \int_{\circ}^{\infty} F(c,t)dt$$

Relation4

$$F(c,t) = \exp(-\int_{\circ}^{t} R(s)ds).\left[C(QP^{*}, KP, KG) + P(KP^{\circ} + d.KP)\right]$$

In which TC is total cost, QP^{*} is favorable of private sector, KP is private sector capital, KG is public sector capital, R is short-term interest rate, P is prices of capital goods, C is the cost of the private sector, $\int R(s)ds$ is representing a discount rate , $KP^{\circ} = \partial KP / \partial t$ represents the net investment is long-term.

By Using equations investments, savings and production, a pattern forms dynamic economy and then changes the long-term effects of public investment on private sector investment, savings and production and the issue of replacement, its dynamic program was to run through the variable investment of this government in just one year from the actual amount of most of them and then subtracting manufacturing, private investment and savings resulting from the implementation of this model in production, investment and savings model that public investment is required in their previous value (unchanged) were compared. Sandra John and Thakur implemented this method for both Korea and India for 1960 and 1975.

The results showed that for India, although short-term effect of an increase in public investment on private investment and savings of the private sector in total long-term negative effect on private investment, total production and savings are positive. In Korea, also, the effect of short-term and long-term effects of increased public investment on private investment, total production and savings are positive.

So we can say that the total production instead of using the private sector, generates favorable private sector, private sector investment and capital reserve capacity of the public sector which not only represents his work, but also the impact of implicit public sector subtraction of the total production will

be included. So we expect the coefficient of this variable in the private sector is smaller than that of the private sector to apply.

3.1.2. Asali Pattern (1996)

"Asali" in his study noted that the volume of investment in developing countries and not the cost of borrowing, are the main investment restrictions. Because the volume of bank credit to the private sector and directly control the price system will not be allowed to play its role in resource allocation. Accordingly, in one of the patterns of his proposed investment, private sector investment is a function of production, total capital in the previous period, public investment and real bank credit granted to the private sector in the past.

Relation5

$$IP_t = a_0 + a_1 Y_t + a_2 K_{t-1} + a_3 IG_t + a_4 DCP_{t-1}$$

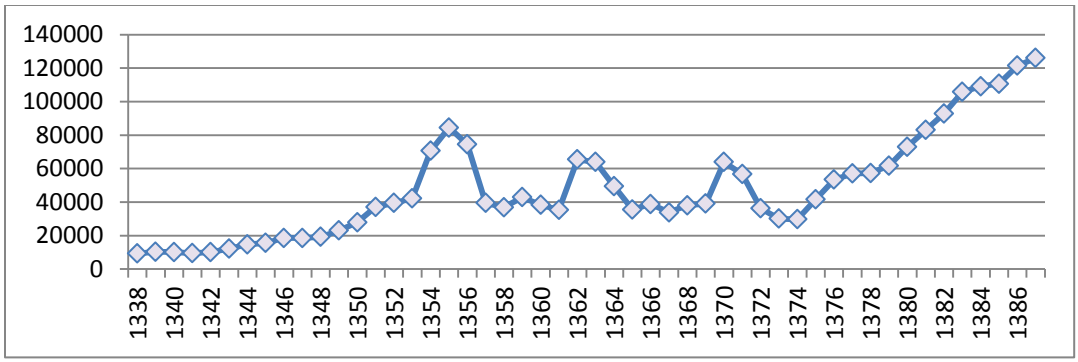
IP is private sector, IG is public sector investment, ΔDCP is bank loans to the private sector, K is the total capital available. Asali model years 1959 to 1992 is estimated for Iran. He concluded that a 10 percent increase in public investment, private investment will increase by 4%.

4. VARIABLES INTRODUCTION AND THEIR TIME PROCESS ANALYSIS

4.1. Private sector investment

Includes physical investments which are done by private economic units in machinery and building. It was about 40000 billion Rails in 1979 and increased gradually the following years of war. In 1984, it reached its peak (65390 billion Rails). Long time war and weapon purchase are the main causes of this great rise. Government investment in infrastructure leads into the lack of confidence in private sector to keep operating in various economic situations. Then, this figure falls into 35400 billion Rials in 1987 which can be due to the lack of governmental financial resources, raising the risk of investment in private sector and reluctant foreign investors because of instability. After the war in 1986, investment flourished once again; due to high reconstruction expenses and removing war traces in one hand and construction plans in Hashemi Rafsanjani office, operating monetary and currency different policies, specially the policy of structure modification, supporting the government in forming and developing new industries on the other hand, investment has increased to about 64000 billion Rials in 1989. In 1989, though, private investment has experienced a sudden fall due to an increase in inflation rate from 9% to 20.7% and the occurrence of problems of importing raw materials for factories. It fell into its lowest level (30000 billion Rials) in 1993.

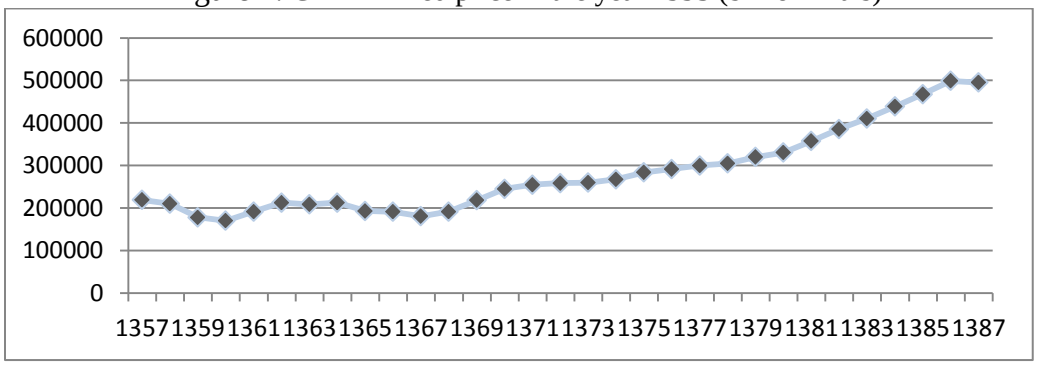
Figure 1: general investment in machinery in fixed prices of the year 1995 (billion Rials)



4.2. Gross Domestic Production

Gross domestic production (GDP) includes the value of those goods and services which are produced in a specific period (normally a year) in a country. By goods and services, in this definition, we mean those goods and services that are located at the end of production chain and are not purchased for other services and productions. There are varieties of methods for calculating national gross production. Three common methods include: calculating the whole added value, calculating consumption view and calculating income view. One of the most important variables in private sector investment is gross domestic production. Forming private stable finance is one of the most fluctuating elements in GDP of every country. Due to the significance and sensitivity of this macroeconomic variable, its determinants recognition is of great importance in every economy. Investment theoretical studies in private sectors of different countries, specially developing one, demonstrates that changes in gross domestic production which is the most important determinant in private sector's investment.

Figure 2: GDP in fixed price in the year 1995 (billion Rials)

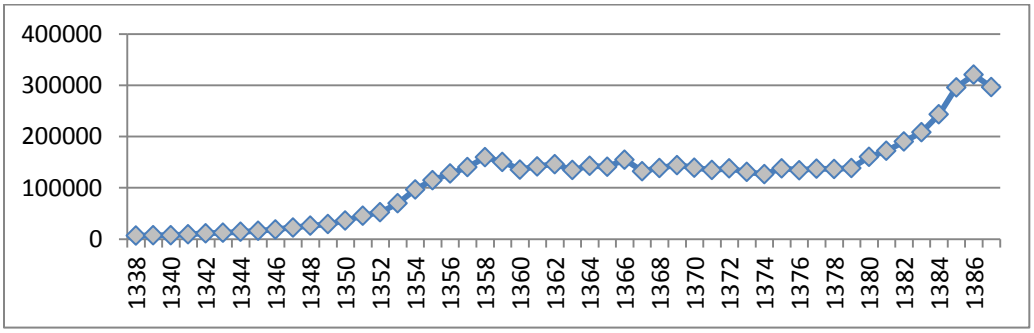


4.3. Liquidity

Liquidity which is defined in terms of its components, is the sum of currency in the hands of those three variables, demand deposits and quasi-money. As in Figure 3 can be seen, the liquidity variable that always has an upward trend. The pace of change has been slow in the years before 1995 and actually experience a moderate slope. But in later years, especially since 1997 because of flooding and the accumulation of capital in the construction sector, increase in the sector that shows the rise and wander its liquidity and inability to invest money in the manufacturing sector has been stranded. However the rise of oil prices can also explain this sudden increase. Because of the sale of oil on world markets at higher prices, the influx of currency into the country. As well as converting these currencies to Rials, and injecting it into the community, an increase in the liquidity will be renewed. Also factors such as the lack of coordination between monetary and fiscal policy, the weakness and the inability to manage liquidity produce gaps in different sectors that seemed to be solved with liquidity and the multiplicity of monetary

policy is expansionary, which reflects the lack of a plan for the future is not far. It was because of the increase in liquidity as a strong sedative usage and not a cure that can be irreparable consequences in all sectors created in the future.

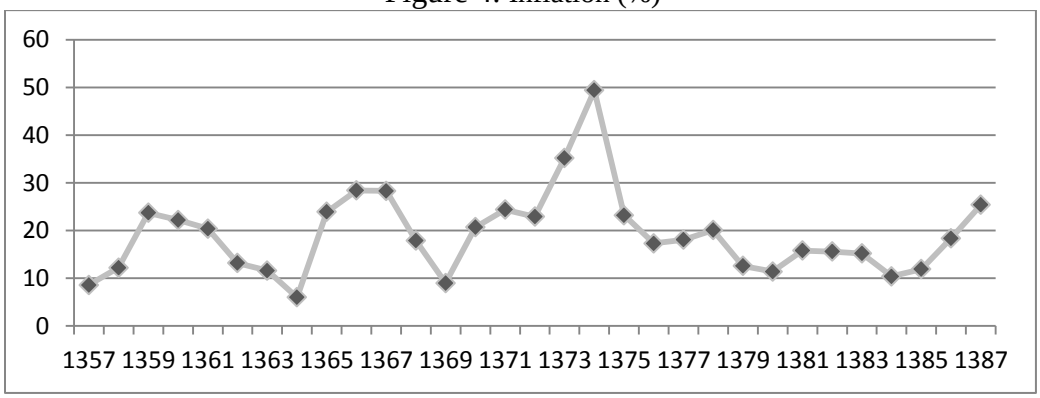
Figure 3: liquidity to fixed price in 1376 (billion)



4.4. Inflation

In economics, inflation refers to increase of money flow, prices or financial incomes. Inflation is generally defined as disproportionate increase in prices. Inflation is an in-balanced and increasing trend in prices in an economy. There are various definitions given for inflation, though, they all refer to imbalance and increase in prices. In Iran, one of the determinants is imbalance between government's income and expenses. The other determinant can be structural inflation.

Figure 4: Inflation (%)



5. METHODOLOGY

The economic models can apply three classes of statistical observations: time series observations, cross section observations and panel data observation. In this paper, we study time series data using ordinary least square (OLS) method which is one of the most common methods in econometrics. Applying most common econometrics methods for predicting model coefficients using time series data is based on this hypothesis in which model variables are stationary. A time series variable is stationary if its mean variance and dependency coefficient do not change during the time regardless of the time that these indices are needed to be calculated. If the variable be non-stationary, R^2 determination coefficient can be very high, although there may not be any relationships between model variables; it may lead to a kind of misunderstanding. Furthermore, non-stationary variables in a model that may cause some invaluable F and t test. Besides, critical quantities provided by F and t distributions are not true critical quantifies for the test that lead to this misunderstanding "there is a firm and significant relationship between model's variables". The fact is that the regression is spurious one. Augmented Dickey-Fuller (ADF) test is used in this research to determine the level of data sustainability.

6. VARIABLES ANALYSIS IN TERMS OF BEING STATIONARY

Due to time series data of this research, we analyzed variables' stationary before predicting model. If variables are stationary (i.e. I (O)), the process goes on. Otherwise, if some of the variables are I (1) and I (2), convergence test is applied. After analyzing variables' stationary and making variables stationary using OLS, variance anisotropy, autocorrelation and multicollinearity tests are applied for the variables. Any possible problem must be fixed through common econometric method. Shared-root test is used to analyze variables' stationary in the model. Therefore, Augmented Dickey-Fuller (ADF) test applies shared-root test results of test results of Augmented Dickey-Fuller (ADF):

7. AUGMENTED DICKEY-FULLER (ADF)

ADF test was applied for model variables between 1957 and 2008; the results are as following.

Table (2) the result of Augmented Dickey-Fuller Test in 1% level.

Result	Augmented Dickey-Fuller	The critical values	Variable
I(1)	-3.78	-3.57	LGDP
I(1)	-5.65	-5.57	LIP
I(1)	-3.68	-3.57	LRM2
I(1)	-7.52	-3.58	INF

8. INTRODUCE THE MODEL:

As already noted, the aim of this study was to evaluate the effects of economic sanctions on private investment in Iran. On this basis, and considering the patterns of ordinary least squares (OLS) for the selection of variables, private sector investment (IP) as the dependent variable and four variables of gross domestic product (GDP), inflation (INF), the amount of money (RM2) and sanctions (in the form of dummy) have been entered as independent variables in the model. Based on the given description, appropriate pattern considered in the present study is as follows:

Relation6 LIP = 0.557LGDP + 0.352LRM2 - 0.14D1 - 0.0109INF

In the estimated model, one percent change in inflation rate leads to -0.010% change in private investment; meanwhile, one percent change in LGDP leads to 0.557% change in private investment. Also one percent change in LRM2 leads to 0.352% change in private investment. In the estimated model, $\bar{R}^2 = 0.94$, $R^2 = 0.94$, $D.W = 2,00$ and all variables are I(1). All stationary residuals were in right level that demonstrates there is a long-term relationship and all variables are in significant 99% confidence level, except permanent variables which are in significant 95% confidence level. According to the table, Lagrange coefficient test reveals a kind of autocorrelation among variables; logarithm of the average GDP ratio is estimated to be positive and the monetary base is positive too, that shows a positive relationship with private investment and the estimated rate of inflation. On the other hand, sanctions are negative which demonstrate a negative correlation with inflation and sanctions on the private investment sector. According to the results, variables' residuals all are stationary, sentences are same and there is no false regression problem as well.

9. RESULTS

9.1. Variance anisotropy test

In all estimated models, time series data are applied. This is why white test is applied for analyzing variance anisotropy.

Table 3: The results of variance anisotropy test

Result	Obs*R-squared	F-statistic	Variable
Variance Anisotropy	0.33	0.36	LIP

9.2. LM test for analyzing autocorrelation

This test is same as Briosh-Gadferri test that is applied to determine the existence or non-existence of autocorrelation problem in residuals; No autocorrelation problem was observed according to the results.

Table 4: The results of LM test for analyzing autocorrelation

Result	Obs*R-squared	F-statistic	Variable
non-existence of autocorrelation	0.87	0.71	LIP

9.3. Cointegration test

The economic concept of integration is that when two or more series based on the theoretical foundations, are linked together to form a long-term equilibrium relationship, although these time series may have been a random process (to be non-viable), but over time, as well as follow the difference between them is stable (viable). If two time series are not cointegrated, in this case, there is no balance. So to test the long-run equilibrium relationship between the two variables (or variable, co-integration analysis is used

Table (5) integration test results

Result	The statistics Dickey-Fuller test	Critical values at 1%	Variable
There is a long-term relationship with 99% confidence	-6.95	-3.57	LIP

10. DISCUSSION AND CONCLUSION

Private investment in every country, that includes private sector's investment in machinery and private sector's investment in building, is not only affected by economic variables such as inflation, currency rate, public investment, direct foreign investment, etc., but also by the decisions of top financial figures. Because of the most significant factors needed for attracting stray capitals in private sector, it is essential to make sure of economic security and stability for private sector's investors. This assurance can be the result of financial top figures' decisions. In fact, investment motivation, especially foreign investment, needs investor's assurance of a low-risk economy. Furthermore, investment is influential in economic issue due to two major reasons; in one hand, the form of investment institutions' demand and family savings' supply demonstrates that how much of economic gross production (EGP) is for investment, therefore, investment demand reveals long-term living standards. On the other hand, due to volatility of investment, it can reveal the decision of those who are willing to invest according to the short-term changes and fluctuations in every society. In this study, based on the features of independent variables, only their effects have been studied in a macro level. According to the results of this research, in the estimated model, there is a direct relationship between logarithmic coefficient of GDP and money with private investment in logarithm. Meanwhile, sanction's permanent variable and inflation coefficient are negative that reveals a reverse relationship between sanction & inflation rate and private investment in

logarithm; it demonstrates that the higher the inflation rate, the lower the private investment. Also economic sanctions would also reduce the amount of private investment.

11. PRACTICAL SUGGESTIONS

- ✓ Investment incentives for private investors through incentive policies such as tax exemption for all or part of the heavy industry and in particular for the production of basic goods.
- ✓ Pay particular attention to the consistency of monetary and fiscal policy, careful planning and attention to all the consequences of policy and vision in all aspects of policy implementation.
- ✓ Having a long-term and short-term planning and continuous review of the investment strategy.

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ETHICAL CONSIDERATION

Authenticity of the texts, honesty and fidelity has been observed.

CONFLICT OF INTEREST

Author/s confirmed no conflict of interest.