

## The Factors Affecting Inflation and the Forecast of Its Driving Forces

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### ABSTRACT

Most of the world has experienced inflation phenomenon which defined as the persistent increase in general level of goods and services price with different rates in their economical records. Some people believe that inflation acts in the role of a destructive evil but in fact is not necessarily always the case. Inflation may affects individuals, business and the industry and trade sectors of the economy and business of communities in different ways. The degree of this impact relies on timely forecasts or weaknesses of on time predictions of inflation. Predicting the future based on past trends as well as including variables and factors cross-impact on inflation using future study practical methods can contribute notably to control and/or equip the process of dealing with inflation. Despite the importance the prediction of inflation, future trends, wild cards and sequences has which can lead to milestones or breakdowns in the trend, the studies conducted in Iran have not been successful in providing accurate predicting methods or limited studies have addressed the issue of predicting effective and main variables in economy. This study intends to investigate the role of the prospective propellants of inflation. The results of this research could be effective in prospects of uncertainties and applying on time policies and ultimately reduces the social and economic impacts and damages caused by inaccuracy in forecasting inflation on time.

**KEYWORDS:** Forecast, Driving forces, Inflation, Predicting methods, social consequences, social consequences

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### 1. INTRODUCTION

Inflation has been defined as the ongoing increase in the general price level of products and services. This phenomenon is measured as annual increase. Due to the increase in inflation, every single monetary unit can buy less percentage of services or products and the value of currency would not be constant. The value of each currency is indicated by the purchasing power which suggests that a product or service can be bought by that currency. The purchasing power decreases due to the increase in inflation rate.

For example, if the annual inflation rate is 2%, one might theoretically buy one product with 100 currency unit in current year and in next year, he would buy the same product with 152 currency unit. Inflation has different types such as deflation (negative inflation), hyperinflation and stagflation [1, 2]. In recent years, Most of the world advanced countries have tried to keep their inflation rate on 2 or 3 percent, because inflation, one of the most important macroeconomic indicators, has a relationship not only with economic factors but also collateral or sometimes multilateral with political issues, human behaviors (such as expectations, desires, priorities, tastes, and culture), etc... Often it is believed that inflation acts as a destructive evil, but in reality it is not necessarily. Inflation affects differently in different people and over sectors. It depends on predictable or unpredictable inflation. If inflation rates are consistent with what the majority of individuals in a society expected to be (predicted inflation), it will have lower negative effects on costs and the economy, industry, trade and the household expenditure and negative social consequences resulting from the decline in purchasing power is reduced.

Often it is believed that inflation acts as a destructive evil, but in reality it is not necessarily. Inflation affects differently in different people and over sectors. It depends on predictable or unpredictable inflation. If inflation rates are consistent with what the majority of individuals in a society expected to be (predicted inflation), it will have lower negative effects on costs and the economy, industry, trade and the household expenditure and negative social consequences resulting from the decline in purchasing power is reduced. The analysis of the past flow of inflation shows that one of the most important reasons of inflation in Iran is the structural factors arising from the lack of sectional coordination, infrastructure constraints and bond supply in key sectors [3,4,5,6,7,8,11,12,13]. Fig1 shows

the point-to-point inflation rate in Iran from 1990 to 2014. In other words, one of the main causes of inflation is adoption of decisions and policies following positive economical targets but they turn to a kind of inflationary tools because of failure to adopt them timely or/and unprincipled implementation of them.

If forecast and foresight tools in relation to inflation can be used well, major harms can be prevented.



**Fig. 1.**The inflation rate flow in Iran from 1990-2014 [9,10]

If we correctly and scientifically use tools to predict and prospect inflation, major damages will be prevented.

Among the most important reasons of failure of these programs, weakness in outlook development, lack of capabilities and potentials consideration in goal-setting and predicting the future can be highlighted.

Horizontal scanning, Delphi trend analysis, scenario, visioning, modeling, simulation, roadmap and hindsight are the most important methods of forecasting; each of these methods can be used in the economy of countries due to the goals, conditions and facilities.

Despite the importance of forecasting in providing a view of future condition, it has been seen that internal studies conducted in Iran have not been successful in provision of accurate forecasts or limited studies have predicted main and effective variables of economy. The most important reasons of forecast result weakness of Iran economical factors are as follows.

- Incomplete monitoring of effective variable
- The lack of taking driving forces as main variables
- Weak capability of modeling (quantification) some important and effective variables (like economical sanctions against Iran)
- Inaccurate measurement of some shocks and surprising events effect in the economy (like expected inflation)
- Low record and multiple statistics of some important and effective variables

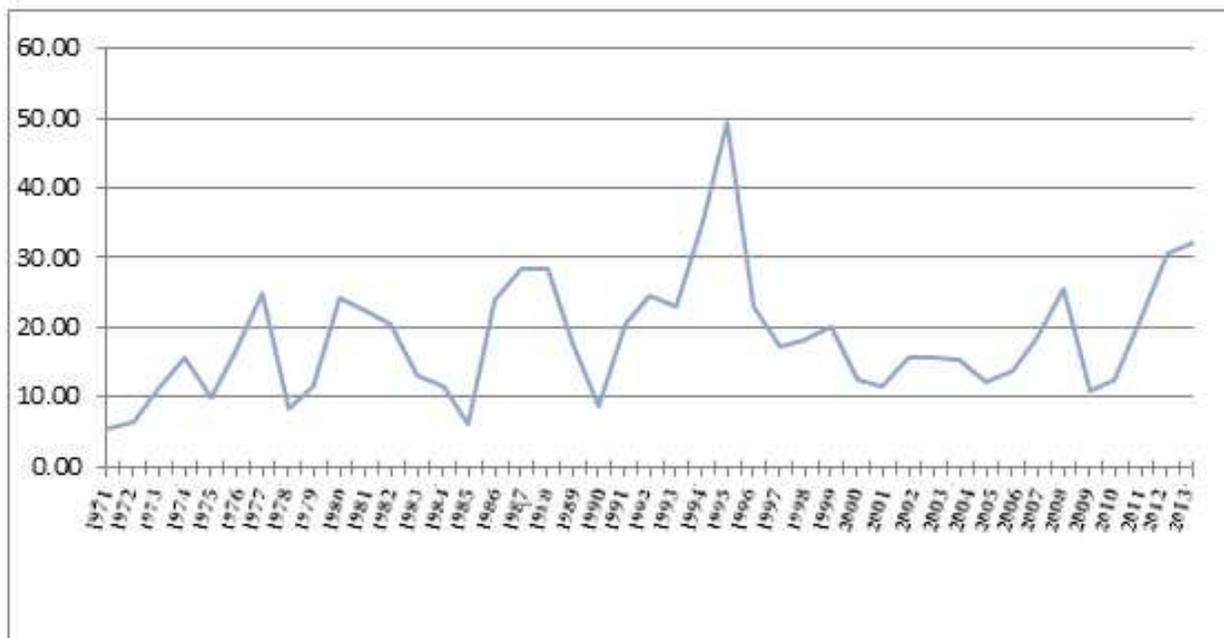
In this regard, the current study aims to investigate the role of driving forces in forecast of inflation factors. The result of this study can be useful in forecasting uncertainties and preplanning, and ultimately reducing social harms and effects of unexpected inflation.

## 2. The analysis of inflation rate changes

During the post-revolution years, i.e. 1980, 1987, 1995, 1999, 2002, 2009 and 2012, the inflation rate rose but it decreased in 1985, 1990, 1993, 2001, 2005 and 2009. The accuracy of statistics showed that there had not been any uniform and clear inflation rate during that period of time.

On the other hand, inflation in 2011 is lower than the highest inflation since the Revolution (1995). The reason can be the very high liquidity and heavy demand in the country after years of war and increasing the currency

revenues caused by the rise in oil prices (Fig2); non-inflationary government policies in 2014 changed the inflation rate trend so that Economy Trading Institute reported Iran latest inflation rate as %14.60 in 2014. (Fig3)



**Fig.2.**The inflation rate changes (1971-2013) [9,10]



**Fig.3.**The inflation rate changes (2010-2014) [9,10]

### 3- Influencing propellants on inflation rate in Iran

A lot of factors including demographics, exchange rate, liquidity, changes in commodity prices, emerging markets, Central Bank policies, etc. can cause changes in inflation rate in different communities [14].

Recognition of the main driving forces of inflation rate is so effective in macroeconomic stability of communities. Some major driving forces of inflation rate are as follows:

**1. Exchange rate:** Positive shocks of exchange rate have negative effect and negative shocks of it have positive effect (asymmetry of shocks).

Exchange rate has more effect on stability of inflation in short term comparing long term period [15].

**2.The global commodity price changes:** the share of imported inflation out of hundred percent of inflation is calculated 14%, although there is much controversy between researchers and economic experts on the weight and value of this percentage, However this share only states the primary effect of importing before considering multiplier factor of the increase in the price of imported raw materials on the cost of different commodities produced from each other; by considering this factor , the share of importing inflation would increase to %17 [16,17].

**3. Transport costs and energy vectors:** If the price of energy products changes and reaches to the level of world prices, the maximum and minimum inflation rates will be 37.2 and 2.73 percent respectively[18].

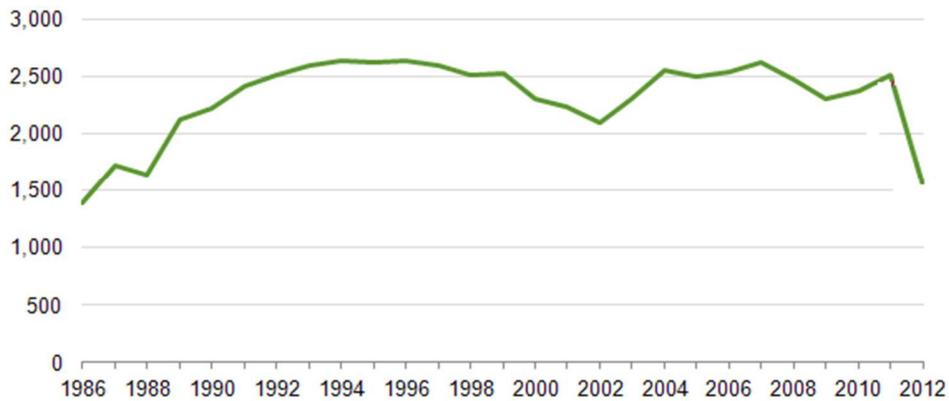
**4. Liquidity:** Much of the liquidity created in recent years has been focused on the demand side; this fact is one of the reasons for the past fluctuations of markets such as currency, gold and housing. A significant portion of liquidity overflow toward the consumable products and this issue caused the increase in total demand which has negative impact on the increase in the general level of prices [19].

The trend analysis of inflation in the past shows that one of the major causes of inflation in Iran are structural factors due to the lack of coordination in sectors, supply adhesion and infrastructure constraints in key sectors. In other words, the main causes of inflation in Iran is the decision making and policies that although follows the positive economic goals, because of lack of timely adoption or unprincipled implementation, have become a kind of inflationary tools. If we can predict and prospective the inflation, their main damage is inevitable.

**3.1. Inflationary effect of exchange rate fluctuations**

The exchange rate depends on fiscal and monetary policies. Studies show that there is a bilateral relationship between the exchange rate and the general level of prices and in fact, this relationship forms a vicious circle[14]; i.e. as the exchange rate increases, the general level of prices increases and if the general level of prices increases, the exchange rate will increase. Also, if the exchange rate increases by %10, the inflation rate will increase by %6.6. In this regard, the following points are noteworthy:

- In 70s (1991-2000), as a result of the sharp decline in Iran foreign exchange earnings, the exchange rate had increased considerably.
- In 80s (2001-2010), oil revenues have had an upward trend (figure 4 shows the volume of Iran oil export from 1986 to 2012 [20] Therefore, the real exchange rate has decreased.



**Fig.4.**The volume of Iran crude oil export 1986-2012 (thousand barrels per day)[20]

Thus, the inflation rate in 70s is higher than this rate in 80s. In recent years, neglecting to this point that the %10 rise in exchange rate as a very important driving force can rise the inflation rate by %6.6, it has sharply increased and as a result, inflation rate has increased too.

**3.2. The inflationary effect of the rise in world prices (importing inflation)**

The change in world prices may affect the internal prices through foreign trade and balance of payments. This case is inevitable knowing that world prices are among internal driving forces and the relative impact of the change in world prices (as the importing inflation) on inflation occurs after a time lapse.

**3.3. The inflationary effect of the rise in the price of transportation and energy products**

The change in the price of energy products is the Act of Iran Islamic Council Parliament. Table 1 shows the result of conducted researches on the effect of petrol price rise (as one of the most important driving forces) on inflation Regarding that %25 of the inflation rise is due to the transportation expenses (as one of the most important driving forces), it is necessary to take more careful decisions about the liberalization of energy products prices (time and factor applied).

**Table 1.**theresult of conducted researches on the effect of petrol price rise on inflation  
(source: researcher’s investigation)

Row	Researcher	The inflation rise as a result of %10 rise in petrol price	Methodology
1	Parliament Research Center (2004)	%1.5- %1.6	Input- Output
2	Department of Planning and Economic Affairs, Institute of Economic Research , the Ministry of Commerce	%2.2	Auto- regressive models by distributed lags
3	Jalalabadi,Shafii and Shah Hosseini(2006)	%2	Econometric (VAR,ARDL)

**3.4. The inflationary effect of the liquidity rise**

The liquidity rise is the subordinate of fiscal and monetary policies; the reasons of the liquidity rise in recent years are as follows [21]:

- Holding down the interest rate of loans
- Granting bank loans by order especially to governmental sector
- Converting oil revenues from foreign currency to Rial (Iranian currency) and injecting them to state economy
- Increasing government debt to the banking system and also, excessive increase in deferred debts
- Getting excessive and unfunded loans from Iran Central Bank resources by operating banks
- Expansionary budgeting policies regardless of capacity and growth substrates
- Government budget deficit as a result of the rise in operating expenses, unfinished developmental projects and the rise in demand against supply

**4. The social consequences of inflation**

Inflation will expand an important component as poverty in the community by declining purchasing power, economic growth, reducing national production, reduced income and increased income inequality [31].

There are two important points in intensification of inflation:

A) Until the limit is justified to maintain purchasing power and per capita income and poverty does not lead to social poverty, it is possible to achieve economic growth and poverty relief.

B) If economical poverty leads to social poverty, the country will experience a new situation in which economic improvement is not an easy task, it requires significant programs and investment. Social poverty reduces the pace of economy growth.

The most important socio-economic effects of inflation can be named as the following cases:

Increased poverty, increased unemployment, increased corruption, economic rents, increases in divorce, loss of marriage, having multiple jobs and being away from family, disruption of family relationships, future hopelessness, increased crime and reduced life expectancy, reducing social welfare, reduced leisure time, increased stress, promoting informal jobs, significant role of smuggling and entry of goods that are contrary to the culture, the development of cultural differences, increasing the gap, widespread black market due to the windfall, the marginalization of ethics (economic) , reducing costs and household welfare ... that decision-makers’ foresight and advance planning areas can prevent many of these social consequences [34].

**Table 2.**Forecast values of Iran Macroeconomic factors (source: researcher's investigation)

The forecaster center	variable	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
International Monetary Fund	Population-million people	68.67	69.42	70.27	71.23	72.21	73.20	74.2	75.21	76.23	77.27
	The exchange rate (Iran Rial-U.S. Dollar)	8793	9091	9223	9282	10000	10400	10608	10725	10843	10951
	Financial reserves (except gold) U.S. billion Dollars	29.10	46.80	60.50	81.70	102.61	117.62	134.26	151.35	168.53	185.56
Iran Central Bank	Nominal GDP U.S. billion Dollars	160.76	188.30	222.27	282.63	362.34	376.51	443.25	514.22	592.72	680.33
	Real GDP growth (the percent of annual change)	5.1	4.7	5.8	7.8	4.9	4.6	4.4	4.4	3.5	3.6
	Budget balance (Iran billion Rials)	-49229	-60853	-147431	-96055	-186986	-487031	-539137	-592164	-645075	-705824
	Export (billion Dollars)	43.85	64.37	76.06	97.4	119.94	98.29	113.25	118.1	124.96	130.93
	Current account (U.S. billion Dollars)	1.44	16.64	20.40	34.08	47.18	17.64	25.35	22.43	22.77	22.01
	Foreign debt (U.S. billion Dollars)	22.5	24.3	23.5	28.6	31.5	34	36.8	39	41.3	43.8
Business Monitor calculations	Foreign debt (percent of GDP)	14	12.9	10.6	10.1	8.7	9	8.3	7.6	7	6.4
	Current account (percent of GDP)	0.9	8.84	9.18	12.06	13.02	4.69	5.72	4.36	3.84	3.24
	The exchange rate (Iran Rial-Euro)	11931	10758	12177	13607	13000	13520	13790	13942	14095	14236
	Consumer price (year by year percent)	15.2	12.1	13.8	22.5	22	18	16	16	14	14
	Budget balance (percent of GDP)	-3.5	-3.6	-7.2	-3.7	-5.3	-12.7	-11.6	-10.8	-10.1	-9.5
	GDP per capita-U.S. Dollar	2341	2712	3163	3968	5018	5144	5974	6837	7775	8805

**Table 3.**The real values of Iran macroeconomic factors (source: researcher's investigation)

The forecaster center	variable	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
The World Bank	Population-million people	68.89	69.73	70.58	71.43	72.28	73.13	73.97	74.79		
	Nominal GDP U.S. billion Dollars	163.23	192.02	222.9	286.06	338.19	331.2				
	GDP per capita-U.S. Dollar			2940	3520	4100	4520				
Iran Central Bank	Nominal net exports-billion Rials		171866	208662	337500	273613	166624	298375			
	Budget deficit-billion Rials					120000	100000	700000	290000		
	The exchange rate (Iran Rial-Euro)	1096	11014	9196	9282	9572	9917	10335	10971		
The Chamber of Commerce	The exchange rate (Iran Rial-U.S. Dollar)	874	904	922	935	966	1000	1100	1900	3500	
	The value of exports-billion Dollars	6.8	10.43	12.85	15.29	18.31	21.88	26.54	33.76		
International Monetary Fund	Balance on current account (percent of GDP)	7.6	8.5	10.6	6.5	2.6	6	12.5	3.4	1.3	
	The annual percentage change in real GDP	6.1	4.7	6.2	6.4	0.6	3.9	5.9	2	-0.9	0.8
	Consumer price (the percent of annual changes)	15.3	10.4	11.9	18.4	25.4	10.8	12.4	21.5	25.2	21.8

**5. The predictability of future changes of some economical variables**

Some important economical variables have the capability of predicting with a significant percentage of estimation accuracy and possibility of fulfillment; by having these variables, it would be possible to have useful forecasts in the field of economical policies and programs in order to control the inflation and avoid its possible effects.

Table 2 shows some of these forecast results and table 3 also shows the real values of economical factors. The analogy of each variable in both tables indicates the credibility of forecast and the success rate of its operation.

Due to the importance of inflation and the forecast role in foresight of important economical variables, it seems that predicting future based on the past trend as well as considering collateral effect of variables and diversity of these effects can help considerably to control inflation or at least to equip to deal with it.

Table 3 compares the absolute values, estimates and inflation forecasts in Iran by foreign and domestic institutions. The results of this table represent a degree of credibility and success of foreign institutions in evaluating the rates of predicting inflation.

**Table 3 compares the absolute values, estimates and forecasts of inflation by domestic and foreign institutions**

absolute		Forecast	Estimating			Institution
Statistics Center	Central Bank	International Monetary Fund	International Monetary Fund	Economy watch	World bank	Year
	11.4	16	11.4	11.34	11.27	<b>2001</b>
	15.8	15	15.8	15.74	14.34	<b>2002</b>
13.9	15.6	18	15.6	15.6	16.47	<b>2003</b>
14.6	15.2	15.6	12.1	15.34	14.76	<b>2004</b>
12.1	10.4	15.5	13.6	10.4	13.43	<b>2005</b>
13.7	11.9	14	18.4	11.87	11.94	<b>2006</b>
17.2	18.4	19	25.4	18.39	17.21	<b>2007</b>
25.5	25.4	26	10.8	25.37	25.55	<b>2008</b>
9.5	10.8	12	12.4	10.76	13.50	<b>2009</b>
13.9	12.4	9.5	21.5	27.2	10.14	<b>2010</b>
26.4	21.5	22.5	21.5	21.48	20.63	<b>2011</b>
28.6	30.5	25.2	30.5	30.6	27.34	<b>2012</b>
32.1	34.7	42.3	35.2	27.2		<b>2013</b>

Source: World Bank, IMF, Economy Watch, Business Monitor, the Central Bank and Statistics Center

The accuracy of each of the institutions by the W-simple Cart algorithm which is one of data mining algorithms, are calculated and their Estimates are provided in Table4.

**Table 4. The accuracy and error rate of the estimated inflation by institutions[28,29]**

Error rate	Accuracy rate	Institution
0.16	78%	International Monetary Fund (forecast)
0.38	88%	International Monetary Fund (estimate)
0.44	80%	Economy Watch
0.38	96%	World bank

According to the observed results of international institutes' forecasts and events, most of them have the good estimation accuracy – comparing the realized values. Therefore, it seems that research centers within the country can come to good results for future values of important and effective economical variables if they use suitable forecast approaches. In the following section, the most practical methods of forecasting in Iran will be reviewed.

#### 4.1. Suitable methods for economical variables forecast

Most of information available about the future of some important economical variables is qualitative, so they are not suitable for policy-making and programming. Thus, although possessing qualitative information about future changes of a variable like inflation is useful, it is expected from futurists and researchers in the field of forecast to provide quantitative results (including variables increased or decreased). Therefore, the most useful forecast methods for economical variables are divided to modeling and simulating, according to the author [22,23,24,25,26]:

**a) Modeling:** This method is based on historical data and includes the following subordinates:

- **Structural equation (SEM):** According to structural and theoretical relations among variables, this method is planned. Dependent variables are predicted by independent variables which are dependent variables themselves that should be predicted and put in the model.
- **Time-series models:** They are based on the time trend, time cycle and seasonal impact; They are in two forms of "univariate" (including inductive effect of the dependent variable on itself, like inflation and liquidity) and "Multivariate" (including inductive effect of the dependent and the independent variables)
- **Paving models:** They are based on data exploration.

**b) Simulating:** There are two forms in this method; one form is that we know the probability distribution of the phenomenon (Mont Carlo method) or the other form is that the probability distribution of the phenomenon is unclear and not based on the past data (ATM method).

The most important points in the topic of the forecast models are recognition of effective variables (based on the past, trends, cycles, interactions, etc.) and the selection of the suitable forecast model [27].

The review of scientific records about the forecast of Iran economical variables shows that the best method is "multivariate time-series model" which investigates the inductive impact of the dependent variable and indigenous variables simultaneously. Furthermore, there is the adjustment factor from short term to long term in the above mentioned model, i.e. it can be checked when the shock in short term can be adjusted and whether it can be transmitted to the future. Then, according to the answers provided for these questions and by the contribution of the foresight techniques and methods, the future events can be predicted more suitably.

#### 5. Conclusion

Some influential factors such as demographic factors as a socio-propellant, exchange rates, international commodity price changes, the transportation prices of energy, liquidity, changes in commodity prices and newly emerging markets as economic propellants and some outside economical events as the political propellant and others may result inflation changes in various countries. No matter what the cause of inflation is, not only it can be controlled and prevented but also the intensity and extent of its harms can be reduced. Due to the importance of inflation and the role of forecast in foresight of important economical variables, it seems that predicting the future based on the past trend and also considering the collateral effect of variables and the diversity of these effects can help considerably to control and/or at least to equip for dealing with the inflation. Hence, recognition of factors affecting inflation and suitable forecast and foresight have the capability not only to result into extension of social justice in the society but also to be the important step in order to stabilize the economy, to increase the life expectancy and to create the perfect conditions for growth and sustainable development.

Despite of the importance of forecast in providing the view of the future condition, it has been seen that internal studies have not been much successful in providing precise forecasts and/or limited studies have been conducted on the forecast of effective and important variables in the economy.

Among the most important weakness reasons of forecast models, incomplete monitoring of effective variables, neglecting collateral effects and their diversity, weak capability of quantifying some important and effective variables, inaccurate measurement of the effect of some shocks and not enough and multiple background of some important and effective variables can be referred.

By removing these constraints, using past experiences (the trend analysis) and predicting the future (based on modeling and simulating), stronger forecasts can be made. By using these forecasts, planning and policy- making would certainly have more useful results for the state (Iran) and decrease negative social consequences of implementing some economical decisions.

In this respect, senior managers and decision- makers of state's (Iran) decision- making organizations are recommended to benefit more from scientific studies conducted by researchers and professors of the field of futures studies and foresight and to succeed in taking necessary measures for preventing shocks of surprising events by using scientific techniques and methods of future- monitoring.

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