Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.6, No.22, 2015

The Reasons of Business Cycles Emergence in Iran and the Strategies for Getting Out of Them

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Abstract
Since Iran's economy, like many other countries, has experienced the periods of prosperity and recession, paying attention to the casual relationship between macro-economic variables and business cycles can be considerable in policy makings in economic affairs. In this way this article is to study the reasons of business cycles emergence in Iran's economy in the time period of 1350-1390 of Iranian calendar using the approaches of VAR and ECM models. Results show that the inflation does not maintain the ability to explain the business cycles; on the other words the inflation is not the cause of business cycles but the business cycles cause inflation, the point is approving the business cycles hypothesis in causality from production to prices. Therefore it can be mentioned that a unidirectional causality relationship exists from business cycles towards inflation. Moreover as about the Granger causality between money stock and business cycles in Iran's economy the existence of a bidirectional causality relationship between money stock growth and business cycles has been shown so that both the money stock growth leads to business cycles emergence, besides the business cycles occurring is explaining the money stock changes in the country.
Keywords: Business cycles, monetary stock, Granger Causality, Vector Autoregressive (VAR).

1. Introduction

The modern economics' process has a common feature; that is, the economic activity in the processes is in transition from a period of prosperity in which there is an economic growth to a period of stagnation in which the economic activities have a negative growth. The broadest measure of all economic activities is real GDP which has often no moderate changes. That is, it at a time grows faster than normal and sometimes slower. In analysis of business cycles, distinguishing different steps of business cycles is very important. The events that constitute a business course is characterized by four phases: prosperity, peak, stagnation and nadir that are different in terms of time, intensity and range. During the peak of business cycles, the level of economic activities is high compared to process and in nadir, the economic activities is at a lower level than the process. This is while, some economists believe that the causes of business cycles originate from within an economy and its problems and deficiencies, but some believe that external interferences cause this situation. In this paper, an attempt is made to answer these questions from different views and opinions appropriately, and after studying the genesis of business cycle in Iran economy, some political recommendations are made to remove them.

The paper is organized in the following fashion, after introduction, we will study the business cycles literature from the perspective of different economic schools. The third section examines previous studies done in this field and evaluates the general model of economic cycles. The fourth section is devoted to the experimental model and estimates the model and analyzes the results. Finally, the conclusions and political recommendations are presented.

2. Introductory to business cycle

Theories of business cycles before Keynes can be defined as a range that the roots of new theories can be found among them. As, they have often resulted in the expansion of later modern theories such as traditional Keynesian theory, Friedman monetary theory or monetarists, the monetary theory of the trade cycle, theory of real business cycles (RBC) and finally new theories of Keynesians business cycles. So reviewing them is mostly done for the underlying understanding of the recent views. For example, Keynesian theory of business cycles with its different reading has rooted in ideas that they can be sought in a more general form of demand imbalance that focuses on the general lack of demand.

One of the key features of the cyclic theory of Keynes is the expected profit that can be assumed as the cycle's source which is affected by the outer space as technological advances, the discovery of new raw materials and emergence of new markets. Friedman and the Chicago school included schools which have a prominent place in the literature on business cycles. In a statement, Friedman asserts (1948) that some economists are trying to deals with the ways to control and improve them after occurring by studying business cycles. They analyses it so that the purpose of the economy is to control the cycles. In the meantime, some primarily ignore the costs and long-term economic effects and anti-cyclic policies. While, Friedman is looking for long-term goals. Friedman believes that instability in money growth nearly reflects in economic activities as much as the irregular growth of money that results in irregular economic growth. New classics of monetary branch also believe that the government

is not able to make policies neither in the short, nor the long term. And this is violated when unpredictable policies are adopted. Because systematic monetary policies cannot change the level of production and employment. Since the government cannot impose a policy by adopting systematic policies and on the other hand, the economic agents with rational expectations can recognize their personal interests, so there is no room for the government and its effective interventions. They believe that there is no significant barrier to market transparency, unless the factors are random and unavoidable. Only then the expected error can be raised. Because they believe that the expected and anticipated policies change only the nominal variable and in terms of imposing unpredictable and non-systematic policies, the economic actors cannot have an optimal behavior due to lack of or violation of information. In this sense, it can be said that the new classics are somehow the classics with the difference that their models are associated with random stresses or disorders, and the results of both models are in a manner quite similar and it seems that the classics are a special case of new classics when the random stresses and deviations are zero. From the point of view of new classics, increasing the money supply in an expected condition makes the economic actors not to change their product and employment and therefore an increase in the money supply leads to change in nominal variables like an increase in wages. Another part of the business cycle literature is devoted to theories that is concerned with real business cycle (RBC). The central argument of economists in favor of real business cycles is that the economic cycles is the result of changes in real variables. Accordingly, economic actors operate with optimum approach and rational behavior and do not suffer systematic errors. The markets are transparent and the economy is always in equilibrium and this is not an ideal condition or classical model, but a steady state in the economy. In other words, the above conditions is true in the short term. RBC fans believe that nominal variables such as money supply and price level don't affect the real variables such as employment, production, and in fact the real variables can explain the behavior and volatilities of real variables. Since economic actors benefit from rational expectations, unannounced and unexpected events can only deviate their behavior that in the shortest time, the new data is placed in their rational model and returns once again to equilibrium condition. RBC fans relate the stress and cycles in economy to the fluctuations in the supply, and therefore believe that the root of these changes is in fact the changes in technology. They believe that the large fluctuations in the technology increases productivity and ensures that the economy to get out of a path with long-term stability and be quickly placed in another long-term path.

Despite accepting the issue of rational expectations, the new Keynesians are yet committed to the issue of adhesions of prices and wages. New Keynesians compared to their ancestor Keynesian has been somewhat modified, for example, they have accepted the theory of rational expectations and begin their economic analyses from the foundation and principles of microeconomics, but trying to achieve the same results as Keynesian founders. For example, topics such as the low speed of adjustment of prices are raised against the classical theory of rapid adjustment of prices and transparency of markets, and primarily on this basis, new Keynesians convinced that the principles of market lack of transparency is the real root of the business cycles. In new Keynesian model, several factors cause lack of rapid adjustment of markets that they can be briefly related to the reasons such as the theory of social behavior that is related to structural or sociological factors, such as the strict rules on least wage, working hours, and firing worker. In society, there are habits or social forms that manufacturing enterprises cannot ignore them.

3. Literature Review

Gorji and Mirsepasi (2002) examined the role of financial and monetary factors on fluctuations in production in Iran economics during the years 1971 to 1999. Using five-variable auto regression model, they found that the impact of financial policies on creating business cycle is more than monetary policies. Gorji and Eqbali (2009) in another study using the same structure for the period 1959-2006 came to the same results. Abrishami (2002) emphasizes that there are different approaches to the mutual relationship between monetary and real variables. One of these approaches is using multivariate time series and explicit test of coefficients constraints in vector autoregressive (VAR) models which is preferred to other approaches as no assumption on their exogenous and endogenous is not already applied. He is trying to use the different concepts of exogenous in a stacked structural system and examines the relative importance of supply shocks to demand shocks. He also stresses that money supply not only affects the aggregate demand but also total supply. According to the results, the supply side shocks such as changes in import and productivity and structural reforms play an essential role in Iran economic cycle in the short and long term. Volatility of short-term and long-term production are attributed to supply shocks which is inconsistent with the findings of Funke (1997) on the importance of demand shocks than supply in the short term. In addition, the vulnerability of Iran economy to import shocks is high. Yavari and Asgharpur (2002) with an emphasis on monetary policies in the development of business cycles believed that an interruption in the inputs and outputs of production process will causes monetary policies to be effective in the real product and employment and create business cycles. Shahroodi (2004) followed by a two-stage Hodrick - Prescott filter in extracting the long term business cycle showed that Iran economic circumstances are more consistent with the conditions discussed by new Keynesians and variables such as the investment in the housing, actual liquidity, oil revenues,

changes in exchange rates, imports, government spending, and wholesale and retail prices index difference can explain business cycles well. Samadi and Jalaei (2004) attempted to show that variables such as oil revenues, private sector investment, government budget deficits and liquidity of the private sector are the most important factors in the formation of the business cycles in Iran economy. Dikaleh (2005) in Iran's economy for the period 1959 - 2003 came to the conclusion that a significant relationship exists between oil shocks and business cycles. In addition, the variable of government costs, liquidity, imports and investments in the construction sector have also an important role in business cycles. Tayeb-Nia and Ghasemi (2006) have identified the business cycles of Iran and then using statistical indicators and the properties of business cycles, have calculated and analyzed the key variables affecting business cycles. Then in the second stage, a business cycle model in vector autoregressive was identified and analyzed and using this model, the effects of oil shocks are also evaluated. The results show that the GPD responses to impulses imposed on different combinations and factors hidden in them in the first period had a more effective role in the development of business cycles and then, its cyclical effects were gradually and slowly disappeared. The shock to oil until the third period had an upside and slow movement and then the cycles have passed an almost stable path from the period on. However, its effect will not disappear. Houshmand et al., (2008) estimated and analyzed the business cycles using Hodrick - Prescott filter. About the monetary variables, they believe that business cycles of Iran economy is a non-monetary phenomenon. Price variables in the Iran economy changes opposite the direction of business cycles and real wages in favor of the business cycles. Granger causality test results indicate that the volatility of oil and gas export can be identified as the main source of business cycles in Iran economy. The GDP is the reference variable of business cycles in this paper. Shahrestani and Arbabi (2009) have selected GDP as the reference time series and thus assumed the GDP cyclic changes representing the business cycles. Noting the importance of total expenditure variables, they briefly emphasized that although a positive technology shock leads to an increase in consumption, investment and imports, but it cannot explain all the changes. Shahmoradi et al., (2010) have used to approaches Hodrick -Prescott filter and Baxter – King filter for extraction of business cycles of macroeconomic variables to determine their common motion. The results show that the hypothesis of the possibility to use the real business cycles for Iran economy cannot be rejected. According to the results of the study, it cannot be expected that the monetary policies to be active in Iran economy. The results of the study are similar to the foreign studies, so it can be said that the real business cycle approach is able to model the revealed cycles of macro-economy variables. The importance of role in the supply fluctuations in Iran economic cycle has been proven in this research. Finally, this study suggests that monetary policy has no significant impacts on real production. So, the authors suggest that it is enough for Iran economy to focus on RBC models.

Saez and Push (2002) have examined the role of business shocks in shaping the overall cycles in Venezuela during the years 1950-1995 using stochastic general equilibrium model as well as using calibration for a small country with an open economy that has oil income. The results show that the volatility in the oil sector can explain a significant portion of the economic cycles. Baldini (2005) in his article examined the role of financial policies on business cycles in Venezuela. Therefore, oil sector is a completely dominant sector in the Venezuelan economy. Conduct of financial policy on business cycles in developing countries than in industrialized countries is more severe. Following, it is shown that oil price and the key variables of financial sector such as total revenue and oil revenues have a cyclic behavior. Husin et al. (2008) empirically examined the oil price shocks on non-oil business cycles in the oil-exporting countries and for 9 oil countries like Iran, Norway, Algeria, Oman, Saudi Arabia, Nigeria, Kuwait, the UAE and Yemen showed that fiscal policy changes resulting from changes in oil prices over the business cycle are significant and have high explanatory power.

Forni and Gambetti (2010) examined the macroeconomic shocks and business cycles. This study examining America's economy using quarterly data has shown that both supply and demand variables are important in the development of business cycles. Monetary and financial policies have a significant impact on price and production. The negative shocks of total demand have positive impacts on production. Masagus M. Ridhwan et al., (2010) examined the impact of monetary policies on real economic activities using Meta-Analysis approach. In this research, they identified the various reasons for the effects of monetary policy on economic growth. For this purpose, they used vector autoregressive models, so that their results indicate that the accumulation of capital, financial deepening, inflation rate and the economy size are important factors in explaining the changes in the impact of monetary policies on production over time. Differences in the type of models used in the early studies also have considerable explanatory role in variability of this influence. Kasmin and Shinder (2014) explored the ambiguities in theories of business cycles. In this study, a comparative approach was done between new Keynesians theories and real business cycles and the occurrence of cycle and reasons for them under conditions of uncertainty were analyzed. Kristoffer (2014) examined the impact of monetary and real variables in the development of the business cycle whose results showed that, unlike previous approaches, both monetary and real phenomena explain the business cycles in the economy of countries.

4. Methodology and Data

4.1. Data

In our studies, we used multivariable auto-regression model using major effective variables including: Gross National Product (GNP), Total Government Cost (TGC) as an indicator of monetary policies, Customer Price Index (CPI) as an alternative variable interest rates, money supply (M1) as an indicator of monetary policies and Oil Price (OILP) as an exogenous factor to investigate the causes of the development of economic cycles. It should be noted that the data are considered seasonal and have been extracted from the website of the Central Bank. Another point is that the logarithm of variables is used for homogenization, for example, production figures or government spending is very different from oil price index. The research model is as below:

$$Log\ GDP_t = \alpha_0 + \sum_{j=1}^{p} \alpha_{1j}\ Log\ GDP_{t\_j} + \sum_{j=0}^{q1} \beta_{1j}\ Log\ TGC_{t-j} + \sum_{j=0}^{q2} \beta_{2j}\ Log\ INF_{t-j} + \sum_{j=0}^{q3} \beta_{3j}\ Log\ M1_{t-j} + \sum_{j=0}^{q4} \beta_{4j}\ Log\ OILP_{t-j} + U_t$$

As in the above equation, GPD represents the gross domestic product, TGC total government costs, INF inflation index, M1 money supply and OILP represents price of oil.

4.2. Unit root test

Nelson and Plosser (1982) argue that almost all macroeconomic time series typically have a unit root. Thus, by taking first differences the null hypothesis of nonstationarity is rejected for most of the variables. Unit root tests are important in examining the stationarity of a time series because nonstationary regressors invalidates many standard empirical results and thus requires special treatment. Granger and Newbold (1974) have found by simulation that the F-statistic calculated from the regression involving the nonstationary time-series data does not follow the Standard distribution. This nonstandard distribution has a substantial rightward shift under the null hypothesis of no causality.

Thus the significance of the test is overstated and a spurious result is obtained. The presence of a stochastic trend is determined by testing the presence of unit roots in time series data. Non-stationarity or the presence of a unit root can be tested using the Dickey and Fuller (1981) tests.

The test is the t statistic on φ in the following regression:

$$\Delta Y_t = \beta_0 + \beta_1.trend + \rho Y_{t-1} + \sum_{i=0}^{\infty} \varphi_i \Delta y_{t-i} + \varepsilon_t \qquad (1)$$

Where Δ is the first-difference operator, ε_t is a stationary random error.

If a time-series is found to be non-stationary, a filtering mechanism such as the first difference of the variable can be employed to induce stationarity for univariate model estimation. Augmented Dickey–Fuller (1981) and Phillips–Perron (1988) tests are carried to test the null hypothesis of a unit root in the level and the first difference of the two variables. As Enders (2004) indicated, the Augmented Dickey–Fuller (ADF) test assumes the errors to be independent and to have constant variance, while the Phillips–Perron (PP) test allows for fairly mild assumptions about the distribution of errors. Results of both ADF and PP tests for stationarity are reported in Table 1. The null hypothesis of a unit root cannot be rejected in the level of the variables, but all null hypothesis of a unit root is rejected in the first difference of the variables. As observed in Table 1, the business cycle variables of the logarithm of GDP (Cycles), Inflation (INF) are at stationary level, but the logarithm of the money supply (LM1) and logarithm of total government costs (LTGC) were non-stationary and first level integrated and the level of these variables are affected by permanent shocks, so that after any changes, they don't tend to return toward linear trend and the variables are stationary by only once differencing.

Table 1. Results of unit root test

variable	ADF t-statistic (lag length)	PP t-statistic (bandwidth)
Cycles	-3.23	-3.26
INF	-3.79	-3.93
LM1	-2.45	-2.15
LTGC	-1.89	-1.54
Critical Value (95%)	-3.45	-3.45

4.3. Cointegration test

The cointegration test is based in the methodology developed by Johansen (1991), and Johansen and Juselius (1993). Johansen's method is to test the restrictions imposed by cointegration on the unrestricted variance autoregressive, VAR, involving the series. The mathematical form of a VAR is

$$y_t = \theta_1 y_{t-1} + \cdots + \theta_p y_{t-p} + \vartheta X_t + \varepsilon_t \qquad (2)$$

where y_t is an n-vector of non-stationary I(1) variables, x_t is a d-vector of deterministic variables, $\theta_1, .., \theta_p$ and ϑ are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated with each other but are uncorrelated with their own lagged values and other right-hand side variables. We can rewrite the VAR as (Eq. (3)):

$$\Delta_{y_t} = \prod_{y_{t-1}} + \sum_{i=0}^{\infty} \Gamma_i \Delta_{y_{t-i}} + \beta_{xt} + u_t \quad (3)$$

Where (Eq. (4))

$$\Pi = \sum A_i - I_t \quad that \;\; \Gamma_i = -\sum A_j \quad (4)$$

Granger's representation theorem asserts that if the coefficient matrix n has reduced rank r<n, then there exist n x r matrices α and β each with rank r such that $\pi = \alpha \beta'$ and $\beta' y_t$ is stationary. Here, r is the number of cointegrating relations and each column of β is a cointegrating vector. For n endogenous non-stationary variables, there can be from (0) to (n-1) linearly independent, cointegrating relations.

According to Granger (1988), cointegration means that the two non-stationary variables are integrated in the same order with the stationary of residuals. If the two variables are cointegrated, there exists a force that converges into a long-run equilibrium. In other words, if stock market and macroeconomic variables, there is a force of equilibrium that keeps stock market and macroeconomic variables together in the long-run. There are two test methods to identify the presence of a cointegrating relationship between two variables: (a) the Engle-Granger two-stage single equation method and (b) the Johansen-Juselius (1990) cointegration test. The Johansen method has two separate tests, the trace test and the maximum eigenvalue test. The Engle-Granger method obtains only one single cointegration relationship whereas it is possible to obtain more than one cointegration relationship with the Johansen method. Given this, the Engle-Granger method is Ordinary Least Squares (OLS) based test and the Johansen method is a maximum likelihood based test that requires a large sample. For the Engle-Granger two-stage single-equation method in this study, the Augmented Dickey-Fuller (ADF) test equation includes an intercept but no time trend. The test equations were tested by the method of least squares. The optimal lags are automatically selected for the ADF test based on the Schwarz Info Criterion (SIC). Based on the residual sequence of the ADF test, the null hypotheses of a unit root cannot be rejected for this country in the study, which has proven having one cointegrating relationship between stock market and macroeconomic variables in the country. Numeric values of the results of cointegration test by the Engle-Granger method are not reported in this study due to space limitation.

Cheung and Lai (1993) reported that the Johansen approach is more efficient than the Engle-Granger method because the maximum likelihood procedure has significantly large and finite sample properties. The Johansen (1991), procedure uses two ratio tests: (a) a trace test and (b) a maximum eigenvalue test, to test for a number of cointegration relationships. Both can be used to determine the number of cointegrating vectors present, although they do not always indicate the same number of cointegrating vectors.

The results of the Johansen cointegration test in Table 2 show that the trace statistics and the maximum eigenvalue statistics are bigger than the critical values for Iran; therefore, the null hypothesis of no cointegration cannot be rejected at the 5 % significance level for Iran.

The results indicate that there is two cointegration relationship between these variables at the 0.05 level, which the trace statistic and the maximum eigenvalue statistic are greater than the critical values, the null hypothesis of no cointegration can be rejected at the 0.05 level. The results indicate the existence of two cointegrating equation between stock market and macroeconomic variables in the Iran.

Table 2. Results of the Johansen cointegration test

Null Hypotheses	Alternative Hypotheses	Trace Statistic	Critical Value (5%)	Maximum eigenvalue statistic	Critical Value (5%)
r=0	r=1	63.10	27.58	104.76	47.85
r ≤ 1	r=2	32.90	21.13	41.65	29.79
r ≤ 2	r=3	8.59	14.26	8.74	15.49
r ≤ 3	r=4	0.15	3.84	0.15	3.84

4.4. Extraction of production business cycles

According to the theory of spectral analysis, a time series of compounds with different frequencies is made. In other words, when it comes to econometric studies in the frequency domain, a time series is considered as a weighted sum of the following series that have different cyclic patterns. This is more understandable when is raised for the continuous time series. Thus, consider the example of volume of production in a country, which value is calculated continuously. To extract GDP variable cycles using HP filter, it is tried to take the action and remove the cyclic part of the variable. HP filtering is an algorithm to select smooth variables in the time series. The filter is used to explain the long-term results of time series by reducing the importance of price volatility in the short term.

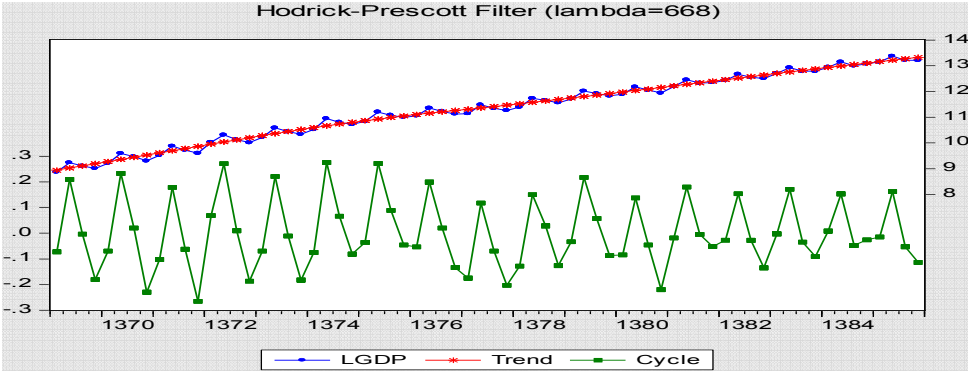

Figure 1– GDP trend and business cycle's in Iran

To ensure the classical properties of the error terms in estimation of VAR model, we first determine the number of interrupts that are necessary to appear in the pattern. Given the data obtained in the table and comparing them with the critical values, if we consider the SC (Schwartz-Bayesian) criterion, the number of optimal interruptions would be 1 (Table 3).

Table 3. Optimal lag of VAR model

Lag	Log L	AIC	SC	HQ
0	-6973.861	78.15936	78.29698	78.06549
1	-3080.282	37.76420	39.69088*	36.45007
2	-2755.824	37.24750*	40.96324	34.71312
3	-2564.093	38.21377	43.71859	34.45914
4	-2372.092	39.17703	46.47090	34.20214
5	-2158.844	39.90290	48.98584	33.70776

In the next section, the Granger causality between variables is investigated. The results of the tests are reported to investigate the causality between variables of the business cycle of production, inflation, money supply and government cost the logarithms in table (4).

Table 4. Granger Causality Test

Hypothesis Test	F	Prob
Inflation does not granger cause Cycle Cycle does not granger cause Inflation	1.55 3.67	0.21 0.01
LM1 does not granger cause Cycle Cycle does not granger cause LM1	37.96 9.87	0.00 0.00
LTGC does not granger cause Cycle Cycle does not granger cause LTGC	24.69 0.46	0.00 0.70
M1 does not granger cause Inflation Inflation does not granger cause M1	17.33 1.42	0.00 0.24
LTGC does not granger cause Inflation Inflation does not granger cause LTGC	5.94 2.01	0.00 0.12
LM1 does not granger cause Inflation Inflation does not granger cause LM1	5.05 2.85	0.98 0.04

Based on the above table, it can be said that the null hypothesis related to the Granger causality test between inflation and business cycles is in this case that inflation is not the explanatory power for the business cycles and in other terms, inflation is not the causality of business cycles. But, business cycles are causality of inflation, which confirms the theory of business cycles in the causation from the production to costs. So it can be said that there is a unidirectional causality relation from the business cycle to inflation. But about the Granger causality between money supply and business cycles in Iran economy, based on the above table, it can be stated that a bidirectional causality exists between money growth and business cycles, so that the money growth results in business cycles in Iran economy and it also explains the changes in the volume of money in the country.

As we have seen in the previous sections, unit root test and cointegration test suggest that there is a long-term relationship between the variables. As we know the cointegration requires ECM.

4.5. Estimation of long-run relationship between the model variables

In this step, we obtain the cointegration vector and the normalized vector that reflects the long-term equilibrium relationship between the model variables using Johansson method. The result can be seen in the table below.

Table 5. Vector of cointegration

Vectors	Cycles	INF	LM1	LGTC
Normalized Vector	1.00	-0.01 (-1.61)	-7.55 (-4.58)	-2.42 (-6.74)

At this stage, due to the fact that the existence of a cointegration vector between the variables of the model is confirmed, it is necessary to initially estimate the cointegration equation, and then estimate the Vector Error Correction (VECM) model to evaluate the short-term error adjustment rate. So after obtaining the long-term coefficients, ECM pattern was estimated to integrate long-term and short-term relationships. Adjustment coefficient of this pattern for this model and for first vector was equal to -0.60, and it is statistically significant and shows that 60 per cent of the imbalances of the past period, is adjusted to long-run equilibrium.

Sims (1990) suggested using impulse response functions and variance analysis to properly and comprehensively analyze the effects of unforeseen political shocks on macroeconomic variables. To study the dynamics between the pattern variables, action - reaction functions are used. In other words, action - reaction functions are responses that the internal variables of the system give to impulse response caused by the error. The functions determine the effect of a unit impulse as a standard deviation on the current and future values of the endogenous variables. The figure below shows the effect of a unit random impulse on the business cycles of gross domestic product, inflation, money and government cost shows as a standard deviation from the business cycles of production, inflation, and money supply and government costs. Action – reaction figures about the shocks imposed by the production or from business cycles to study variables are as follows.

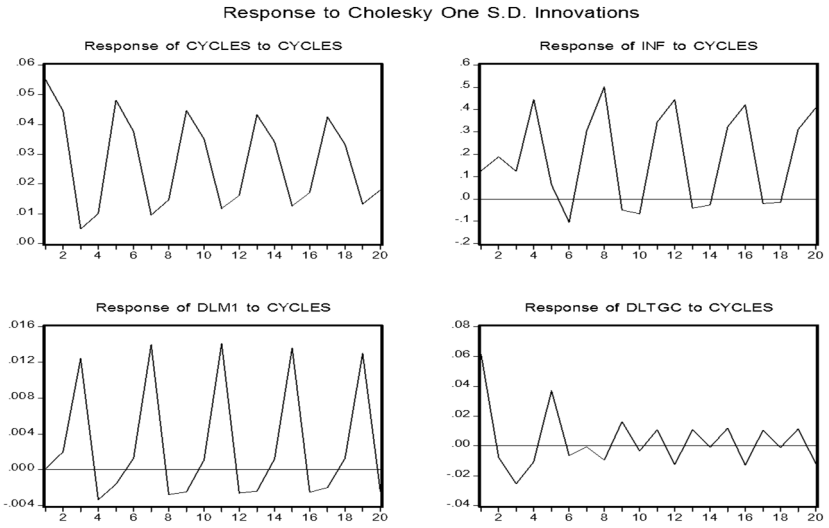

Figure 2 - Impulse Response Function of business cycle and research variables

The figure right above shows the shock caused by business cycles on inflation which indicates that by imposing shock from production, intense changes are caused in inflation in different periods. Lower left figure shows the effect of money growth from business cycles which show the rapid reaction of money growth to business cycles in Iran economy in different periods. The right below figure shows the low impact of business cycles of production on the variable of government costs and the shock tends to be diminished after 10 periods. Action - reaction figures related to money growth shocks and reaction of other variables are as follows:

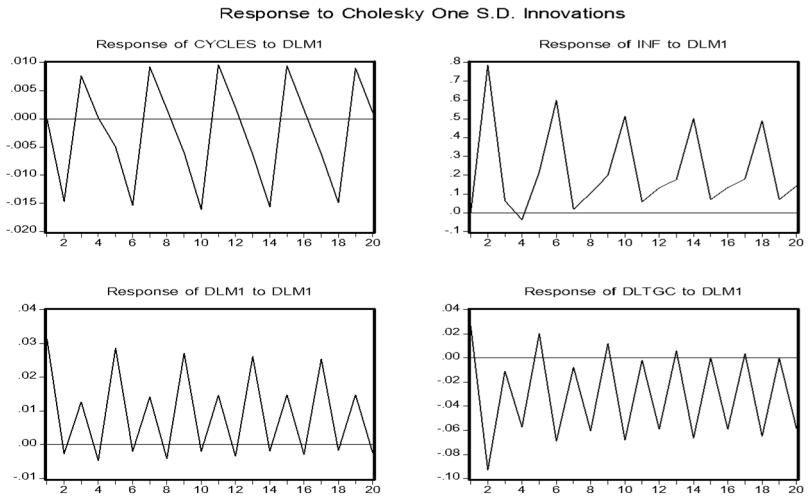

Figure 3 – Impulse Response Function of changes in money and research variables

Based on the above diagrams, it can be argued that according to the diagram right above, entering a unit shock to money growth increases inflation, but the inflation in long-term is slightly inclined to be diminished. Bottom right diagram shows the continuing influence of money growth shocks on the variable of government costs that in the long term, its effect is established. Upper left diagram shows the reactions of the business cycles to money supply shocks which indicates the regular and continuing effects of shocks on the business cycles of Iran economy.

Finally, in the following table, the results of experience of variance in the business cycle affected by other variables is stated in the study.

Table 6. Analysis of variance of business cycles in Iran and its influencing factors

Variance Decomposition of CYCLES:

Period	S.E.	CYCLES	INF	DLM1	DLTGC
1	0.055048	100.0000	0.000000	0.000000	0.000000
2	0.073101	93.77984	0.047361	4.008984	2.163819
3	0.079018	80.64383	0.172839	4.370419	14.81291
4	0.079845	80.56964	0.433037	4.280949	14.71638
5	0.094000	84.38998	0.567668	3.370381	11.67197
6	0.103320	83.09579	0.790547	4.996895	11.11677
7	0.108168	76.60163	0.996499	5.285330	17.11655
8	0.109319	76.80281	1.047467	5.198806	16.95092
9	0.119015	78.87166	1.526071	4.641433	14.96083
10	0.125815	78.36292	1.454287	5.781454	14.40134
11	0.129769	74.48517	1.727485	5.980658	17.80669
12	0.130905	74.72604	1.701379	5.900937	17.67164
13	0.138596	76.40165	1.995607	5.474061	16.12868
14	0.144139	76.24169	1.877120	6.237185	15.64400
15	0.147406	73.63443	2.031308	6.371538	17.96273

Based on the results of the above table, it can be stated that most changes in Iran business cycle in the period in question are explained by production business cycle, but in long run, the share of money growth and government costs variables in explaining business cycles is more. Therefore, it can be concluded that one of the causes of business cycles in Iran economy, based on analysis of variance and Granger causality test is financial irregularities and growth in the money supply which has a greater impact on changes in production. The government cost variable also has a large share in these irregularities and disturbances in the production.

5. Conclusions and political recommendations

5.1. Results

The purpose of this study is to investigate the causes of business cycles in Iran economy. For this purpose, it is tried to design an experimental model to test the research hypothesis using the proposed theoretical model. Therefore, using vector autoregressive and Granger causality test, the relationship between business cycles, money supply, inflation and government costs has been examined.

The results of the unit root test, cointegration test between variables and error correction model suggest that a long-term equilibrium relationship exists between the business cycles of production, inflation, money supply and government costs. In other words, the high speed of error adjustment tend to have long-run equilibrium.

The results of this study show that inflation has explanatory power for the business cycles, but business cycles are the cause of inflation, which confirms the theory of business cycles on the causation from the production

to prices. So, a unidirectional causality relationship exists from business cycles to inflation, which indicates that with a boom in production, an increase in prices can be expected. But for Granger causality between money growth and business cycles, it can be said that a two-way relationship exists between the variables. So the money growth leads to develop business cycles in Iran economy and business cycles and economic volatilities explain the changes in the volume of money in the country. Also, the variance analysis and Granger causality test show that the variable of government costs plays a great role in the irregularities and changes in the production.

In accordance with the views of the real business cycle theorists, cyclical instability may be due to total demand shocks or total supply shocks or a combination of both. On the demand side, shocks can be resulting from instability in some parts of financial policies and government costs that has been emphasized by Keynes and Keynesian models, or it may be due to the instability in the financial sector, which has been considered by monetarism. According to Abel and Bernanke's comments, economic variables like production, consumption and investment are aligned with the cycles. Government costs is in line with the cycles. Investment has greater variability than consumption, although the costs of durable goods is also strongly aligned with cycles. Employment is aligned with cycles and unemployment is totally anti-cyclic. Real wage and average labor productivity are in line with cycles, although the real wage partly corresponds with cycles. Money supply and stock prices are consistent with cycle and they are progressive. Inflation (and the prices) and the nominal interest rate are in line with the cycles and retrogressive. Plaser (1989) notes that consequences that can be observed in response to a shock represents selecting the agent. So the social or state programmer should spare no effort to address the impacts of the interventionist policies which is in line with cyclic government costs.

The above points confirm the hypothesis of this study in align with cycles or anti-cyclicality of variables used for Iran economy. At the end, the views expressed about the neutrality and meta-neutrality of money suggest that the amount of money and the money growth rate will not affect the changes in production. This view by economists in recent decades is adjusted so that at least, money in the short term will have the ability to influence production.

5.2. Recommendations

Since the relationship between production and inflation indicate the progress of inflation variable, so to increase the production, we should wait for the change in prices to motivate manufacturers. For this purpose, it is necessary that state policies pay particular attention to rational and low growth in prices, especially in recent years to get out of stagflation. In addition, due to the high impact of money supply growth on business cycles, the central bank is recommended to use the monetary policy instruments to reduce money growth for meeting the target of establishing order in the business cycles. Also, due to the significant contribution of state costs in the business cycle, an effective strategy can be adopting contractionary fiscal policy to reduce demand and ultimately reduce business cycles. On the other hand, due to the role of money in occurrence of business cycles, it is recommended that central bank and monetary authorities avoid discretion policies which disrupt the expectations of economic agents and more policies should be in line with the growth incentives. Also due to the role of government costs in the economic cycle, it can be stated that by increasing the current and development costs, government can play a useful role in sustainable economic growth, as by controlling government costs and optimizing the costs, any intense changes in GDP will be decreased.

According to the results of investigation, the impact of monetary shocks on production is inversely correlated with the size of the shocks. Namely, those monetary policies that lead to the creation of small monetary shocks affect real output to a greater degree. Therefore, it is recommended that monetary policy makers to be more bound to the rules for making expansionary policies and formulate the money growth rate for production and develop its amounts according to the labor productivity. Monetary policy makers also need to avoid policies that lead to small-scale monetary shocks to reduce inflation, because the negative effects of such policies on production growth is significant. In fact, due to high rate of inflation and quick prices adjustment in the country, it is recommended to avoid unnecessary monetary expansions to increase the trust of people to policymakers and observe the changes in production in time of the implementation of monetary policy on the basis of price adjustments.

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