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Structural Macroeconomic Capacity to a Reaction in Economic Policy Shocks: The Case of Iran

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Abstract
The aim of this paper is to simulate the effects of some macroeconomic policy tools on production and inflation of Iran by the current worldwide financial and real crisis. The theoretical framework of the analysis is based on the so-called 'IMF/World Bank Integrated Model' which is the synthesis (a merger) of the basic monetary approach of the Balance of Payments used at the Fund for designing its adjustment programs, and of the growth Harrodian type model, used at the Bank for its macroeconomic projections for an open economy. This integrated Model has been calibrated for the Iranian case, over the period 1979-2009, and its empirical form has been used for estimating the effects on global output and inflation of three channels of economic policy: restriction in government spending, changes in domestic credit policy as well in exchange rate. The dynamic simulation results, over the period 2006-2009, show that a decrease in government spending is an appropriate policy to reduce the inflationary pressures, even though it has negative effect on economic growth, the domestic credit expansion to private sector creates economic growth considerably higher than an increase in the level of consumer price while devaluation has not had considerable effect on economic growth through exports or imports.

Keywords: Integrated IMF/World Bank Model, Macroeconomic Policy Simulation, Iran

JEL Classification: E00, E21, E22, E50, E51, E52

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1. Introduction

The worldwide financial crisis, born in the United States in 2007, has struck, first of all, the majority of the industrialized countries and, progressively, its macroeconomic effects on the "real economy" have hurt the majority of the developing or the so called emerging countries. Among these developing or emerging countries, one of the main countries of Occidental Asia, Turkey and Iran have been affected, with a certain delay, more by the real aspects and consequences of this crisis than by the collapse of the international financial markets.

The channels through which these countries have been shocked by the crisis affected rather and especially the trade balance (in particular with the fall of exports and also of the "remittances" of the nationals working abroad). The negative effects of these shocks have involved increasing difficulties for balancing the trade balance (and therefore the balance of payments itself) and slowdowns for different branches of the economic activity. Then, the difficulties of balance of payments had necessarily consequences on the stability of the exchange rate (and consequently on the price level) and the slowdowns of the production affected negatively on the tax re-entries.

Such scenarios of propagation of the crisis require that effective economic policy decisions are implemented in order to boost ahead the economic activity (increase of GDP) and to control inflation in order to face all these kind of negative impacts which affect the Iranian and the Turkish economies.

In this paper, we shall concentrate our analysis on the case of Iran and we intend to show how it could be possible to "adjust" the economic activity of this country on a situation providing more growth and less (controlled) inflation by means of an efficient economic policy to be implemented in short run. More precisely, our purpose is to examine three short run macroeconomic policy types (budgetary, banking credit and exchange rate policy), concerning the situation of the country struck by the worldwide crisis.

Iran has never been under the direction of some international Institutions such as International Monetary Fund (IMF) or the World Bank. Iran, however, has attempted to apply economic policies that indirectly have many aspects of the Structural Adjustment Programs recommended or imposed by these international Institutions. This country has faced two grand events, the 1979 Islamic revolution and the war of 1980-88 with Iraq. After the war, the economy deteriorated and the country's infrastructure weakened. Three five-year plans have been outlined; the first one, for the period 1990-94, targeted economic reforms such as liberalization and reconstruction of war damage. In 1991, the old system of multiple exchange rates was replaced by a triple-rate regime. The plan has not been very successful because its objectives were too ambitious. The second plan, for the period 1995-1999, was more realistic. But the country faced a debt crisis. The third (2000-2005) plan included a major program of reforms such as privatizations, exchange rate unification and license authorization for private banks. The third plan was more successful than the other two. The fourth plan coincided with the presidential changes in 2008 end the objectives of this plan have not been followed by the new government. After the sharp oil price increases, the government took excessive and ambitious measures of expansionary monetary and budgetary policies which resulted in high inflation rates.

Then, the economic situation of the country needs, in an urgent way, macroeconomic policy measures in order to recover economic growth with a sustainable inflation. Therefore, in order to examine if the three macroeconomic policy tools (budgetary, banking credit and exchange rate policies) that we have above mentioned, are able to adjust the Iranian economy on both targets, higher GDP and lower inflation (seized through the consumer price index), we shall argue our analysis with the frame of the "Integrated IMF-World Bank model" (Khan, et al. 1990).

This model is the synthesis (a merger) of the basic monetary approach, used at the Fund for designing its adjustment programs, and of the growth model, used at the Bank for its macroeconomic projections. Actually, IMF and World Bank view external financing and adjustment programs in LDCs as complementary theoretical frameworks and they use the Integrated Model to support their lending plans.[1]

However, the Model can also be utilized for various other purposes, like the analysis we intend to obtain. For instance, Berthomieu and Shajari (2010) estimated the adequacy of the Integrated IMF and World Bank model for five MENA countries (Algeria, Morocco, Egypt, Iran, Tunisia and Turkey), by using, for each country,

[1] A series of macroeconomic models appeared to evaluate these programs as, Aghevli and Sassanpour. (1982), Otani and Sassanpour. (1988), Vaez-Zadeh. (1989), Agénor. (1990), Reinhart. (1990), Haque, Lahiri and Montiel. (1990), Haque, Montiel and Symansky (1991), Khan and Haque. (1998).

calibrated models deducted from the "Integrated IMF-WB Model", to simulate the impact of the implementation of various macro-economic policies on the key macroeconomic variables. They show that, in the model, the price level has considered lower than its actual level and the price had underestimated. In this context, the equilibrium of the balance of payments is considered as the priority of any macro-economic policy, inflation remaining the second goal of these policy that can be well analyzed by means of the model. As well, Berthomieu and Tykhonenko (2006) examined the impact of the Structural Adjustment Programs, also in the frame of the "Integrated Model", in the case of Russia.

The dynamic simulation, between 2006 and 2009, show that a decrease in government spending is an appropriate policy to control inflation, even though it has negative effect on economic growth, and the domestic credit expansion to private sector is an appropriate policy to boost economic growth, without making high inflationary pressures. A devaluation policy has not considerable effect on economic growth through exports or imports.

Then, the paper will be structured as following: Section 2 outlines the IMF/World Bank integrated model and examines its working from the point of view of growth and inflation. Section 3 presents the estimation of the key parameters of the model explaining the structural frame of the Iranian economy. In Section 4, we give some simulations in order to test the applicability of this model to analyze the performance of adjustment programs in the period 1979-2009. Then, Section 5 analyzes the effects on growth and inflation of the different economic policies, like changes in domestic credit, in government spending and exchange rate. Finally, Section 6 presents concluding remarks.

2. The IMF/World Bank Integrated Model

The integrated model, which was presented by Khan, et al. (1990), has two building blocks: the first one, the monetary block, has been derived from the Fund programs, and the second is a variant of the standard Harrodian growth model, which has been derived from the Bank's programs. The "IMF model" is linked to the monetary approach to the balance of payments and ensures consistency between the monetary impact of the policy changes and the desired balance of payments outcomes. The "Bank model" is a variant of the two-gap growth model or a Harrod-Domar model for an open economy, so called as the "Revised Minimum Standard Model" (RMSM). The IMF approach is concentrated on financial variables and the World Bank's focus on real variables so that the result of combining the monetary approach, and the Harrodian growth model gives a unified framework in which the domestic price level, the output and the balance of payments equilibrium can be simultaneously determined.

The macroeconomic accounting framework is divided into the four following sectors: the private sector, the public sector, the foreign sector and the domestic banking sector.

The private sector:

The private sector is assumed to own all factors of production and disposes from the nominal income. It holds (Y) for providing private consumption (C_p), taxes (T), investment (ΔK), the variation of cash balances (ΔM^d) and of the foreign assets (ΔF_p), minus borrowing of private sector from the banking system ($-\Delta D_p$). Then the private sector's budget constraint is:

$$Y - T - C_p - \Delta K \equiv \Delta M^d + \Delta F_p - \Delta D_p \quad (1)$$

The Public sector:

The public sector received taxes and uses the proceeds for as government consumption. The budget constraint for the public sector is:

$$T - G - \Delta F_g + \Delta D_g \equiv 0 \quad (2)$$

where (T) is the global tax perceived by the government, (G) the public expenses, (ΔF_g) the variation of the foreign assets detained by the government and (ΔD_g) net of borrowing of public sector from the banking system.

The foreign sector:

The foreign sector receives revenues from imports purchased by the domestic economy and spends on domestic exports. The foreign sector budget constraint defines the balance of payment (BOP) equilibrium:

$$\Delta R = X - Z - (\Delta F_g + \Delta F_p) \quad (3)$$

(X) and (Z) are the values of exports and imports in nominal terms, measured in local currency; (ΔR), also measured in local currency, is the foreign reserves held by the Central Bank.

The domestic Banking sector:
The Banking sector is simply a financial intermediary which acquires assets in the form of international reserves and claims on the domestic private and public sector and supplies its own liabilities in the form of money to private sector. The variation of the money supply is the consequence of the variation of the Central bank foreign reserves (ΔR) plus the increase of the domestic credit ($\Delta D_p+\Delta D_g$) borrowed by the private and public sectors:

$$\Delta M^s = \Delta R + \Delta D_p + \Delta D_g \quad (4)$$

The Fund components:
Following the Polak's approximation, the relationship between real (Δy) and nominal (ΔY) changes in output can be written as:

$$\Delta Y = \Delta P y_{t-1} + P_{t-1}\Delta y \quad (5)$$

P_{t-1} and y_{t-1} denote the one lagged period of the price level and real GDP, respectively.

The domestic aggregate price level P varies over time for two reasons: a change in the price of the domestically produced goods (ΔP_d), and a change in the international price level through imports. Thus the following price equation is defined as follows:

$$\Delta P = (1-\theta)\Delta P_d + \theta \Delta \hat{e} \quad (6)$$

where (θ) is the share of imports in the overall price index and ($\hat{e}$) the exchange rate (the domestic currency price of the foreign currency); in this equation the domestic price variation (ΔP_d) is assumed to be independent from foreign prices and the foreign price is taken (normalized) as the numéraire.

From the IMF model, the typical equilibrium condition between supply and demand of money ($\Delta M^s = \Delta M^d$) is introduced in the merged model through the adequate values for ΔM^s and ΔM^d. The variation of the money demand follows the usual monetarist equation (the velocity of money is assumed to be constant):

$$\Delta M^d = v\,\Delta Y \quad (7)$$

where v is the inverse of the velocity of money, which is assumed to be exogenous and constant in the short and medium terms. Thus, the monetary equilibrium condition is:

$$v\,\Delta Y = \Delta R + \Delta Dp + \Delta Dg \quad (8)$$

The export supply and import demand equations are defined as:

$$X = X_{-1} + (X_{-1} + c)\Delta \hat{e} - c\Delta P_d \quad (9)$$
$$Z = Z_{-1} + (Z_{-1} - b)\Delta \hat{e} + b\Delta P_d + a\Delta y \quad (10)$$

where c and b are the sensitivities respectively of exports and imports, in physical terms, to the variations of the exchange rate; a is the marginal propensity to imports ($\Delta Z = a\Delta Y$). ΔF_g and ΔF_p are the net accumulation of the foreign assets held by the public and the private sectors, respectively. They have to be revaluated according to the variation of the exchange rate as follows:

$$\Delta F_g = \overline{\Delta F_g}(1+\Delta e) \quad (11)$$
$$\Delta F_p = \overline{\Delta F_p}(1+\Delta e) \quad (12)$$

($\overline{\Delta F_g}$) and ($\overline{\Delta F_p}$) are the amounts of the foreign assets demanded before the variation of the exchange rate.

The World Bank components:
The growth of real output as a function of the level of investment may be written as:

$$\Delta y = \rho^{-1}\frac{\Delta K}{(1+\Delta P)} \quad (13)$$

(Δk) is the total domestic investment in real terms and ρ is the ICOR (incremental capital-output ratio); in other words, the production function binding capital and output is from a Harrodian type. (ΔP) denotes the variation of the domestic global price level and Δk is equal to ($\Delta K/(1+\Delta P)$).

The consumption function can be specified as:

$$Cp = (1 - s)(y - T) \quad (14)$$

where s is the ratio of private saving to disposable income.

The Integrated model:
The merged (or integrated) model has been exercised by Khan et al. (1990). Real output, in the Fund model, is determined outside the system and prices, in the Bank model, are considered as exogenous. The integrated model can determine the changes in growth, inflation and the BOP. In the merger of the Bank and IMF models all

equations proceed from the previous developments.

Investment (ΔK) is financed by private savings which is in constant proportion to disposable income ($s.(Y-T)$); thus from (1) and by rewriting (Y) as ($Y_{t-1}+\Delta Y$), one obtains:

$$\Delta K = s\,(Y_{-1} + \Delta Y - T) - \Delta M^d - \Delta F_p + \Delta D_p \qquad (1')$$

where (Y) is the nominal income it holds for providing (C_p) private consumption, (T) taxes, (ΔK) investment, the variation of cash balances (ΔM^d) and of the foreign assets (ΔF_p), and, finally, the reduction of borrowing from the banking system ($-\Delta D_p$).

Finally, the basic structure of the integrated model is given by the thirteen preceding equations (1) to (13) and it can be summarized in Table 1.

Table 1: Structure of the merged framework

Target variables	Endogenous variables	Exogenous variables	Control or decision variables	Parameters
	ΔP	Y_{t-1} ; y_{-1}		ρ
Δy	ΔY	P_{t-1}	*T or G*	θ
ΔP_d	ΔM^d ; ΔM^s	X_{t-1} ; Z_{t-1}	ΔD_p	*a*
	X ; *Z*	ΔF_g	ΔD_g	*b*
	ΔF_p ; ΔF_g	ΔF_p	Δe	*c*
	ΔK			*s*
	T or G			*v*

***Source*: Authors**

Regarding to the Iranian economy, we also introduce the variation of the public expenses (ΔG):

$$\Delta y = \rho^{-1}\frac{\Delta K}{(1+\Delta P)} + \alpha.\Delta G \qquad (13')$$

and also we assume that the price of non-traded good adjusts to equilibrate the domestic market according to the level of real money balances:

$$\Delta P = f\Delta M + \theta\Delta\hat{e} \qquad (6')$$

3. Estimation of the Model

In a first step, before the assessment of the seven parameters of the model, we examine the stationarity of all the time series used in our estimation. The ADF Unit Root Test shows that, for the period from 1979 to 2009, most variables are stationary at first difference, except for the prices and taxes in Iran, which are stationary in level. We can specify that once variables are considered as variation, they become stationary (cf. Appendix). In the second step, the parameters are estimated in the econometric system with five equations drawn from the model (price level variation, GDP growth in real terms, consumption, imports and exports). The estimation of simultaneous equation system, with the two-stage least-squares (2SLS) method, makes it possible to obtain as a more efficient estimation. Table 2 reports the estimation results of the model including the estimates for the behavioral equations.

Table 2: Estimation results for the Iranian Macro-economy

Consumer Price:
$\Delta P = 0.7\Delta m_t + 0.0002\,\Delta\hat{e}_t$
(1.98) (1.78)
$R^2 = 0.79$

Real Output:
$\Delta y^* = 0.33(\Delta K/(1+\Delta P))_t + 0.03\,(\Delta G/\Delta P)_t$
(2.1) (1.99)
$R^2 = 0.69$

Consumption:
$Cp = (1-(0.18)).(y^* - T)_t$
(3.7)
$R^2 = 0.81$

Import Demand:
$Z = 1.28Z_{t-1} + 0.27\,(\Delta P-\Delta\hat{e})_t + 0.1\,y_t$
(1.77) (2.06) (1.88)
$R^2 = 0.77$

Export Supply:
$X = 1.2\,X_{t-1} + 0.002\,(\Delta\hat{e} - \Delta Pd)_t$
(5.6) (1.79)
$R^2 = 0.78$

Note: Numbers in parentheses are values of *t-statistic*
***Source*: Authors**

According to our results reported in the table, the value of the coefficient (ρ^{-1}) that measures the impact of a change in investment on the GDP is significantly 0.33. The value of the parameter ρ is relatively low (around 3)[1]; it means that, in Iran, the production factors are not efficient. The value of this parameter and the sensibility of the output to government expenditure can show the large share of oil revenues in the GDP, which increases the "size of the State" and which needs large amounts of heavy public investment.

The value of *f* shows that the sensibility of inflation to money supply is high and that the share of imports in the price index has not a strongly significant effect on the price index. The coefficient *b*, which is a response of imports to the relative prices, is positive; it means that the vast inflationary pressure and also an anticipation of a high level of inflation do not allow an increase in the exchange rate change can decreases imports. Depending on the model, *c* the coefficient of exports to prices is significant and positive; in other words, higher prices have a significant effect on the level of exports. Consequently, the inflation has a negative effect on the trade balance.

4. Dynamic Simulation of Economic Policies:

We conduct a dynamic simulation in order to test the reliability of the model for predicting the movements in our two targets variables, an increase in the economic growth and control of inflation. Over the period 1979-2009, the results for Iran show that the model tracks the actual movements of our target variables very well (Figures 1 and 2). As we can see, despite the following trend of the simulation and the changes in price index, there is a downward trend in the simulated values regarding the actual trend. On the other hand, the model underestimates the consumer price index variation[2]. Hence, simulation of the results can be used to predict the behavior of the two targets variables when we apply different economic policies.

[1] Montiel and Haque (1990) considered that the value of ICOR were between 4 and 7, the range which seems too high for Iran

[2] This confirms the results by Berthomieu and Shajari (2009) that the price variation was underestimated and that the equilibrium point from the price side (the interaction between the condition of a balanced growth and the balance of the goods and services) was pointed in the negative area of the figure.

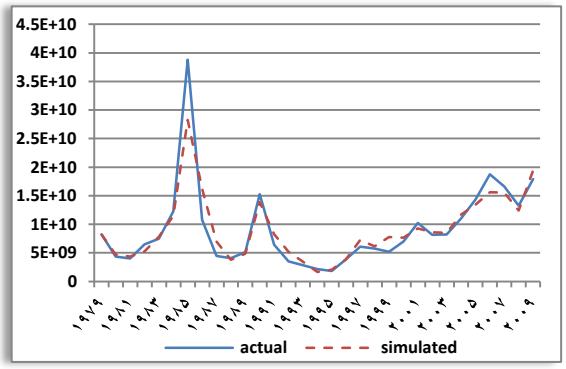

Figure 1: Actual and simulated values of Iran's real output

Source: **Authors**

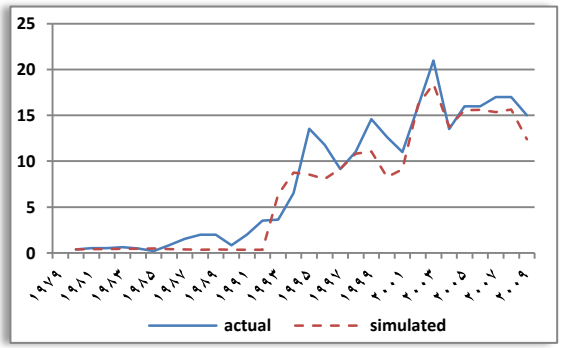

Figure 2: Actual and simulated values of Iran's consumer price index

Source: **Authors**

The estimated parameters, in the previous section, are now used to simulate some policy issues which arise from the stabilization program designed to improve a country's disequilibria intern and extern. The object of this section is to simulate the integrated model in the case of Iran in order to test the impact of some adjustment policies. According to the IMF-World Bank model, we consider three economic policies which proposed by these institutes: a decrease in government spending, an increase in domestic credit and exchange rate devaluation. In order to quantify the impacts of these policies, the three scenarios of dynamic stimulation are conducted as follows in next sub-sections.

4.1. Scenario I: A 10 percent reduction in government expenditures

A policy on a reduction in government expenditures is often recommended by the IMF is the. However, in Iran, an increase in the government expenditures has been arising from the higher oil prices and revenues which have had a direct impact on economic growth. Our estimation results show that there is a direct relationship between government expenditures and the real GDP. Therefore the question is:

what its impact on controlling inflation. The average growth of the government expenditures, during the period 2006-2009, was around 20 percent, a rate strongly higher than the average growth of the years before (between 1979 and 2005 the average growth of government expenditures was 10.5 percent). Therefore, to keep the constant growth rate of government expenditures, regarding to the previous years, we assume to conduct a 10 percent decrease in government expenditures at a constant rate during the years 2006-2009. Figure 3 and Figure 4 show the effect of this policy on real output and the consumer price index. As our results show, a 10 percent decrease in government expenditures declines the simulated real output and consumer price variation curves while the impact on real output is relatively slight.

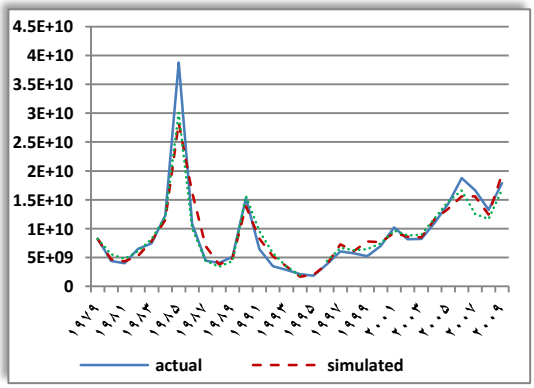

Figure 3: Effect of Scenario I on Real Output
***Source*: Authors**

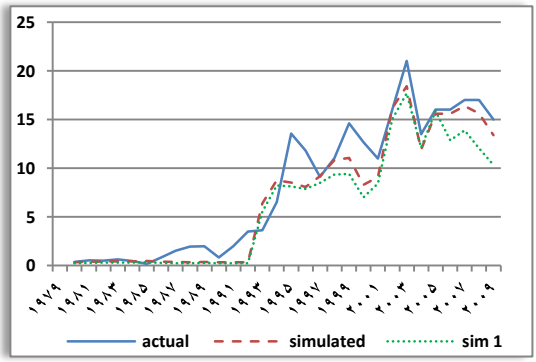

Figure 4: Effect of Scenario I on Consumer Price Index

***Source*: Authors**

4.2. Scenario II: An expansionary credit

An expansionary credit policy is also recommended by IMF and Wold Bank. The stimulation shows that in order to achieve a 3 percent increase in GDP growth, the domestic credit to private sector has to increase 12 percent.[1] An increase in the domestic credit to private sector creates a flow of an excess supply of money and consequently creates inflationary pressures. Figure 5 and Figure 6 show the impact of this policy on the real output and consumer price index variations.

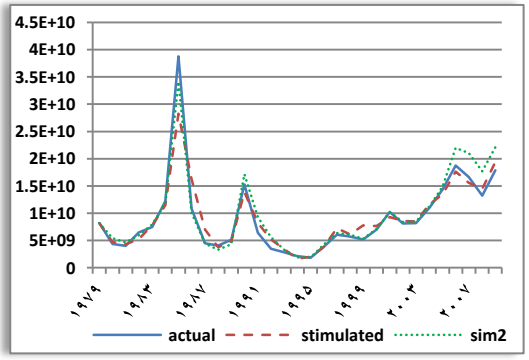

Figure 5: Effect of Scenario II on Real Output
***Source*: Authors**

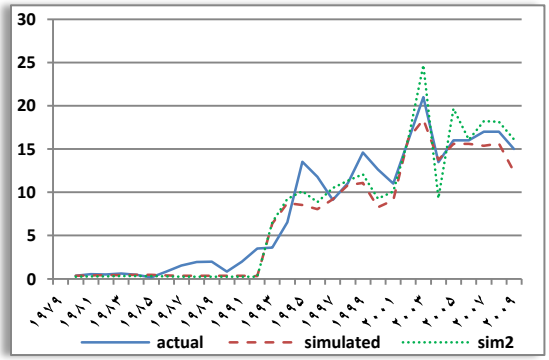

Figure 6: Effect of Scenario II on Consumer Price Index

***Source*: Authors**

As our results shows, a 15 percent increase in domestic credit to private sector raises the simulated real output and consumer price variation curves.

4.3. Scenario III: Exchange rate devaluation

The exchange rate devaluation is a policy very often recommended in stabilization programs in order to facilitate the equilibrium of the balance of payments, even though this policy raises numerous debates in the development countries. According to the observed 16 percent average

[1] We have verified (tested for) the effects on GDP of increases of 10 percent and also 15 percent in domestic credit to private sector. Our results show that a 12 percent increase in domestic credit leads to a 3 percent increase in GDP between 2006 and 2009.

inflation rate during the years 2006 to 2009, we assume devaluation in the Iranian currency by 15 percent during the same period. Figure 7 and Figure 8 show the effects of such policy on the real output and the consumer price index. As our results show, such devaluation raises the simulated consumer price variation curve considerably upward.

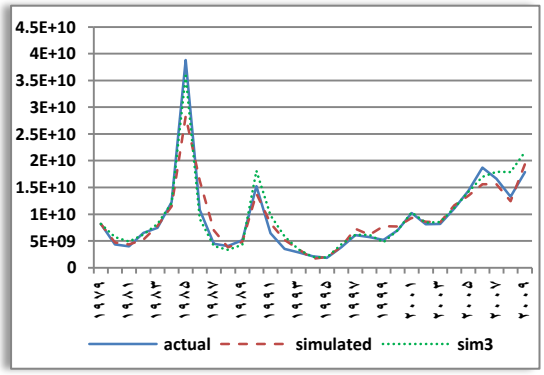

Figure 7: Effect of Scenario III on Real Output
***Source*: Authors**

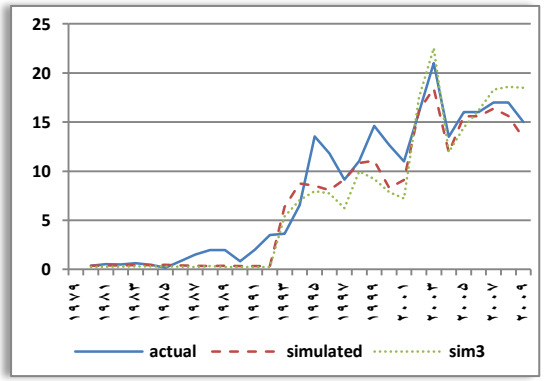

Figure 8: Effect of Scenario III on Consumer Price Index
***Source*: Authors**

Overall, Table 3 summarizes the results conducted by the different scenarios. The first scenario states 10 percent decrease in government expenditures would result in economic growth and leads to a fall in inflation rate. In fact, this policy is successful in controlling for inflation, while it has a slight negative effect on economic growth. In the second scenario, we increased domestic credit to private sector up to 12 percent. This policy provides 3 percent of economic growth but it creates also 1.4 percent of higher inflation rate. In the third scenario, 15 percent of devaluation in the Iranian currency leads to a higher inflation rate and makes slightly economic growth.

Table 3: Simulation results (2006-2009), in percent

Average growth	Actual	Sim.	SI	SII	SIII
Output	4.1	5.1	3.5	7.8	6.4
Consumer price index	16	15.1	11.5	16.5	17.9

Sim. : Simulation Values
SI: Scenario I, SII: Scenario II, SIII: Scenario III
***Source*: Authors**

5. Conclusion

The aim of this article was to conduct the effects of some macroeconomic policies on production and inflation in an emerging economy affected by the current worldwide financial and real crisis in the case of the Islamic Republic of Iran. More precisely, our purpose was to examine three short run macroeconomic policy types (budgetary, banking credit and exchange rate policies), concerning the situation of the country struck. We adopted Integrated IMF and World Bank to estimate the principal economic parameters to stimulate the impact of the implementation of various macro-economic policies on the key macroeconomic variables such as output and consumer price variation.

Our estimation results showed that imports were a function of inflation and also nominal income, the role of government in economy and stagflation during the considered period. In addition, inflation had a negative effect on the level of exports. In other hand, the pressure and anticipation of a high level of inflation have negative effect on balance of the payments. The share of the domestic inflation in the total variation of the consumer prices index is more important than the imported inflation. In Iran, inflation is rather the result of an excessive monetary policy. To control inflation, it would be necessary to control the money supply, and inflation is mainly due to unfinished projects which were initiated by the State or by State-related corporations.

The dynamic stimulation results enable us to compare the impacts of the different policies on the target variables, during a specific period of time. Over the period 2006-2009, a fiscal policy was an appropriate policy to control inflation. The results also showed that the expansion of the domestic credit to private sector was an

appropriate policy to boost economic growth. The real economy structure of Iran confirmed also our results, since the growth of the domestic credit to private sector declined from 41 percent in 2006 to 13 percent in 2009 and this has caused a credit crunch in Iran's economy.[1] The credit crunch had a direct impact on the global output and the real economy, through the downward pressure on business investment, employment, and consumption.

The currency devaluation policy has not affected significantly production, via the exports or imports. This result also confirmed our estimation outcomes according to which exports, in Iran, have been influenced by oil price rather than by exchange rate variations, and imports have been influenced more by the level of inflation rate. However, during the considered the period, this policy resulted in a higher inflation rate, at a level around to 3 percent.

References

1. Aghevli, B. and C. Sassanpour (1982), "Price, Output and the Trade Balance in Iran," *World Development*, 10(9), 791-800.
3. Agénor, P. R. (1990), "Stabilisation Policies in Developing Countries with a Parallel Market for Foreign Exchange," *IMF Staff Papers*, 37, 560-592.
4. Berthomieu, C. and P. Shajari (2010), "Adjustment with Growth: Application of the IMF and World Bank Integrated Model to estimate Iran and Turkey Macroeconomic Performance," *The Middle East Business and Economic Review*, 22 (1), pp. 22-46.
6. Berthomieu, C. and A. Tykhonenko (2006), Neither Adjustment nor Growth for Russia in the 90's; a Critical Evaluation based on the IMF-World Bank Integrated Model., Working Paper, Université de Nice-Sophia Antipolis, CEMAFI, France.
7. Haque, N. U., K. Lahiri and P. Montiel (1990), "A Macroeconomertic Model for Developing Countries," *IMF Staff Papers*, 37, 537-559.
9. Haque, N. U., P. Montiel and S. Symansky (1991), "A Forward Looking Macroeconomic Simulation Model for a Developing Country," *Journal of Policy Modelling*, 13 (1), 41-65.
10. Khan, M. S., P. Montiel and N. U. Haque (1990), "Adjustment with Growth: Relating the Analytical Approaches of the IMF and the World Bank," *Journal of Development Economics*, 32 (1), 155-179.
11. Khan M. S. and N. U. Haque (1998), Do IMF Supported Programs Work? A Survey of the Cross Country, Empirical Evidence, IMF Working Paper, WP/98/169.
12. Otani, I. and C. Sassanpour (1988), "Financial, Exchange Rate, and Wage Policies in Singapore, 1979-86," *IMF Staff Papers*, 35, 474-495.
13. Reinhart, C. (1990), "A Model of Adjustment and Growth: An Empirical Analysis," *IMF Staff Papers*, 37 (1), pp 168-182.
14. Vaez-Zadeh, R. (1989), "Oil Wealth and Economic Behavior, the Case of Venezuela," *IMF Staff Papers*, 36, 343-384.

[1] The banking system in Iran has faced rapid growth of non-performing loans over the past decade, and according to official statistics, in 2009/2010, NPLs reached up to 50 billion dollars (more than 25 percent of total loans) while a major part of NPLs belongs to semi-public sectors. When the NPLs increase from a specified limit, it has negative effect on the bank`s lending.

Appendix

ADF stationary Tests for the series used in the model for Iran over the period 1979-2009

Series	M	Gdp	Z	X	P	C	ex	Δk
Test critical values ADF	-5.09 $_{i}^{FD}$	-4.34 $_{i}^{FD}$	-6.46 $_{i}^{SD}$	-3.51 $_{I}^{FD}$	-3.85 $_{I}^{L}$	-4.73 $_{i}^{FD}$	-4.28 $_{I}^{FD}$	-3.00 ^{FD}

$_{it}$: Series is stationary with « trend and intercept ».
$_{i}$: Series is stationary with « intercept ».
^{L} : Series is stationary in level.
^{FD} : Series is stationary in first difference.
^{SD} : Series is stationary in second difference.