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Evaluating the Market Exchange Rate Pressure in Inflation Condition (An Empirical Evidence of Iran)

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ABSTRACT

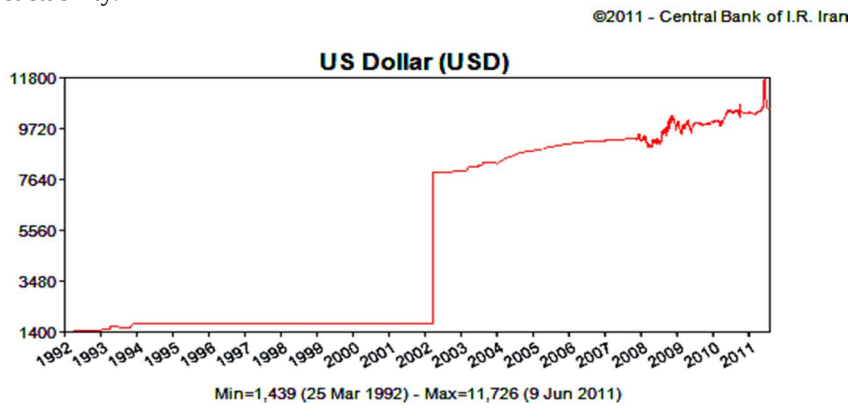
For this paper, exchange rate market pressure has been calculated quarterly over the last seven years in Iran and secondly, by using the SVAR model, the EMP effects on main economic variables such as consumer price, budget deficit and credit to private sector are analyzed. The results indicate that the government has had difficult time stabilizing the exchange rate in recent years, and EMP pressure on economy is extensive. Impulse response and variance decomposition of the SVAR model implies that shocks on EMP have immense effect on variables such as CPI and budget deficit. It is expected with current inflation, recent energy price reform and omitting government subsidies, that the central bank will recruit a more flexible exchange rate regime, but as the EMP shock on other variables is enormous, it seems that with the current inflation, the central bank encounters hyperinflation if accept a more flexible exchange rate policy.

KEYWORDS: Foreign Exchange Pressure, Central Bank's Policy, Fiscal Imbalances, Iran economy.

1.INTRODUCTION

In this study we analyze exchange rate market pressure in Iran quarterly from 2003 up to 2010. There are some fundamental differences between Iran's economy and other countries which have open market economy. One of main differences is oil income. This income enables the government to use a sterilization policy and creates balance in the exchange rate market by supplying foreign exchange rates (Alinejadshahabi *et al*., 2012).Evaluating export of oil supply and exchange rate supply and demand indicates that Iran normally has had surplus exchange rate which has increased with the oil price boom. However, reviewing the exchange rate market in the last 7 years indicates that, government permanency on the exchange rate market has decreased, which has disabled calm market in its determined rate. The reasons for this problem can be interpreted by assessing exchange rate demand and supply and different economic shocks.

Due to the removal of controls on foreign exchange and trade, the rial has depreciated significantly Since May 1993, such that in early May 1995 the free market rate was close to fixed exchange rate (Oskoee, 1998&Gilaniniа*et al*., 2012).However, it seems that since 2003(Figure 1) policy on control of exchange rate market hasn't been very successful. Exchange rates normally experience fluctuation and this rate hasn't increased with inflation. Moreover, in2010, the government undertook the energy price reform and omitted government subsidies on basic food and energy. Energy and foods subsidies have been one of the major government outlays and considered a significant portion of the government budget. A policy of eliminating subsidies leads to extra pressure on price levels and exchange rate market stability.



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As the Mundell–Fleming model (Fleming, 1962; Mundell, 1963) recommends, a country's exchange rate system choice should be based on shocks that country comes across, the level of capital mobility and autonomy of monetary policies. So with the high inflation in market, government budget deficit, government neglecting subsidies and exchange rate market fluctuations, especially in the first 6 months of 2011, should the central bank follow a fixed exchange rate policy or higher levels of flexibility as the more suitable policy? To find answers to such questions we evaluated exchange rate market pressure in Iran and analyzed the effects of different shocks on it.

2. LITERATURE REVIEW

Many studies have estimated and calculated EMP for different countries. Grinton and Roper (1997), Weymark (1995, 1997, 1998), Enchengreen *et al.*, (1996), have put forth the most important empirical works on EMP assessment. Weymark (1995) explains EMP in the absence of exchange market intervention as the changes in exchange rate that should be removed, given the expectation generated by the exchange rate policy actually achieved.

Weymark (1995,1997) proposed an open market economic model, and in order to evaluate EMP, estimated a parameter as convention factor as relative weight of exchange rate in EMP. Weymark considered specific assumptions in her model such as interest parity of domestic and foreign exchange rate or perfect substitution of domestic and foreign asset. Splonder (1999) expandedon Weymark'smodel by including a monetary policy instrument and sterilization of foreign exchange intervention into it. The main advantage of the Weymark's model is that it can be used to managed floating exchange rate regimes and can measure multi-intervention activity(Yu-Ming Hsiao *et al.*, 2011). However, it seems this model isn't suitable for countries like Iran where domestic and foreign assets are not freely traded substitutes and capital is not so mobile.

Other experts have tried to evaluate EMP from different prospective, such as Eichengreen *et al.*, (1996) who, without any estimation, calculated the EMP with weight of sample variance of linear relationship between exchange rate, monetary policy instrument and foreign exchange rate reserve. Many researchers have used this pattern of weight using principle component in order to calculate EMP, such as Pentecost *etal.*, (2001), Bird and Mandilaras (2006).

Oskooee and Shiva (1998) used annual Iranian data over the 1959–1990 period and employed Girton and Roper's (1977) monetary model as exchange rate market pressure model(EMP) to show how its capacity to identify a central bank intervention in the black market for foreign currencies. The results show that there is enormous pressure on the official exchange rate, and the central bank of Iran does not elaborately engage in black market activities.

3. METHODOLOGY AND DATA

In this section, first, EMP was calculated in the case of Iran, after which, by employing the structural vector autoregressive model, the effects of important shocks such as government deficit, inflation and domestic credit on EMP, and effects of EMP shocks on these variables, is evaluated. The data comes from the International Financial Statistics and central bank of Iran. The frequency is quarterly(data seasonally adjusted) and the sample period is 2003q4 -2010q4.

To calculate EMP, Eichengreen*et al.'s*,(1996)method and Bird and Mandilaras's (2006).Model were employed. The calculation model is specified by:

$$EMP = \alpha(dlogGXI) + \beta(dlogDR) - \gamma(dlogITR) \qquad (1)$$

Where XI stands for the nominal exchange rate of Iran against the US dollar, DR is the deposit rate as domestic short-term interest rate and ITR is international assets (as proxy of international reserve). When the exchange rate depreciates or domestic interest rate increases, exchange market pressure increases and if any losses occur in the foreign reserve, more pressure is imposed on EMP. In order to calculate the weight of each above variable in the model, such as $\alpha, \beta \text{and} \gamma$, it is one over the standard deviation of each variable divided by the sum of all three ratios, for instance, for the weight of the deposit rate (DR), the model is calculated as:

$$\beta = \frac{\frac{1}{SD_{dlogDR}}}{\frac{1}{SD_{dlogXI}} + \frac{1}{SD_{dlogDR}} + \frac{1}{SD_{dlogITR}}} \qquad (2)$$

SD is the standard deviation. Applying the weight of each variable in the model ensures that more volatile series are allocated a lower weight and do not dominate the EMP. Table 1provides descriptive statistics for XMP for Iran.

A Baseline SVAR model with contemporaneous restrictions is selected to analyze the effects of EMP shock on budget deficit, consumer price index, and domestic credit, and these variables 'effects on EMP shocks for Iran. For VAR analysis, first of all below structural equation is assumed,

$$A_0 Y_t = A_t X_t + B\varepsilon_t \tag{3}$$

Where Y_t is $(n\times 1)$ vector of endogenous variables, A_0 is a $(n\times n)$ matrix of coefficients of simultaneous relations on the endogenous variables; X_t includes lag of endogenous variables, A is the matrix of coefficients on the lagged variables in the model; ε_t as $(n\times 1)$ vector of the structural innovation which is orthogonal and $\sum_{\varepsilon t} = E(\varepsilon_t \varepsilon_t^{'})$ is the variance covariance matrix of the structural innovation. Structural shocks in a SVAR can be identified by inserting some restrictions in the baseline model. The SVAR basic model consists of four variables represented by the vector X_t :

$$X_t = (GDF_t, DC_t, CPI_t, EMP_t) \tag{4}$$

Where GDF_t is the goverment budget deficit, DC_t is the domestic credit , CPI_t stands for the consumer price index, and EMP_t is exchange rate market pressure index. To identify the structural VAR, the Amisano and Gianini (1997) strategy (AB method) is used. In this method enough restrictions are imposed on both matrices A_0 and B . The identified system $A_0 u_t = B\varepsilon_t$ is as follows:

$$\begin{bmatrix} 1 & 0 & 0 & a_{14} \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & a_{34} \\ a_{41} & a_{42} & a_{43} & 1 \end{bmatrix} \begin{bmatrix} u_t^{GDF} \\ u_t^{DC} \\ u_t^{CPI} \\ u_t^{EMP} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_t^{GDF} \\ \varepsilon_t^{DC} \\ \varepsilon_t^{CPI} \\ \varepsilon_t^{EMP} \end{bmatrix} \tag{5}$$

Where a_{ij}^{0}, for $i:1...4$ and $j:1...4$ is the coefficient of contemporaneous relation in the matrixA_0, and $, \varepsilon_t^{GDF}, \varepsilon_t^{DC}, \varepsilon_t^{CPI}, \varepsilon_t^{EMP}$ are the structural shocks associated with the respective equations; b_{ii}, for i:1…4, is the diagonal element of the matrix B.

The first variable represents goverment budget deficit, and it responds instantaneously to the EMP shock and its effect simultanously influences EMP. The second variable represents the domestic credit where the DCis assumed to react simultaneously to the EMP. The third variable represents the consumer price level,and it responds simultaneously to EMP shocks and impact on EMP. Fourth variable is exchange rate market pressures, and it seems this variable responds imediately to other variable shocks.

4. RESULTS

Table 1 presents the calculated EMP values from 2003 Q4 TO 2010Q4. As shown in Figure 2, EMP manifested volatility in the last 7 years, due to speculative pressures exercised by government deficit, inflation, worldwide economic recession, fluctuation of oil prices,..etc. It seems foreign exchange market pressures strongly relate to fiscal deficits where private sector saving is low, current account deficits are high, external debt is large and, possibly when, the confidence of capital market is low (Bird & Mandilaras2006).

Iran has experienced two digit inflation and increasing budget deficit in recent years. Government management of exchange rate policy to be lower than real prices, selling foreign exchange at higher prices, and employing other tools such as internal and external borrowing have been ways of trying to smooth out the decrease in government budget deficit. Moreover, the government is trying to control inflation by managing the exchange rate to be lower than real exchange rate. Thus, one of the government's policies on reducing inflation in recent years has been importing consumer goods at lower prices in order to increase supply of goods. Table 1 indicates utmost pressure and volatility on EMP over 7 years. The SVAR model is used to forecast the strength of EMP imposed shock on variables like consumer price, budget deficit and domestic credit.

As reported by impulse response in Figure 2, the effects of EMP shock are pronounced on CPI and government deficit. Any sudden shocks to EMP cause CPI and budget deficit to increase and domestic credit to decrease simultaneously. Also, this result is in agreement with the variance decomposition tables which show that after the first and second quarter, 45%and 42 %of GDF fluctuations, respectively, were accounted for EMP shock. After the 3rd and 4th quarters 13% and 21% movements of CPI, respectively, were due to exchange rate market pressure. It seems that over shorter periods (1 to 4 quarters) the EMP effects on GDF are stronger than its effects on CPI; while over longer periods (4 to 8 quarters) the EMP effects are more pronounced on CPI compared to GDF. Furthermore, as shown in Table 3, the effects of other model variables on EMP are also pronounced. Most fluctuation of EMP following, are related to GDF, DC and consumer price index. The results indicate that although the EMP effect on domestic credit is weak, the effect of domestic credit on EMP is considerable.

Figure 2. Plot of EMP, 2003.4-2010-4

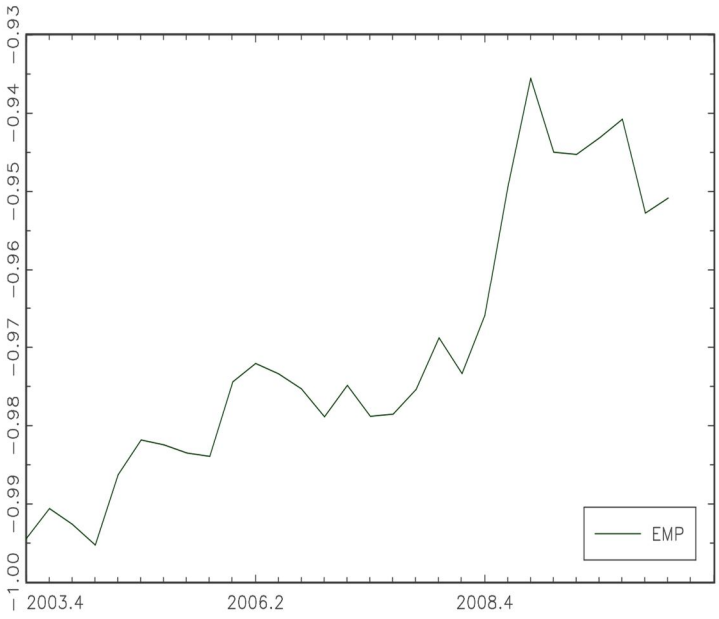

Table 1.Calculated EMP values

QUARTERS	EMP
2003Q4	-0.99441
2004Q1	-0.99058
2004Q2	-0.99259
2004Q3	-0.99525
2004Q4	-0.98627
2005Q1	-0.98183
2005Q2	-0.98245
2005Q3	-0.98351
2005Q4	-0.98394
2006Q1	-0.97441
2006Q2	-0.97206
2006Q3	-0.97339
2006Q4	-0.97531
2007Q1	-0.97887
2007Q2	-0.97487
2007Q3	-0.97881
2007Q4	-0.97853
2008Q1	-0.97536
2008Q2	-0.96877
2008Q3	-0.97337
2008Q4	-0.96591
2009Q1	-0.94939
2009Q2	-0.93554
2009Q3	-0.94497
2009Q4	-0.94526
2010Q1	-0.94313
2010Q2	-0.94078
2010Q3	-0.95274
2010Q4	-0.95082

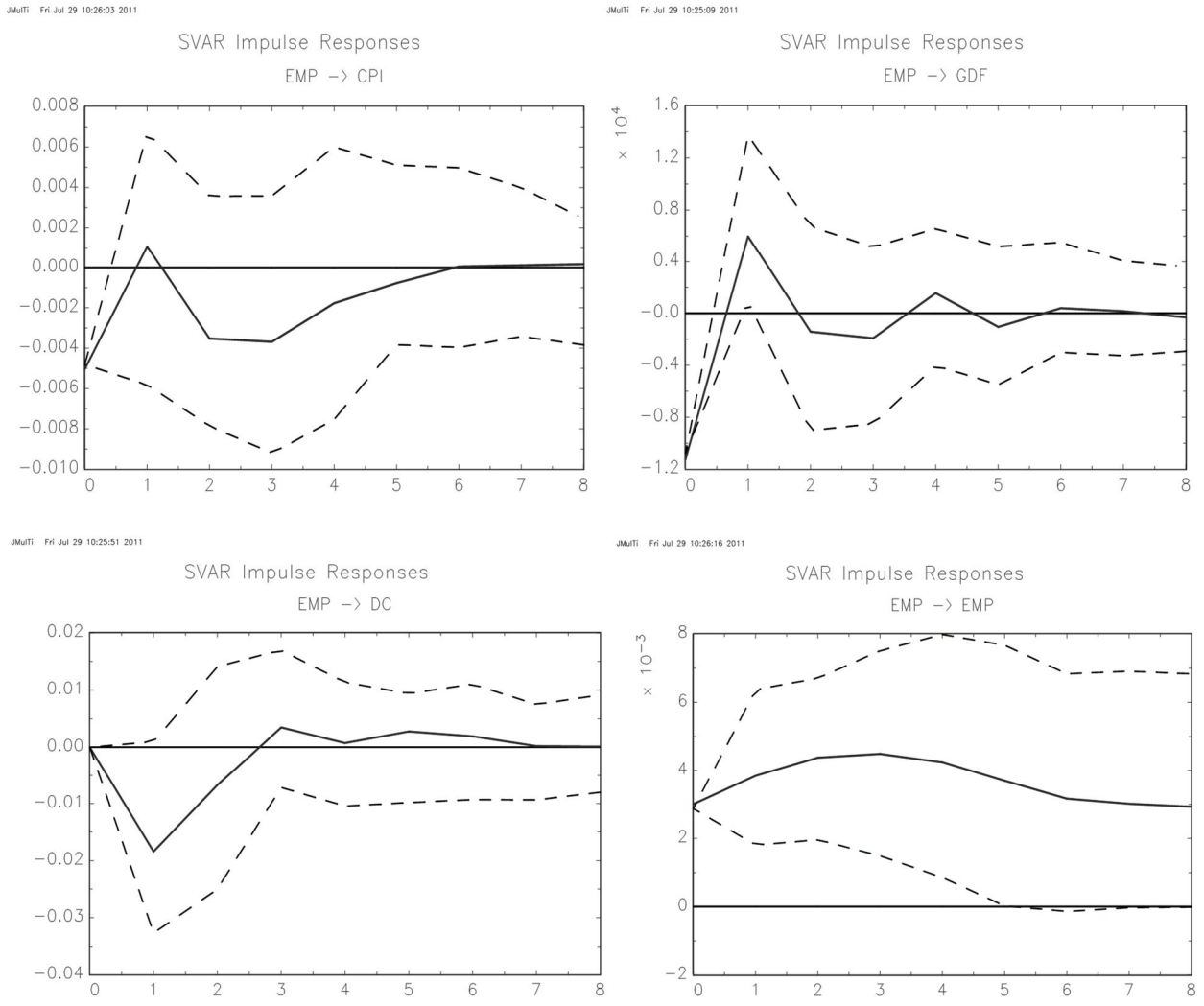

Figure 3. Impulse response, Effect of EMP shocks

Table 2. Proportion of forecasted- error in EMP

VARIANCE DECOMPOSITION	PERIOD	1	2	3	4	5	6	7	8
GDF		0.48	0.42	0.26	0.19	0.14	0.12	0. 11	0.11
DC		0.03	0.02	0.02	0.02	0.02	0.03	0.04	0.06
CPI		0.02	0.02	0.13	0.21	0.28	0.34	0.38	0.41
EMP		0.45	0.54	0.58	0.58	0.55	0.51	0.46	0.43

Table 3. VARIANCE DECOMPOSITION: EMP

VARIANCE DECOMPOSITION	PERIOD	GDF	DC	CPI	EMP
EMP	1	0.51	0.00	0.10	0.45
	2	0.32	0.13	0.08	0.54
	3	0.28	0.14	0.10	0.58
	4	0.28	0.15	0.11	0.58
	5	0.28	0.14	0.12	0.55
	6	0.28	0.14	0.12	0.51
	7	0.28	0.14	0.12	0.46
	8	0.28	0.14	0.12	0.43

5.CONCLUSION

In this research EMP in Iran is calculated, and the response of variables such as inflation, budget deficit and domestic credit to EMP shocks is evaluated. The results indicate that the government has had a hard time to stabilizing the exchange rate in recent years, and EMP pressure is enormous on economy. The SVAR model implies that any sudden shocks to EMP cause CPI and budget deficit to increase and domestic credit to decrease simultaneously. Moreover, variance decomposition results indicate that EMP has stronger effects on GDF over shorter periods than EMP effects on CPI, while over longer periods, EMP effects are more pronounced on CPI compared to GDF. Furthermore, most fluctuation of EMP relates to GDF, DC and consumer price index.

It would be expected that with current inflation, recent energy price reforms and elimination of energy subsidies, the central bank would employ a more flexible exchange rate regime, but the results imply that as EMP shocks on other variables are huge, policy makers are reluctant to devaluate currency simultaneously with omitting energy subsidies. Because the current exchange rate can facilitate the import of much cheaper foreign goods, and used as inflation control policy. It isn't possible for the government to follow both policies of skipping subsidies and designing a more flexible exchange rate policy at the same time. Moreover, selling foreign currency on the market in order to solve a portion of the budget deficit has been one of the central bank policies in recent years. If the exchange rate is devaluated to lower rate, all central bank exchange rate would sellat lower price, but if currency rate does not change, exchange rate demand is decrease but the central bank make more rial selling per dollar. By omitting subsidies and increasing of government income, the government's will to earn more income and sell of currencies at lower prices decreases. So due to econometric results and Iran economic condition, it isn't reasonable, at least in the short time after omitting subsidies, a flexible exchange rate policy followed by monetary authorities.

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