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Is Monetary Discipline a Precondition for the Effectiveness of Iran's Export Promotion Policies?

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Is Monetary Discipline a Precondition for the Effectiveness of Iran's Export Promotion Policies?

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Abstract

In the last decade, Iranian authorities have implemented a number of trade reforms and export stimulating policies. They have also tried to stabilise the dollar exchange rate and eliminate the black market premium. These policies have had little, if any, lasting favourable effect on non-oil exports. One conjecture may be based on the inconsistency of their monetary policy: as money supply is used independently – without any regard for trade reforms and export promoting policies – to accommodate government's fiscal needs, its inflationary consequences undermine export incentives. We use 1982:Q1-2000:Q2 data to estimate the response of exports to a one-off rise to money supply and find that the results support the above conjecture.

Keywords: *black market premium; exchange rate; export performance; impulse response; Islamic Republic of Iran; monetary policy.*

JEL Classification: E51; F17; F41; O11.

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[†] This paper was written when A. H. Mozayani was a visiting research fellow at the Department of Economic Studies, University of Dundee.

1. INTRODUCTION

The policies adopted by the authorities of the Islamic Republic of Iran, since its establishment after the 1979 revolution, drastically curtailed Iran's participation in the world economic scene. The substantial oil revenue enabled the authorities to adhere to their inward-looking policies for almost a decade, despite having to meet the massive costs of the 8 year war with Iraq which began in September 1980, soon after the establishment of the Islamic Republic. However, as soon as the war was over the implausibly large share of public spending in GDP, on the one hand, and the impracticality of heavy reliance on oil revenue, on the other, necessitated a revision in the economic policies in favour of promoting openness. By the end of 1989 there was a significant shift towards encouraging non-oil exports by private sector; both directly via policies targeting exports – e.g. trade reforms; subsidies; provision of low premium loss insurance schemes; financial rewards on performance; etc. – as well as indirectly through the exchange rate policies – for further details see Pesaran (2000).

Although the authorities have tried to adhere of their export promoting and trade reform policies and the exchange rate policies have also played a major role in this respect, evidence is not very encouraging. One explanation could be that, in order to be effective, these policies ought to be accompanied by consistent macroeconomic policies, in particular monetary stance. The direct policies and reforms designed to encourage exports which have been implemented during past few years were well received. Also, the second phase of exchange rate 'unification' policies aimed at undermining the foreign currency black market have been managed successfully. These are considerable achievements on the path towards promoting openness to trade. However, the money supply policy has remained 'pro-cyclical' and there has been no effort to adopt a monetary stance that would be compatible with the trade openness aims, namely the improvement of trade balance and creation of jobs in export related sectors; it is not unreasonable to expect that the persistent pursuit of an accommodating monetary policy would severely undermine such aims.

In this paper we attempt to provide a quantitative assessment of the effect of expansionary monetary policy on export performance. We use quarterly data for the 1982-2000 period to estimate an export performance equation. This equation is then used to examine the extent to which the impact of an expansionary monetary shock on price level and exchange rate – quantified within a VAR framework – undermines export performance. Our results show that

exports are likely to suffer immediately from the inflationary consequences of such shocks. This finding suggests that the export stimulation policies are unlikely to achieve their targets effectively if the growth of money stock is determined by priorities that are independent of the underlying aims of trade policies. The rest of the paper is organized as follows. Section 2 provides a brief summary of the relevant features of the Iranian economy over the last two decades. In Section 3 we estimate an export performance equation and use it – in conjunction with a VAR system capturing the monetary side of the economy – to quantify the effect of a one-off rise in money supply on the export performance through exchange rate and price level channels. Section 4 concludes the paper.

2. PRELIMINARY OBSERVATIONS

The post 1979 revolution era can be divided into two periods. In first period the imposition of revolutionary principles, coupled with the consequences the war with Iraq necessitated a significant increase in the role of the state in the economy and led to an inward-looking behaviour based on imposing severe controls on the foreign exchange market and international trade. This is followed by the second period which is marked by the end of the war in 1988, during which five-year development plans have been implemented to reconstruct the war damaged zones and as well as revitalise the depressed economy. In this period, the stricter inward-looking attitude was gradually supplanted with more liberal approach which encouraged openness to international trade.

The various quantitative and non-tariff barriers were steadily lowered and the direct dominance of the state – in controlling foreign commerce – was slowly replaced with more conventional trade policies based on tariffs and duties. In addition, the latter period has seen clear efforts to engage in international arrangements under umbrellas such as WTO, and the establishment in 1996 of Iran's Trade Representative Office could be interpreted as a genuine effort to launch a more liberal trade regime. This 'progressive' move was matched by similar actions in the foreign currency market. The heavy state control which was in operation in the first period and had given rise to a very active and dynamic black market was gradually replaced by the so called 'unification' policies with clear targets to reduce and eventually eliminate the significant black market premium of the exchange rate and to stabilise the Rial/US\$ rate. The first unification policy which was experimented over the 1993-1995 period failed and had to be

abandoned. But the second one which started in 2002 has so far been successful and the exchange rate over past two years has been remarkably stable – see Figures 1 and 2.

Figure 1. Rial/US\$ Exchange Rate (Black Market Exchange Rate)

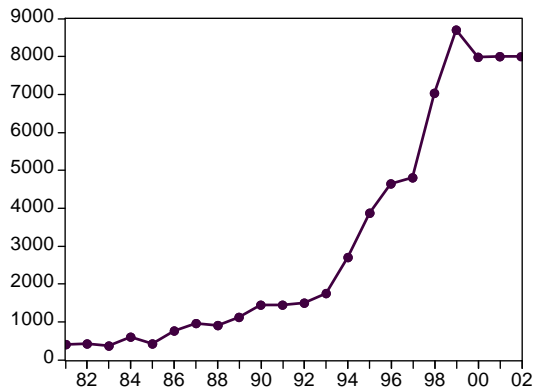
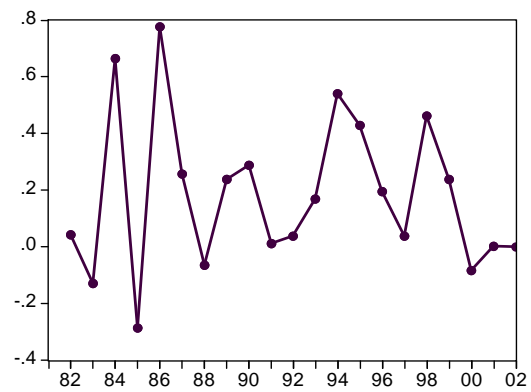


Figure 2. Annual %Change in the Exchange Rate (Black Market Rate)



Unlike trade and exchange rate policies which have been moderated considerably over the latter period, the monetary policy has throughout the two periods been simply used as a vehicle to fulfil government’s budget deficit requirements. As a result, monetary base has expanded considerably, especially since the end of the war as the government has removed its budget deficit by practically printing money – see Figures 3 and 4.

Figure 3. Money Supply (Billion Rials)

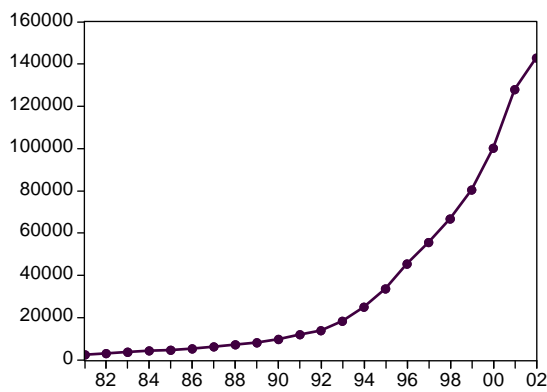
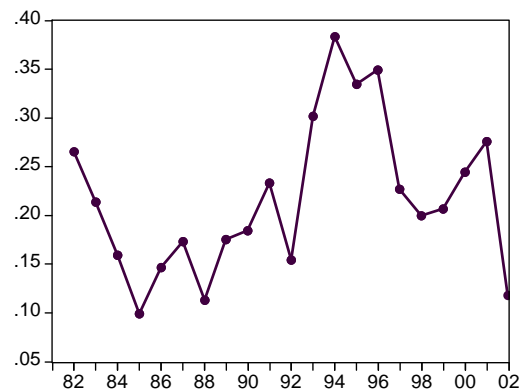


Figure 4. Annual Rate of growth of Money Supply



Two points are worth noting in this connection. On the one hand, whilst the surplus foreign exchange from oil revenue has enabled the government to stabilise Rial/US\$ exchange rate – as the authorities have directly intervened by selling foreign currency in the domestic market, using the so called ‘Oil Stabilization Fund’ or ‘Foreign Currency Reserves Fund’, via

the banking system – the money supply has not been sterilised, resulting in an expansion of money stock. On the other hand, during the periods when oil revenue has fallen below some predetermined threshold, the government has compensated the shortfall by raising the money supply. These have led to a dilemma in the Iran’s economy in that both decreasing and increasing oil revenue correspond to a money expansion. Consequently, any volatility in the world oil market has had severe consequences for the economy beyond the normal effect on the current account. The inevitable effect of the excessive expansion of money supply has been a persistent rise in the price level leading to a relentless inflationary process – see Figures 5 and 6.

Figure 5. Price Level (Consumer Price Index)

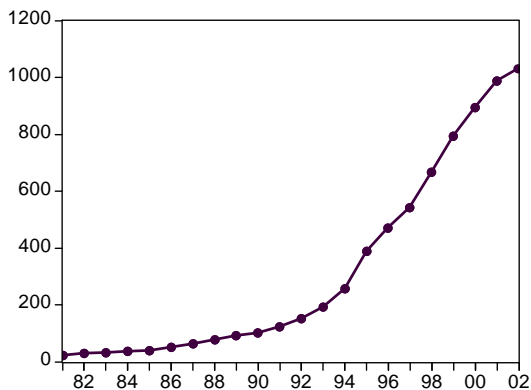
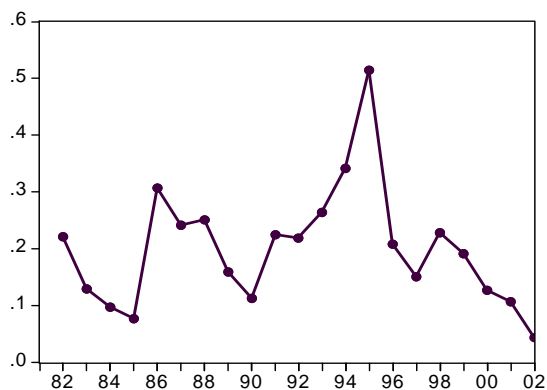


Figure 6. Annual Inflation Rate



To see how the foreign sector accounts have evolved over the two periods, in Figures 7, 8 and 9 we plot oil revenue, non-oil exports earnings and total expenditure on imports. It is clear that, except for the years 1991-1992 when Iran borrowed from abroad to speed up the reconstruction of the war-damaged regions, the expenditure on imports are fairly stable around a constant mean, which is mainly predetermined around the mean of oil revenue. In contrast, non-oil export earnings have a clear trend and have been responding to the announcements regarding the exchange rate policies and the subsequent implementation and sustainability of these policies. In particular: (i) the considerable increase in exports after 1990 occurred in anticipation of the announcement that the premium between the official and the black market rate would be reduced; and (ii) the sharp reduction in 1994 followed the rumours that the ‘exchange rate unification’ policy could no longer be sustained and would soon be abandoned (see Figure 1 above for the behaviour of the black market Rial/US\$ rate). Because we are interested in assessing the relative, rather than absolute, performance of non-oil exports, in Figure 10 below

we show the ratio of non-oil export earnings to total expenditure on imports. It is interesting to note that this ratio preserves the main characteristics of the numerator (depicted in Figure 8). This is due to the fact that, as mentioned above, the denominator of this ratio has been closely fluctuating around a constant mean.

Figure 7. Iran's Oil Revenue (Value, Million US\$)

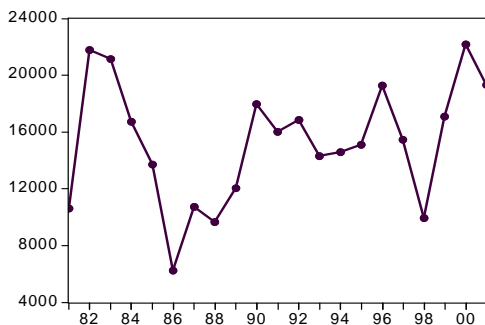


Figure 8. Iran's Non-Oil Exports (Value, Million US\$)

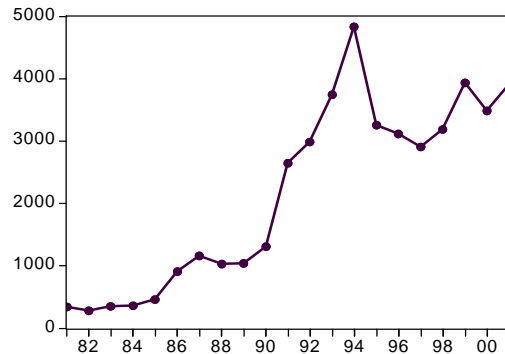


Figure 9. Iran's Imports (Value, Million US\$)

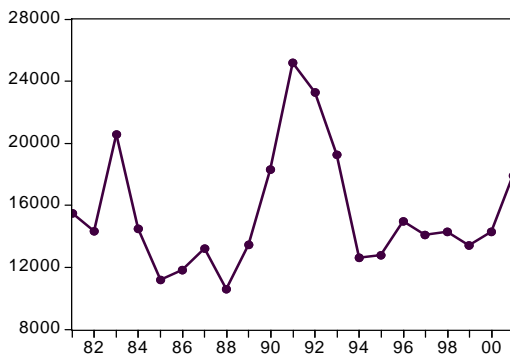
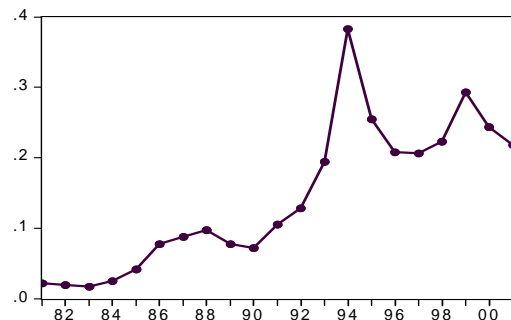


Figure 10. Iran's Non-Oil Export Performance (Exports/Imports)



3. EFFECT OF A MONEY SUPPLY SHOCK ON EXPORT PERFORMANCE

In this section we attempt to quantify the effect of a positive monetary shock on non-oil export performance in order to highlight the detrimental effect of the 'irresponsible' use of money. To do so, we first need to formulate a satisfactory empirical relationship between a suitable measure of export performance and those variables which can be 'sensibly' considered as its determining factors. Because the main aim of policies which encourage non-oil exports is to improve Iran's trade balance, we measure 'export performance' by the ratio of non-oil export earnings to total expenditure on imports. As for the choice of (explanatory) variables which could be argued to determine the ratio of non-oil export earnings to expenditure on imports, following general

theoretical considerations and the suggestions made in the relevant literature¹, we experimented with: price of exports; price of imports; consumer price index; exchange rate; income; oil revenue; foreign price level; and a scale variable capturing foreign income². We estimated various dynamic specifications allowing for different sets of explanatory variables consistent with general theoretical considerations. Narrowing down the set of explanatory variables by imposing plausible restrictions guided by statistical criteria, we selected, among the alternative candidates, that relationship which outperformed the rest empirically, was parsimonious, and had a plausible behavioural interpretation. Table 1 reports the estimates of the selected equation and Figure 11 compares the actual and fitted values of the dependent variable.

Table 1. Estimates of Coefficients of the Export Performance Relationship
Dependent Variable: $\log(\text{Non-Oil Export Earnings/Imports Expenditure})$

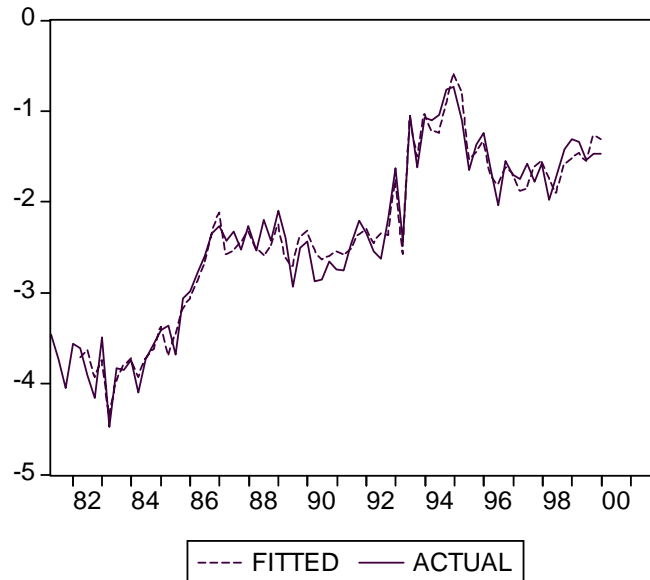
Explanatory Variables	Lag	Coefficient Estimates
$\log(\text{Non-Oil Export Earnings/Imports Expenditure})$	2	0.220 (3.3903)
$\log(\text{Non-Oil Export Earnings/Imports Expenditure})$	3	0.230 (3.8328)
$\Delta\log(\text{Exchange Rate; Iranian Rials per US\$})$	1	0.384 (2.2480)
$\log(\text{Exchange Rate; Iranian Rials per US\$})$	3	0.309 (5.5157)
$\log(\text{Price of Exports/Consumer Price Index})$	0	0.585 (5.3276)
$\log(\text{Price of Exports/Consumer Price Index})$	3	-0.378 (3.8386)
$\log(\text{Foreign Income/Oil Revenue})$	1	-0.271 (4.0447)
$\log(\text{Foreign Income/Oil Revenue})$	4	0.205 (3.3188)

- Estimation period is 1982:Q2 – 2000:Q1 and data are from Central Bank and Management and Planning Organization of Iran, and the Federal Reserve of St. Louis, USA.
- Given that all explanatory variables can safely be regarded as exogenous, the regression equation was estimated using OLS. US variables are used as proxies for the respective foreign ones. The regression equation also included an intercept, seasonal dummies and dummies for the war and exchange rate policy periods (estimates not reported).
- Numbers in parentheses next to the coefficient estimates are the corresponding t-ratios based on White's heteroscedasticity adjusted standard errors. Other relevant statistics are: $\bar{R}^2 = 0.958$; $\hat{\sigma} = 0.183$; and the value of the LM test statistic for 4th order serial correlation, distributed as $\chi^2_{(4)}$, is 4.9798.

1 See, for instance, Jung and Lee (1986), Mah (2003), August (2001), Goldstein and Khan (1978), Redding and Venables (2003) and Miles (1979). Some studies, e.g. Faini (1994) and Barlow and Senses (1995), also include wage rate and interest rate amongst the explanatory variables, but it can be argued that these are not relevant in the case of Iran.

2 'Foreign' in this context typically refers to 'trading partners' or 'the rest of the world'. Following the convention, we use the US variables as proxies for the respective foreign ones.

Figure 11. Actual & Fitted Value of Regression



As Table 1 shows, the behaviour of export performance is well explained by the three variables: ‘Rial/US\$ exchange rate’, ‘Price of Exports/Consumer Price Index’ and ‘Foreign Income/Oil Revenue’, which capture the relative price and income effects. The effects of these explanatory variables are distributed over few years and the dependent variable also has a sluggish response to these effects. The results indicate that both a depreciation of the exchange rate and a rise in price of exports relative to the CPI stimulate exports and improve the non-oil trade balance. This is in line with the expectation that, for a small country which takes export prices as given, exporters respond to potential nominal profit margins inherent in price and exchange rate. As a result, government’s monetary stance is bound to affect the country’s non-oil export performance through its impacts on the exchange rate and the price level. Moreover, given the dynamic nature of the relationship, these effects are likely to be persistent for a few periods and could undermine the impact of any export stimulating policies.

To assess the impact of government’s monetary stance on export performance, we need to quantify the effect of a shock to money supply on the price level and exchange rate. One way to proceed is to specify a stylised macro-econometric structural model that captures the main characteristics of the Iranian economy and use its parameter estimates to calculate the relevant

multipliers that embody the impact of a monetary shock. However, given our main purpose – and also because data on most of Iran’s macroeconomic indicators are mainly limited to annual series – a more practical approach is to estimate a vector autoregression (VAR) system consisting of the relevant variables. We therefore opted for the latter and estimated a VAR system where the vector of endogenous variables includes money supply, the price level and the exchange rate, and past values of real income are used as exogenous variables (all variables in logarithm). This specification rests on the assumption that the underlying structural model is conformably block-recursive and that money, price and exchange rate form one of the blocks. Also, to allow for the VAR system to capture, and reflect, the open economy nature of the problem, we measure the variables relative to their foreign counterparts³. Given that our intention, from estimating the VAR system, is to quantify the response of price level and exchange rate to a money supply shock, we are not interested in estimates of the VAR parameters per se⁴. Nevertheless, in the interest of robustness, it is important to determine the appropriate lag-length suggested by data prior to conducting the simulation exercise. First, therefore, we calculated the relevant statistical criteria for selecting the optimal lag-length and the results are given in Table 2 below which show all of these criteria indicate using three lags.

Table 2. Statistical criteria for the selection of the order of the VAR system

Lags	LR	AIC	HQ	FPE
1	190.0954	-8.438214	-7.953813	4.39E-08
2	20.17460	-8.542808	-7.946622	4.00E-08
3	37.79063	-8.986667	-8.278697	2.60E-08
4	6.184680	-8.862360	-8.042605	3.00E-08
5	14.09489	-8.906768	-7.975227	2.95E-08
6	13.59992	-8.959175	-7.915850	2.91E-08

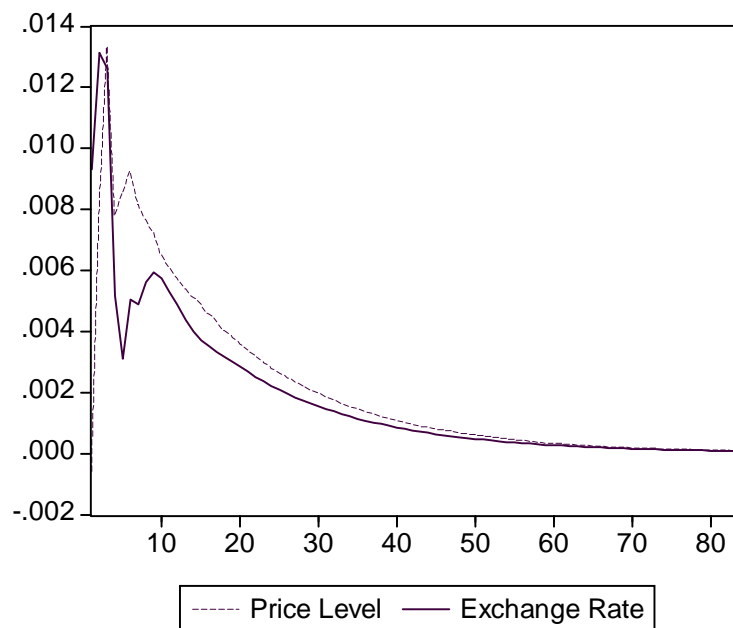
LR is the sequential modified Likelihood-Ratio test statistic (each test at 5% level). AIC and HQ denote the Akaike and Hannan-Quinn information criteria, respectively, and FPE is the final prediction error.

³ As before, the exchange rate is Rials per US\$ and the US variables are used as proxies for the respective foreign ones.

⁴ Since all series are I(1), we first tested for the existence of a cointegration relationship amongst the variables. The VAR system was then estimated in first differences.

Hence, we proceeded to estimate the 3rd order VAR system and used the estimated system to conduct impulse response analysis. The relevant responses are depicted in Figure 12 which shows the effect⁵ of a one-off shock to the money supply equation – equivalent to one standard error of the estimated residual of that equation – on the exchange rate and the price level. It is clear that while the exchange rate responds faster than the price level, their responses follow similar pattern, showing a strong initial over-shooting reaction to the shock which erodes in two phases: a sharp fall followed by a gradual decline. This behaviour is fully consistent with that observed in the economy; every time there has been an exogenous injection of money to finance the budget deficit, the black market exchange rate has shown a tendency to depreciate and this is quickly followed by a rise in the price level.

Figure 12. Responses of exchange rate and price level to a one-off shock to the money supply equation (equivalent to one standard error of the residual)

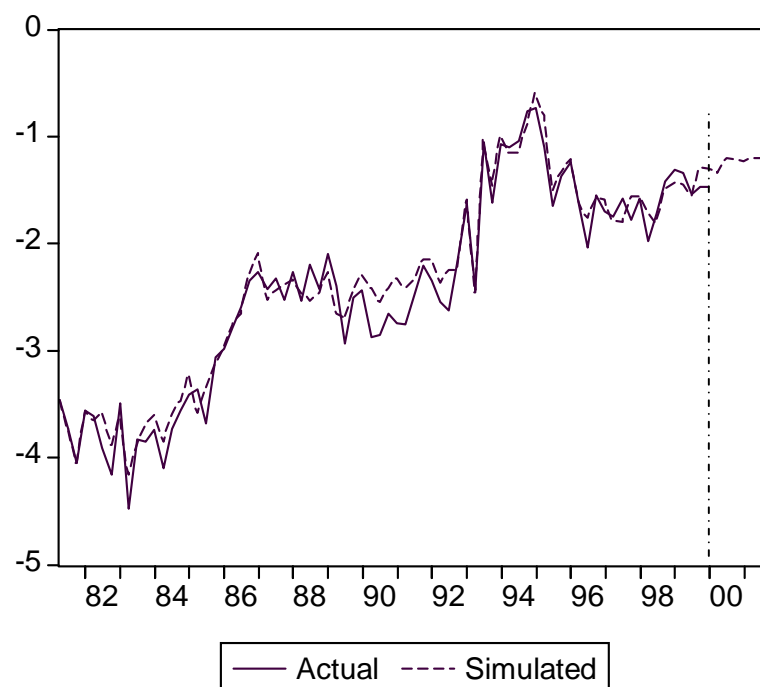


To evaluate the impact of a money supply shock on export performance, we now examine how the effects of the shock on the price level and exchange rate derived above are transmitted using the export performance equation whose estimates we have reported in Table 1.

⁵ We have used the generalised impulse response method proposed by Pesaran and Shin (1998).

This requires solving the export performance equation forward twice, once without and once with implementing the effect of the shock on the explanatory variables in question, and finding the difference between the two solutions. However, we also need to decide on the date at which the shock is to be implemented. In order to reduce the role of other exogenous effects and highlight the effect of the shock, we decided to implement the shock immediately after the last observation, i.e. 2000:Q2, where we keep all explanatory variable constant at their respective 2000:Q1 value and only let the price level and the exchange rate deviate by the effect of the monetary shock⁶. Figure 13 below compares the actual values of the dependent variable – non-oil export earnings/imports expenditure – with the forward solution values where the post-2000:Q1 solution values are calculated by keeping all explanatory variable constant at their respective 2000:Q1 value.

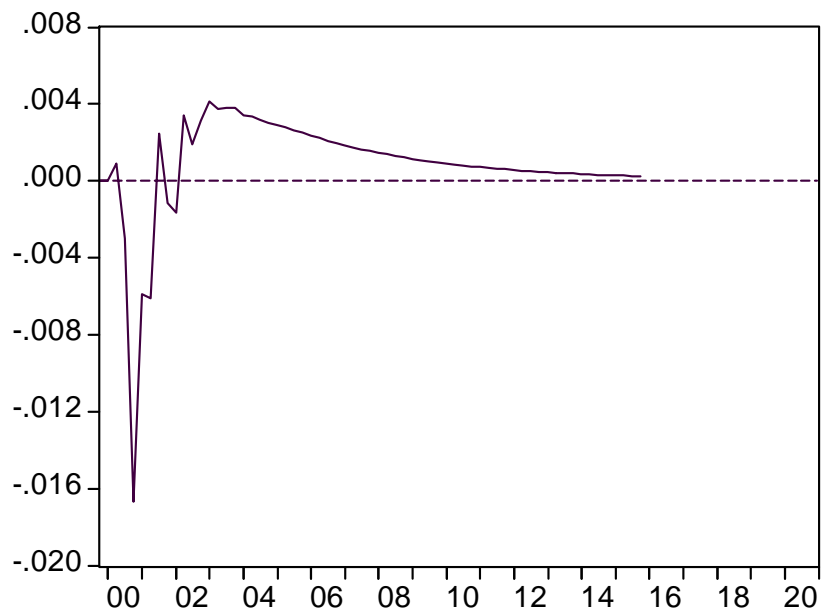
Figure 13. Actual and Simulated Values of Export Performance Ratio



⁶ In order to keep the values of the explanatory variables constant when we implement a monetary shock, we ought to ensure that such a shock does not invoke a change in any of the variables. The only variable that might be argued to respond to this shock is price of exports (foreign income and oil revenue can be safely considered as unaffected by domestic monetary shocks). We therefore used the approaches proposed by Granger and Sims to check if export price is caused by money supply. The statistics based on both tests confirm that money does not cause price of exports.

Given that the within-sample simulated values are well-behaved and the out-of-sample solutions converge rapidly, we proceed to implement the effect of a shock to money through its effect on the price level and exchange rate. In order to make quantitative comparisons easier, we normalise the effects on price level and exchange rate of a money shock to a 10% rise in money supply – as opposed to the one standard deviation of the residual shown in Figure 12 – and use these effects to construct the post 2000:Q1 values of (shocked) price level and exchange rate. These are then used to obtain the simulated values of export performance which incorporate the effect of a 10% rise in money supply. Figure 14 shows the difference between the two simulated series – those obtained by allowing for the 10% shock and those calculated without the shock.

Figure 14. Effect of a one-off 10% Rise in Money Supply on Export Performance Ratio



Given the size and sign of the coefficient estimates of the export performance equation reported in Table 1 on the one hand, and the effect of a money supply shock on the price level and exchange rate depicted in Figure 12 on the other, it is clear that: (i) a monetary shock will improve export performance through its impact on the exchange rate; but (ii) this improvement will be eroded by the effect of the shock on the price level. As Figure 14 shows, the net impact of the money supply shock on export performance turns out to be negative in the initial phase –

during which the price effect dominates – which persists for two years. Clearly, while a one-off monetary shock per se may not have a drastic impact on export performance, a persistent expansion of money supply will be detrimental. More over, the extent of the harm is likely to be enhanced if, as shown in Figure 4, these persistent shocks also happen to be rather volatile.

4. CONCLUSION

On August 25, 2003, the Executive Board of the International Monetary Fund (IMF) concluded the Article IV consultation mission with the Islamic Republic of Iran. The Board’s findings, assessments and recommendations, published in the Public Information Notice No. 03/109 – emphasise concern about the pro-cyclical stance of monetary and fiscal policies stressing that *“Expansionary policies in the current environment of strong private demand – in particular, the use of the Oil Stabilization Fund (OSF) in a period of high oil prices – have contributed to a build-up of inflationary pressures and a narrowing of the external current account surplus”*.

In addition, the World Bank report of July 26, 2003, on the economies of the Middle Eastern and North African countries, argues that the status quo – i.e. public sector driven and protected economies supported by oil – can no longer generate sufficient growth or jobs. It predicts a major unemployment crisis in these countries in the coming years, and calls for trade and investment reforms which, in conjunction with consistent, efficient and disciplined use of monetary and fiscal policies, promise stable and sustainable growth and real employment opportunities.

Our empirical analysis echoes the above concerns. We find that the ratio of non-oil exports to total expenditure on imports deteriorates as (some of) its determinants – the price level and exchange rate – respond to a money supply expansion. Clearly, this negative effect of monetary policy also undermines the effect of direct export promoting policies and trade reforms which are implemented with a view to improving Iran’s trade balance as well as creating jobs in export oriented sectors.

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