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Invited Article

Impact of monetary policy on exchange market pressure: The case of Nepal

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ABSTRACT

This paper uses a monetary model of exchange market pressure to examine the impact of monetary policy on the Nepalese exchange rate. Using a recently developed estimation technique, impulse indicator saturation, along with general-to-specific modeling, we find that a contractionary monetary policy results in easing of pressure on the exchange rate. The robustness of the results is confirmed using misspecification tests.

1. Introduction

One of the primary concerns of emerging market economies is that a rush of capital inflows will fuel consumption, which in turn will cause appreciation of the real exchange rate and erode its export competitiveness. In a similar vein, many other less-developed economies receive substantial remittance inflows, which are different from capital inflows but can nonetheless have similar implications on competitiveness. Nepal is one of the largest recipients of remittances, with its size reaching 23 percent of GDP in 2009. In the same year, Nepal was ranked the fifth-largest remittance receiving country in the world by the World Bank.[2] Fueled by remittances and other structural impediments in the economy, Nepal's trade deficit (goods and services) reached 21 percent of GDP in 2009. Some economic and non-economic factors have led to slowing of the economy in the last decade. Average GDP growth during 2000–2009 was 3.9 percent.

As a small open economy, Nepal has maintained a pegged exchange-rate regime with India as its monetary policy anchor. The authorities in Nepal contend that the pegged exchange-rate regime along with growing foreign-currency reserves based

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[2] See the World Bank's Migration and Remittances Factbook 2011, Second Edition.

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on remittances have been critical for macroeconomic stability. It is true that the country has not faced any serious balance of payments (BoP) crisis, but the inherent weaknesses in the system have kept unrelenting pressure on the INR-NPR exchange rate.[3] In order to study whether the monetary policy can be helpful in mitigating pressure on the exchange rate, we apply a variant of the monetary model applied in Girton and Roper (1977). The authors introduced the term "exchange market pressure" (EMP), which defines pressure on the domestic currency as a sum of the percentage change in the exchange rate and the percentage change in international reserves. As per the model, an expansionary monetary policy will increase pressure (to depreciate) on the exchange rate, while a contractionary policy will ease any such pressure.

In this study, we examine the interaction of monetary policy and EMP in Nepal for the period 1975–2009. In empirical estimation, we use a recently developed technique called impulse indicator saturation (IIS). In modeling the US expenditure on food, Hendry and Mizon (2011) note that empirical testing of a theory that is essentially "correct" may exhibit misspecification if the data generating process is not properly modeled. Many macroeconomic data often incorporate shocks to the system arising from structural changes in the economy following events, such as recessions, wars, and changes in the policy regime. The authors argue that a theory can perform well in a general framework, which incorporates dynamics as well as possible outliers, breaks, and shifts in the data. The IIS technique by Hendry, Johansen, and Santos (2008) allows for these possibilities in a special case of regression where a dummy variable is added for each observation. The application of the IIS technique is useful not only in detecting structural changes in the data but is also flexible enough to capture analytical insights when the model is complete and correct, reject the model if it is incorrect, and improve it when additional information is provided.[4]

The paper makes two contributions to the literature. This study is the first of its kind on Nepal, which is a low-income, landlocked country that has become increasingly dependent on remittances in recent years. It is a case where remittances are critical for macroeconomic stability in the short run, while there is evidence of adverse effects on the economy over long run through the Dutch-disease effects. By establishing a role for the monetary policy in a pegged exchange-rate regime, it can be expected that the policymakers will ameliorate the adverse effects. The second contribution is the use of a relatively new technique to estimate the EMP model. By applying the IIS technique, this study has attempted to test the empirical predictions of the theory while being robust to structural breaks and outliers, which are common in macroeconomic variables.

Our results show that using the IIS technique helped capture outliers in the data which turned out to be important in finding evidence that supported the theory. Accordingly, the results show that a contractionary monetary policy in Nepal can help ease pressure on the home currency. While the OLS estimates produced mostly insignificant effects and failed the misspecification tests, the results using the IIS technique showed better performance in both regards.

The remainder of the paper is organized as follows. Section 2 summarizes the EMP model and offers a brief review of the literature. Section 3 offers details on econometric estimation, including the IIS technique, general-to-specific (GETS) modeling, and the algorithm called Autometrics. This is followed by a discussion of the results in Section 4, which includes a comparison of the OLS and IIS estimates, results from a multiple structural breaks test, forecast evaluation, and an economic interpretation of the findings. Some concluding remarks are given in Section 5.

2. Exchange market pressure

Girton and Roper used the conventional money demand and supply functions as well as purchasing power parity (PPP) to derive a monetary model of EMP. A variant of the original model is adopted here, following Connolly and Da Silviera (1979), Kim (1985), Bahmani-Oskooee and Shiva (1998), Stavarek and Dohnal (2009), and many others.

The first component of the model is the money demand function, which is a stable function of real income (Y_t) and the price level (P_t):

$$M_t^d = kP_tY_t \tag{1}$$

where k is a constant and represents the fraction of income that firms and households desire to hold as money balance. The money supply, M_t^s, is a product of the money multiplier (m_t) and the monetary base ($B_t = R_t + D_t$):

$$\begin{aligned} M_t^s &= m_tB_t \\ &= m_t(R_t + D_t). \end{aligned} \tag{2}$$

The monetary base is backed by the aggregate stock of foreign assets, R_t, and domestic credit, D_t.

Two assumptions are needed at this point. First, the money market is assumed to be in a continuous equilibrium. Second, the PPP holds:[5]

$$M_t^d = M_t^s \tag{3}$$

$$P_t = E_tP_t^f. \tag{4}$$

[3] INR = Indian Rupee; NPR = Nepalese Rupee.
[4] See Johansen and Nielsen (2009), Santos and Oliveira (2010), and Castle et al. (2012).
[5] The nominal exchange rate (E_t) is expressed as units of the home currency per unit of the foreign currency.