E

Exchange Market Pressure

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Abstract

Currencies can be under severe pressure in the foreign exchange market, but in a fixed (or managed) exchange rate regime that is not fully visible via the change in the exchange rate. Exchange market pressure (EMP) is a concept developed to nevertheless measure the pressure in such cases. This article describes EMP and its measurement.

Keywords

Central bank; Currency crisis; Exchange rate regime; Interest rate; Intervention; Monetary policy

JEL Classifications

E52; E58; F31; F33

Definition and Relevance

Exchange market pressure (EMP) on a currency is its excess supply in the foreign exchange market if monetary authorities did not try to influence the exchange rate; this excess supply is expressed in the relative depreciation required to remove it.

Under a floating exchange rate the monetary authorities (usually the central bank) are indeed passive to the exchange rate, so EMP is the actual depreciation. In any other regime the monetary authorities ward off depreciation by policy measures, such as setting a higher official interest rate, or buying domestic currency in the foreign exchange (forex) market. Then the actual depreciation does not coincide with EMP, and correct EMP measurement requires adding the depreciation-counteracting policy actions. The question in the EMP literature, originating from Girton and Roper (1977), is how to do that.

Focusing on EMP rather than sheer exchange rate changes is practically relevant, as 82 per cent of the world's currencies have some sort of peg or managed float (IMF 2009). A first application of EMP exploits the fact that EMP covers the whole spectrum of exchange rate regimes, from floating to fixed. As exchange rate and balance of payment theories essentially focus on tensions in the forex market, under either floating or fixed rates, EMP

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can integrate both types of theory. Second, EMP can be more relevant than exchange rate changes as a determinant of other phenomena. For instance, IMF (2007) takes EMP to study adequate policy responses to surges in capital inflows. Since EMP better signals forex tensions than exchange rate changes, EMP also helps speculators to find profit opportunities, and policy makers to take timely moves to counteract contagion from other countries.

Measure

A crucial element in the EMP definition is that EMP is a counterfactual concept. That is, it is not the actual situation, where the central bank may ward off pressure, that matters, but the hypothetical situation where the central bank (unexpectedly) does not try to influence the exchange rate, as stressed in Weymark (1995). This makes EMP unobservable (except for a pure float). However, we do observe the policy responses to pressure, besides the exchange rate change. This provides an opportunity to quantify EMP in an indirect way.

One typically includes three pressure-offsetting variables, namely the exchange rate, interest rate, and official forex intervention, though some authors exclude the interest rate. Let s_t denote the (logarithm of the) nominal spot exchange rate at time t, defined as the domestic currency price of one unit of foreign currency. The interest rate i_t is supposed to summarize the use of all money market instruments by the central bank, so it is typically a short-term rate. Finally, c_t is the central bank purchase of domestic currency in the forex market, usually approximated by the decrease in official reserves scaled by a proxy of forex market turnover. This all concerns policy of the domestic central bank. For simplicity, the foreign central bank is assumed not to try to affect the exchange rate.

The pressure-offsetting variables lead to EMP measure

$$EMP_t = \Delta s_t + w_i \tilde{i}_t + w_c \tilde{c}_t,$$

where Δ is the first-difference operator, Δs_t, $\tilde{i}_t$, and $\tilde{c}_t$ are the EMP components based on s_t, i_t and c_t, to be specified below, and w_i and w_c are the EMP weights. This measure does not depend on the sources of pressure, nor is a model of exchange rate determination needed to derive it, as Klaassen and Jager (2008) show using just a few assumptions.

Components

The presence of Δs_t is logical given the EMP definition. It has weight unity, so that indeed the EMP measure is in units of depreciation and coincides with the actual depreciation in case of a floating exchange rate regime. A zero counterfactual official forex intervention implies $\tilde{c}_t = c_t$.

The interest rate component $\tilde{i}_t$ differs across studies. The traditional choice is $\tilde{i}_t = \Delta i_t = i_t - i_{t-1}$, which can essentially be traced back to Girton and Roper (1977). It implies that during a speculative attack where the interest rate is set at, say, 100 per cent for two consecutive days, $\Delta i_t = 0$ on day two, so this EMP component would suggest there is no pressure on that day.

The underlying reason for this counterintuitive result is that in the counterfactual, as prescribed by the EMP definition, the interest rate is not i_{t-1}. The true counterfactual rate is the one the central bank would choose to achieve other targets than the exchange rate, usually domestic targets, such as inflation and output. Therefore, Klaassen and Jager (2008) introduce i_t^d as the counterfactual interest rate and $\tilde{i}_t = i_t - i_t^d$ as a component to obtain an EMP measure that is consistent with the EMP definition. A natural proxy for i_t^d is a Taylor-type rule, but in practice simply taking the foreign interest rate (possibly adjusted by the inflation differential) can be a satisfying approximation.

Weights

The weights w_i and w_c in the EMP measure above state how effective the components are in taking away pressure. The weights are assumed to be positive, but they are not observed.

One way to quantify the weights is by a structural economic model in the spirit of Girton and Roper (1977) and Weymark (1995). A popular choice is a model based on the monetary model of exchange rate determination. The advantage is that the weights have a clear economic meaning, which is useful to the extent that the specification of the model is correct.

Another popular approach is the volatility-smoothing method due to Eichengreen et al. (1996). Here a weight is estimated by the ratio of the sample standard deviation of Δs_t to that of the component involved, so that no component dominates the others in terms of volatility. These weights no longer depend on a structural model and are easier to compute, though they now reflect not only the effectiveness of the monetary policy instruments – as they should – but also how intensively the instruments are used.

See Also

- ▶ Capital Controls
- ▶ Currency Boards
- ▶ Currency Crises
- ▶ Exchange Rate Target Zones
- ▶ Nominal Exchange Rates

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