

EXCHANGE RATE EXPOSURE OF THE BANKING SECTOR BALANCE SHEET SEEN FROM THE FOREX MICROSTRUCTURE PERSPECTIVE

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The completed project includes, first, a theoretical part based upon a model of an optimizing international investor acting as an FX dealer. The results are summed up in a scientific paper. Second, there is a policy spin-off part, which exists in the form of policy recommendations (employed or under implementation in the Monetary and Statistical Department of the Czech National Bank). The said policy spin-off areas are: commercial bank risk management, banking sector supervision, and the open economy monetary policy.

The theory and the empirical findings of this model for the Czech economy are discussed in the enclosed paper *“Components of the Exchange Risk Premium in a Multiple Dealer FX Market”*. The paper was submitted to the *European Economic Review*. It introduces a model of an international investor with a forex dealer function, who operates in an imperfectly centralized forex dealership market in continuous time. The dealers have costly access to best quotes. They interpret signals from the joint dealer-customer order flow and decide upon their own quotes and trades in the inter-dealer market. The lowest ask/highest bid price of a foreign currency becomes the single transaction price in equilibrium. Each dealer uses the observed order flow to improve the subjective estimates of relevant aggregate variables, which are the sources of uncertainty.

The price information content of the local order flow observed by the dealer, has to do with the existence of “global” investors/market users in the dealer’s customer base. Global market users have access to bid-ask quotes of more than one market maker, and the latter believe that these clients’ order flow contains superior information about fundamentals. Each dealer also has a local customer base (trading with him/her exclusively). It can be said that the local market users’ order flow is the source of inventory asymmetry across dealers, whereas global market users’ order flow is the medium of fundamental information dissemination in the inter-dealer market. Other reasons for dealer asymmetry considered in the model are (a) residency, linked to different structure of returns on domestic vs. foreign assets, and (b) informational endowments, causing different dealers to perceive different statistics behind the same national asset return processes.

I obtain the formula for the dealer spread around the equilibrium price. I also show how informational dealer asymmetries generate non-stationary cumulative order flows as well as deviations of the inter-dealer transaction price from uncovered parity of national asset returns.

An important lesson coming out of the described model is that there exists a natural distinction between strategic portfolio composition reasons for the FX behavior of a major financial firm and its short-term FX actions following from adverse selection and other information asymmetry reasons. In a dynamic equilibrium, the strategic behavior consequence can be identified with the aforementioned component of the observed exchange rate movements

coming from the national asset return parity. The dealer population heterogeneity, including informational asymmetry, is manifested in the residual component, representing a deviation from parity.

From the empirical point of view, the conducted research is a follow-up of an earlier work on the uncovered national asset return parity for the exchange rate (Published as: A. Derviz “The uncovered parity properties of the Czech koruna” in the *Prague Economic Papers*, Vol. 6, No.1, pp. 17-39, 2002). The said paper mostly dealt with symmetric market-maker periods when the uncovered parity was valid. In the course of the present research, deviations from uncovered total return parity for the Czech koruna/euro exchange rate could be matched with data on received FX order flow by domestically resident dealer banks. These internal data, covering transactions with non-residents, were available to the banking supervision authorities on daily basis until the end of 2001. When applying the theoretical model to the Czech koruna, I assumed that the most prominent asymmetry among the CZK/EUR market makers was linked to their residence status. That allowed me to use the cross-border inter-bank transaction volume as a proxy for the aggregate inter-dealer order flow. Over a number of sufficiently long periods (several months), this approximation worked well in explaining the variable component of the country premium (the difference between the exchange rate return and the return differential less the regression constant) even without the need to resort to asymmetric information explanations. On the contrary, developments in the last months of 2001 suggested that, according to the model, heterogeneity of private order flow interpretations might have played a significant role in the deviations of the CZK/EUR rate from the total return parity.

Policy-relevant conclusions

1. Relevance for the commercial bank FX risk management

The results of our model concerning the structure of the exchange rate country premium indicate that commercial banks might overestimate their FX-risk if they use the “wrong” model for the forex volatility. Specifically, by neglecting the national asset return differential they are likely to overestimate the exchange rate volatility parameter that they use as inputs in the Value-at-Risk analysis, and allocate too much prudential capital to the FX risks. This may be one of the reasons of the current overcapitalization of the Czech banking sector.

Even if one applies the symmetric information version of the Generalized Total Return Parity theorem to the bank FX position, one can easily identify a component that can be hedged immediately (the yield differential). The residual volatility can be also hedged at a low cost, provided one manages to separate the component coming from the market-wide order flow in the forex. This component can be even hedged with a negative cost in the FX swap market (by selling forward the currency which, the bank assumes, the publicly unobserved global order flow is buying into).

The latter possibility is open, in particular, to big FX dealing banks with an easy access to reliable aggregate order flow information through their own client orders. The effect should be probably stronger for less heavily traded currencies, such as the Czech koruna, where the global order flow is being managed by just a few market makers. The fact that these banks stay overcapitalized with respect to the FX VaR, demonstrates that this (micro-) structural opportunity is not being fully utilized.

2. Relevance for the central bank as the banking sector regulator

Here, the said above on the FX risk management of commercial banks must be viewed from the capital adequacy requirement point of view. When evaluating the model which the supervised bank uses to determine the amount of economic capital allocated to the FX risk coverage, the regulator shall be able to recognize the above mentioned possibilities of VaR-reduction as legitimate and revise its capital adequacy requirements downwards accordingly.

3. Relevance of the central bank in the euro introduction context

When guiding the national currency safely towards the fixed peg to, and later to a full takeover of the euro, the central bank may mainly face the market challenge in the form of a global order flow going against the targeted peg. This effect cannot be effectively dealt with unless the central bank puts itself in a position where it is able to monitor all the relevant FX order flow components in its currency. Apparently, this would mean regular trading with the major market makers in the CZK/EUR segment as well as participation in the key electronic broker trades (Reuters Dealing 3000, EBS). This should help prevent the “unnoticed” parts of the global order flow from driving the exchange rate unexpectedly away from the target.

4. Relevance for the central bank as the monetary policy conductor in an open economy

The Czech National Bank, like many others, pursues the inflation targeting policy. One of the instruments of the latter is an open economy macromodel used as a framework for inflation forecasts. Since the beginning of this year, the said forecasting macromodel utilizes the Generalized Uncovered Total Return Parity ideas taken over from the presently reported research, i.e. including *the term with the global order flow prediction* made privately by the central bank. This feature of the macromodel is motivated by the assumption that the central bank of a transitional economy may at times have a superior private information on the future cross-border FX order flow. This can happen if the latter is induced by e.g., expected privatization income or officially supported green-field investment.

The said private order flow information can have at least two consequences. On the one hand, the central bank inflation forecast may be superior to that of the public, due to the prominent role that the exchange rate plays among inflation factors. On the other hand, the exchange rate expectations of major market participants can differ from that of the central bank. This is probably why the inflation targeting policy of the Czech National Bank has so far been much more successful than its efforts to influence exchange rate expectations.

According to the model that came out of the present research, the asymmetry in the perceived global order flow should lead to deviations of the exchange rate from uncovered parity. When such a deviation comes about and cannot be explained away by any of the symmetric information factors (such as a publicly observed cross-border order flow), one may infer that the information-dissemination process is subject to substantial frictions. Our results suggest that these frictions could probably be removed under a central bank policy relying on frequent forex interventions conducted through influential market makers. Although such a policy was not conducted in the past, it may become a necessity as soon as the eurozone convergence objectives move closer (cf. also Paragraph 3 above).