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Journal of Empirical Finance 13 (2006) 495 – 518

Journal of EMPIRICAL FINANCE

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Asymmetric foreign exchange risk exposure: Evidence from U.S. multinational firms

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Accepted 9 January 2006
Available online 31 July 2006

Abstract

This paper examines how U.S. multinational firms are affected by foreign currency movements. In light of detailed exchange rate data, we find that 29% of our sample of 935 U.S. firms with real operations in foreign countries is significantly affected by currency movements between 1990 and 2001. Results show moreover that U.S. stock returns react asymmetrically to currency movements. By introducing nonlinearity in foreign currency risk exposure, we noticeably increase the precision and the significance of exposure estimates. We demonstrate moreover that asymmetries are more pronounced towards large versus small currency fluctuations than over depreciation and appreciation cycles.
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JEL classification: F3; G12
Keywords: Exchange risk; Asymmetry; U.S. multinational firms; Multinational-specific exchange risk factor

1. Introduction

Since the breakdown of the Bretton Woods system of fixed exchange rates, there is increasing interest in the volatility of exchange rates and its associated risks. It is now a widely-held belief that currency movements are a major source of macro-economic uncertainty that influence the profitability and value of multinational companies. Further, with the globalization of financial markets, the internationalization of trade and the recent currency crises, foreign currency exposure –

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0927-5398/$ - see front matter © 2006 Elsevier B.V. All rights reserved.
doi:10.1016/j.jempfin.2006.01.003

defined as the sensitivity of firm value to exchange rate movements – has gained importance in business and international finance.

While analytical research consistently predicts the impact of exchange rate fluctuations on firm value (see e.g. Shapiro, 1975; Hodder, 1982; Adler and Dumas, 1984; Levi, 1994; Marston, 2001), empirical studies have not been able so far to give a clear answer on the real impact of foreign exchange rate risk. While in earlier years a consensus seemed to have emerged suggesting that exchange rate movements have no perceptible influence on stock returns (see e.g. Jorion, 1990; Bartov and Bodnar, 1994; Amihud, 1994), today, evidence in support of a significant impact of exchange rate movements on firm value (Dominguez and Tesar, 2006; Doidge et al., 2002; Dewenter et al., 2004) still confronts with inconclusive and puzzling results showing that this impact is weak and trivial (Griffin and Stulz, 2001). Interestingly, most of the studies assume that the impact of exchange rate fluctuations is symmetrical, and the sign and the size of the unexpected exchange rate shocks do not influence the resulting stock return reaction. According to Bartov and Bodnar (1994), this failure to account for the potentially asymmetric nature of currency risk exposure may explain the weak empirical findings.

There are numerous theoretical models focusing on trade flows, price formation, corporate behavior and investor sentiment showing that stock returns can be expected to respond asymmetrically to exchange rate shocks. Among them, (i) the asymmetric impact of hedging activities on cash-flows, (ii) firms' pricing-to-market strategies, (iii) their hysteretic behavior, (iv) investors' overreactions and mispricing errors, and (v) the existence of 'trigger points' at which external forces may intervene in the market are the most frequently cited arguments in favor of nonlinear currency risk exposures. While the asymmetric reaction of trade flows and prices has been empirically documented in prior literature (Baldwin and Krugman, 1989; Ohno, 1989; Knetter, 1994; Kanas, 1997; Pollard and Coughlin, 2003), the nonlinear response of stock returns to exchange rate movements has not received much attention in the exchange risk exposure literature until now. It should moreover be emphasized that the vast majority of empirical studies on nonlinear exchange risk exposure focus on the asymmetric nature of exchange risk exposure over appreciation–depreciation cycles (Choi and Prasad, 1995; Miller and Reuer, 1998; Baba and Fukao, 2000; Koutmos and Martin, 2003a; Koutmos and Knif, 2004; Tai, 2005; Priestley and Ødegaard, 2004). On the other hand, the possibility that firm value is differently affected by large versus small exchange rate fluctuations has only been analyzed by a few authors (Di Iorio and Faff, 2000; Williamson, 2001; Doidge et al., 2002; Bartram, 2004).

This paper makes several major contributions to the existing literature. First, it documents that the sensitivity of U.S. stock returns to exchange rate movements is asymmetrical as these asset returns respond differentially both to positive versus negative news from exchange rate markets and to large versus small currency shocks. In order to perform this firm-level analysis, we construct a new extensive data set consisting of 935 U.S. companies with real operations in foreign countries. The comparison of our result with previous U.S. evidence suggests that models assuming symmetric exposure are frequently misspecified and, thus, not able to detect the impact of currency movements on firm value. Finally, this study shows that the disaggregation of the worldwide trade-weighted U.S. dollar exchange rate index into six region-specific trade-weighted indices increases the precision and significance of exposure estimates.

The organization of the paper is as follows. Section 2 reviews theoretical work on the underlying reasons why firm value can be expected to be asymmetrically affected by exchange rate movements. In Section 3 the empirical methodology used to measure and test for asymmetric exposure is outlined. Data selection procedures and data sources are described in Section 4. The empirical findings follow in Section 5, with our concluding remarks in Section 6.

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