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A revisit to economic exposure of U.S. multinational corporations

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ABSTRACT

To shed light on the influence of U.S. major trade partners' currencies on MNCs' firm values, this study investigates the asymmetric effects and the determinants of appreciated and depreciated economic exposure of the U.S. MNCs. Our empirical results reveal several findings: (1) The influences of exchange rate fluctuation on stock returns vary enormously for different currencies. (2) During the U.S. dollar appreciating period, MNCs benefit very little from this appreciation against major trade partners' currencies, but most MNCs see harmful impacts from a U.S. dollar appreciation against the Brazilian real. (3) During the U.S. dollar depreciating period, most U.S. MNCs benefit from this depreciation against the European Monetary Union's euro, Mexican new peso and Brazilian real; however, they overall suffer losses against the Chinese yuan, Japanese yen, and British pound. (4) The level of foreign sales is the key determinant of economic exposure.

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1. Introduction

Starting from 1973, after the collapse of the Bretton Woods System, the world began to abandon the fixed exchange rate system and adopted floating exchange rate regimes, resulting in a substantial increase in national exchange rate volatility. When exchange rate volatility increases by a wide margin, the resulting foreign exchange exposure will have a far-reaching impact on firm value. Foreign exchange exposure refers to the possible risk of losses in the economic activities of firms holding foreign exchange, using foreign exchange, or when they are affected by the impact of industry competition due to exchange rate movements.

There are conventionally three types of foreign exchange exposure: transaction exposure, translation exposure (or accounting exposure), and economic exposure. First, transaction exposure derives from the sensitivity of realized domestic currency values of the firm's transactions denominated in foreign currencies to unexpected changes in exchange rates. Second, translation exposure refers to the potential risk that the firm's consolidated financial statements may be affected by changes in exchange rates. Third and lastly, economic exposure is defined as the extent to which the value of a company would be affected by unanticipated changes in exchange rates. For enterprises, economic exposure is the most important foreign exchange exposure among these three types. Therefore, this study focuses on economic exposure of multinational

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corporations (MNCs) and investigates the sensitivity of the firm value to changes in exchange rates. We also explore the determinants of such economic exposure.

In accordance with the financial theory, the net present value (NPV) of a time series of corporate after-tax value of future cash flows, both incoming and outgoing, is viewed through two main channels: One is the domestic value of the firm's current assets and liabilities, and the other is that of the future operating cash flows. In other words, economic exposure can be properly measured by the sensitivities of the domestic currency values of both the firm's current assets and liabilities and NPV of a series of future operating cash flows to changes in exchange rates. Thus, economic exposure includes asset/debt exposure and operational exposure.

Exchange rate fluctuations in international trades not only affect MNCs, but also domestic manufacturers with purely domestic production and sales. Due to competition between importers and domestic manufacturers, unexpected changes in exchange rates can influence firms' operating performance for both international trades and pure domestic products. Therefore, how to measure the impact of unanticipated changes in exchange rates on the firm value is a very prominent issue for both pure domestic and international trade firms.

One of the main explanations for the relationship between exchange rate volatility and firms' values is through imports and exports in international trades (Allayannis & Ofek, 2001; Chowdhury, 1993; Cushman, 1983; Franke, 1991; Giovannini, 1988; Kenen & Rodrick, 1986; Kroner & Lastrapes, 1993; Lastrapes & Koray, 1990; Pozo, 1992). For example, Allayannis and Ofek (2001) find that foreign exchange exposure is positively correlated with the degree of international trades. Since the level of the firm's participation in international trades is closely related to foreign exchange exposure, our study focuses on MNCs with available foreign sales data and examines their asymmetric effects and the determinants of economic exposure.

The majority of existing empirical evidence on foreign exchange exposure tests for a constant linear relationship between stock returns and changes in exchange rates.¹ Most previous studies on economic exposure show that United States (U.S.) MNCs, exporters, and manufacturing industries are not significantly influenced by exchange rate movements (Al-Shboul & Alison, 2009; Bartram & Bodnar, 2012; Bodnar & Gentry, 1993; He & Ng, 1998; Jorion, 1990). As noted by Bartram and Bodnar (2007), this phenomenon is the so-called "exposure puzzle." One of the plausible explanations is correlated to the use of foreign currency derivatives or balance sheet hedging, such as owning foreign assets or debt (Bartram, Brown, & Minton, 2010). Therefore, whether firms use financial derivatives or adjust the foreign currency assets and liabilities of the foreign currency they hold is essential to measure foreign exchange exposure. Bartram (2004) explains that another possible reason may result from the estimation method in linear models or the measure of a trade-weighted exchange rate index. The linear estimation method captures only the first moment exchange risk rather than second moment exchange risk. Some financial theories predict that firms' foreign exchange exposure might be beyond a purely linear relationship between corporate cash flows and changes in exchange rates (Giddy & Dufey, 1995; Ware & Winter, 1988).

In contrast with traditional linear models, the generalized autoregressive conditional heteroskedasticity (GARCH) model (Bollerslev, 1986) ponders on the clustering volatility of exchange rates and thus can improve the inadequate measure resulting from the linear models. Simultaneously, most studies in the existing literature estimate exposure coefficients by using the trade-weighted exchange rate of the various currencies making up the composition with the effect of risk diversification. Since the principal businesses of individual companies in various industry environments differ greatly, the influences of exchange rate volatilities of major counterparties on firms' values should be greater than those of the overall exchange rate index. For that reason, to measure the relationship between the individual firm value and the exchange rate volatility, major currencies of trade counterparties should be taken into consideration in the main body of economic exposure rather than just the exchange rate index.

Most studies in the earlier literature on currency exposure do not consider the asymmetric effect of exchange rate appreciation and depreciation (Allayannis & Ofek, 2001; Bodnar & Gentry, 1993; Bodnar & Wong, 2003; Choi & Prasad, 1995; Jorion, 1990). Priestley and Ødegaard (2007), based on periods of depreciation and appreciation, confirm that exposure to bilateral exchange rates is statistically and economically important to U.S. industries. Since the impact of exchange rate appreciation or depreciation on importers versus exporters exhibits contrary effects, it is worthwhile to further clarify the influences of the direction of exchange rate movement (i.e., appreciation or depreciation) on firm values when examining economic exposure. To ward off the effect of underestimating changes in exchange rates or to cancel out the effect between positive and negative foreign exchange exposure, it is necessary to take account of the asymmetric effect between depreciation and appreciation for economic exposure. For example, Booth and Rotenberg (1990) show that many Canadian natural resource firms benefit from the Canadian dollar appreciating, whereas Knetter (1994) presents that market share objectives could result in greater export price adjustments during the period of domestic currency appreciation.

Based on the above scenarios, we consider the move direction of exchange rates, the ratio of foreign sales, and derivatives hedging instruments to revisit the topic of economic exposure of U.S. MNCs. This study not only covers the trade-weighted exchange rate index, but also adopts the exchange rates between the U.S. dollar and the foreign currencies of the major international trade counterparties. To be more persuasive, in addition to using the linear model, we also employ the modified linear model and the GARCH model. From a more widespread angle versus previous studies, this paper reexamines economic exposure of U.S. MNCs.

¹ See, for example, Adler and Dumas (1984), Jorion (1990), Bodnar and Gentry (1993), He and Ng (1998), Griffin and Stulz (2001), Allayannis and Ofek (2001), Williamson (2001), Doidge, Griffin, and Williamson (2006), Bartram and Karolyi (2006), El-Masry, Abdel-Salam, and Alatraby (2007), El-Masry and Abdel-Salam (2007), and Bartram and Bodnar (2012).

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