International Review of Financial Analysis 32 (2014) 13–22

Contents lists available at ScienceDirect

International Review of Financial Analysis

No puzzle: The foreign exchange exposure of Australian firms

Dirk G. Baur *, Isaac Miyakawa

University of Technology, Sydney, Business School: Finance, Australia

ARTICLE INFO

Article history:
Received 6 August 2013
Received in revised form 15 December 2013
Accepted 19 December 2013
Available online 8 January 2014

JEL classification:
F23
F31
G15

Keywords:
FX exposure
Asymmetric exposure
Commodity currency

ABSTRACT

In this paper we analyze the constant and time-varying influence of currency movements on the value of Australian firms listed on the S&P/ASX 100 index for a period from 1980 to 2010 using daily, weekly, monthly and quarterly returns. Whilst the constant exposure model provides only weak evidence over the full sample period the time-varying exposure analysis reveals that most firms are exposed to currency movements in some periods. The exchange rate exposure of Australian firms is dependent on the appreciation or depreciation trajectory of the Australian dollar and on the sample frequencies used. The positive average FX exposure is consistent with the structure of the Australian economy, the size of the mining sector and the role of the Australian dollar as a commodity currency. Finally, we argue that our findings are fully consistent with financial theory and do not constitute a puzzle.

1. Introduction

The strong appreciations of the currencies of Australia, Brazil and Switzerland between 2009 and 2012 and the responses of Brazilian and Swiss policy makers to counter the effects of a stronger domestic currency to support the export sector have highlighted the importance of the exchange rate for firms and economies as a whole. Fixed exchange rates, on the other hand, do not provide a solution to the problem of excessive currency fluctuations as the Eurozone crisis and member states like Greece, Ireland and Spain have shown. Weaker currencies could have helped these countries to regain competitiveness and lower the adjustment costs but the structure of the Eurozone excluded the possibility to devalue the euro for these countries.

If the value of a currency has indeed an influence on the economy as a whole, a similar relationship should be present at the firm level. (e.g. see Heckman, 1985; Marston, 2001; Shapiro, 1975). However, many studies have reported only weak exposure of firms to currency changes inconsistent with the effect on the aggregate, economy-wide, level. This study aims to shed some light on this "unexpected" and "puzzling" result.

Jorion (1990) was the first to approach foreign exchange rate (FX) exposure empirically for a large sample of U.S. multinational firms and found significant FX exposure in less than six per cent of the sample firms. A study by Dukas, Fatemi, and Tavakkol (1996) finds that less than ten per cent of firms have significant FX exposure during the late 1970s and 1980s. With the exception of investigations of financial institutions (see Chamberlain, Howe, & Popper, 1997; Choi & Elyasiani, 1997), other papers report similar results and fail to identify strong FX exposure of firms (see, for example, Bodnar & Gentry, 1993; Jorion, 1991).

A common explanation for weak results was that firms' hedging decisions result in a lack of statistically significant exchange rate exposure estimates (Bartov & Bodnar, 1994; Doukas, Hall, & Lang, 2003). Bodnar and Gentry (1993) contend that FX exposure coefficients may be small for industries that do not specialize in a certain activity, such as importing or exporting, since the impact of exchange rate changes is offsetting (see also He & Ng, 1998). Alternatively, Bartov and Bodnar (1994) argue the possibility that previous studies had failed to find FX exposure evidence as 'investors make systematic errors when characterizing the relation between firm value and changes in the dollar'. The authors cite asymmetric FX exposure with respect to appreciations and depreciations and investor uncertainty leading to lagged exposure as examples of the complexities that underlie these systematic errors.[1] Another explanation is that the economic exposure of firms is dependent on the return measurement interval (Chow, Lee, & Solt, 1997). These explanations were used to rectify methodological issues. The resulting approaches include a lengthening of the return measurement interval (e.g. see Dominguez & Tesar, 2006), the inclusion of lags of the exchange rate return into the models (see, for example, Bartov & Bodnar, 1994) and investigations of the temporal instability of FX exposure (see, for example, Bodnar & Wong, 2003; Koutmos & Martin, 2007).

* Corresponding author at: P.O. Box 123, Broadway, Sydney, NSW 2007, Australia.
E-mail address: dirk.baur@uts.edu.au (D.G. Baur).

[1] See also Bartram, Brown, & Minton, 2010; Doukas et al., 2003; Fang, Lai, & Stephen, 2009; Muller & Verschoor, 2006 among many others.

1057-5219/$ – see front matter.
http://dx.doi.org/10.1016/j.irfa.2013.12.007

The first major studies that focus on the FX exposure of Australian firms are Loudon (1993) and Khoo (1994). Consistent with the findings from other markets around this time, only a small fraction of the sample firms had statistically significant exposure coefficients. Following these results were a series of investigations aimed at diagnosing the nature of Australian firms' FX exposure. A study of the effect of return frequency on FX exposure was conducted by Di Iorio and Faff (2001b), who find large increases in the number of statistically significant FX exposure coefficients as the return horizon is lengthened from one day to 50 days. This mirrors the international results reported by Dominguez and Tesar (2006) who find a similar increase in significant FX exposure coefficients over seven of the eight countries as the return interval is increased from one week to 52 weeks. Finally, Di Iorio and Faff (2001a) find evidence for both lagged FX exposure as well as time variation in Australian firms' FX exposure between 1988 and 1998.

There are many reasons for a small number of significantly exposed firms. Investors may need time to obtain and process information about firms, i.e. about the impact of exchange rate changes and hedging activities, leading to an increasing exposure for longer return intervals. Firms may not consistently hedge their FX risk[2] leading to a time-varying exposure with positive and negative exposure coefficients. If averaged over a longer sample period the exposure coefficient may indicate no exposure even though there is significant but time-varying exposure (see Agyei-Ampomah, Mazouz, & Yin, 2012). Finally, many firms do not export (import) their products to (from) only one country with one currency but diversify their exposure and trade with many countries potentially lowering the average FX exposure for each firm.[3]

If firms indeed diversify or hedge and vary that hedging activity through time, low or insignificant average firm FX exposures do not constitute an empirical "puzzle".

Indeed, the empirical results reported in this paper are consistent with an economy that consists of a mix of importing and exporting firms, MNCs, well-diversified firms and firms that dynamically hedge their exposure.

We study the FX exposure of 100 listed Australian firms and find a weak average exposure to changes in the value of the currency with the majority of firms displaying a positive exposure, i.e. if the Australian dollar appreciates (depreciates), firm values increase (decrease). The positive exposure can be explained with the fact that Australia is relatively abundant in resources and has a large mining sector rendering the Australian dollar a commodity currency (see, for example, Chen & Rogoff, 2003; Clements & Fry, 2008), i.e. commodity prices, the profits of firms in the mining sector and the value of the Australian dollar co-move.

This study contributes to the literature in several ways. First, we study the FX exposure of Australian firms to the Australian dollar–US dollar exchange rate and the trade weighted exchange rate (TWI) for a relatively long period from January 1980 to December 2010. The prominent papers that address Australian firms' time-varying FX exposure focus on time periods less than ten years (Brooks, Di Iorio, Faff, Fry, & Joymungul, 2010; Di Iorio & Faff, 2001a; Loudon, 1993). Second, we extend the Di Iorio and Faff (2001b) study of the return horizon effect by comparing the FX exposure of Australian firms when short-horizon and long-horizon returns are used over a full 30 year sample period, as well as the effect that the variation of return horizon has on the coefficient estimates in different sub-samples. Third, we analyze asymmetric FX exposure effects in Australian dollar appreciation and depreciation cycles and periods of elevated and "normal" currency volatility. Finally, we perform a qualitative analysis of the firms that are most exposed to positive and negative currency changes.

The finding of a significant cross-sectional dispersion with a small but positive exposure to FX changes of firms can be explained with the role of the Australian dollar as a commodity currency, the relatively large commodity (or mining) sector with large multinational corporations and time-varying hedging activity of the firms. Given these explanations, we conclude that there is no puzzle, that is, the empirical results are fully consistent with financial theory.

The remainder of this paper is divided into four sections. Section 1 describes the theoretical background of exchange rate exposure and outlines the econometric framework to test such exposure. Section 2 describes the data using descriptive statistics and graphs. Section 3 presents the estimation results and discusses the findings. Section 4 summarizes the paper and concludes.

2. Econometric framework and hypotheses

We follow the literature on foreign exchange exposure (see, for example, Adler & Dumas, 1984; Dominguez & Tesar, 2006) and specify a model that measures excess exposure as follows:

$$R_{i,t} = \beta_{0,i} + \beta_{1,i} R_{m,t} + \beta_{2,i} R_{FX,t} + u_{i,t} \quad (1)$$

where $R_{i,t}$ is the return on firm i at time t, $R_{m,t}$ is the return on the market portfolio, $R_{FX,t}$ is the relative change of the currency value and $u_{i,t}$ is an error term. The parameters to be estimated are β_0, β_1 and β_2 for each firm i. $\beta_{1,i}$ is firm i's market beta and $\beta_{2,i}$ is firm i's excess exposure to changes in the exchange rate. Since the model controls for changes in the market portfolio, the coefficient β_2 measures excess or marginal exposure. Dominguez and Tesar (2006) note that the Capital Asset Pricing Model (CAPM) predicts that β_2 is zero because only changes in the market portfolio should be priced, i.e. systematically related to a firm's asset price.

We use the two-factor regression model specified in Eq. (1) as our benchmark model. We also examine whether there is a lagged response of investors to exchange rate changes, i.e. we include lagged FX returns in Eq. (1). If some of the lagged coefficients are significant there is evidence that investors do react to exchange rate changes with a delay. Such a reaction would be rational if a currency fluctuates substantially on a daily basis and investors wait if the change is persistent or reversed after one or two days for example.

Finally, we analyze asymmetric FX exposure by augmenting model 1 with an interaction term as follows:

$$R_{i,t} = \beta_{0,i} + \beta_{1,i} R_{m,t} + \beta_{2,i} R_{FX,t} + \beta_{3,i} R_{FX,t} D_t + u_{i,t} \quad (2)$$

where $\beta_{3,i}$ provides estimates of an asymmetric effect depending on the dummy variable D_t. D_t is used to analyze asymmetric effects of FX exposure if the currency is in an appreciating cycle or, in a separate regression, if the currency is in a depreciating cycle.[4]

The econometric models specified above allow tests of the hypotheses that (i) Australian firms are not exposed to exchange rate changes, (ii) there is no lagged reaction of investors to exchange rate changes and (iii) there is no asymmetric behavior of FX exposure conditional on the regime the exchange rate is in.

3. The data

This section describes the sample of firms, the market index used to condition the FX exposure on market-wide effects, the USD–AUD1 exchange rate and a trade-weighted index of the Australian dollar. The sample period spans 31 years from 1980 to 2010. We use daily data for the description of the data below but also use lower frequency

[2] Hau and Rey (2006) report that only a small fraction of institutional investors hedge their FX risk.

[3] Multinational corporations are diversified across countries and currencies and should display a lower FX exposure than less-diversified firms.

[4] Agyei-Ampomah et al. (2012) use 20 time dummies (for each year) to model the time-variation of FX exposure.