J. of Multi. Fin. Manag. 27 (2014) 114–129

Contents lists available at ScienceDirect

Journal of Multinational Financial Management

journal homepage: www.elsevier.com/locate/econbase

The German humpback: Internationalization and foreign exchange hedging

Tom Aabo[a,*], Rasmus Ploeen[b,1]

[a] Aarhus University, Fuglesangs Allé 4, DK 8210 Aarhus V, Denmark
[b] Grundfos Management A/S, Poul Due Jensens Vej 7, 8850 Bjerringbro, Denmark

ARTICLE INFO

Article history:
Received 6 January 2014
Accepted 22 May 2014
Available online 4 June 2014

JEL classification:
F23
G32

Keywords:
Internationalization
Foreign exchange hedging
Diversification
Cash flow matching
Operational flexibility

ABSTRACT

Previous studies find a monotonic positive relationship between a firm's internationalization and its foreign exchange hedging. We argue that high levels of internationalization can reduce the need for foreign exchange hedging through diversification (e.g. sales to several markets) and operational hedging (matching of cash flows and operational flexibility). We employ multivariate regression analysis and find an inverse U-shape relationship ("humpback") for large listed non-financial German firms. Foreign exchange hedging activity peaks when half of sales (or long-term assets) is outside Europe. We do not find support that diversification or production facilities abroad drive our results. Our paper is the first empirical paper to document an inverse U-shape relationship between internationalization and foreign exchange hedging.

1. Introduction

Empirical studies identify a monotonic positive relationship between a firm's degree of internationalization[2] (often measured by a foreign sales ratio) and its use of foreign exchange derivatives (Allayannis and Ofek, 2001; Brown et al., 2003; Guay and Kothari, 2003). This positive relationship

* Corresponding author. Tel.: +45 8716 4839; fax: +45 8616 5394.
E-mail addresses: taa@asb.dk (T. Aabo), rploeen@grundfos.com (R. Ploeen).
[1] Tel.: +45 2466 4639.

[2] The terms internationalization and multinationality is often used interchangeably. Dunning (1973) defines a multinational firm as a firm that has production facilities in more than one country. We use the more broad term internationalization. Vahnle

http://dx.doi.org/10.1016/j.mulfin.2014.05.001
1042-444X/

makes intuitive sense since the direct foreign exchange exposure increases when a firm increases its sales to markets that use a different currency than the currency in the firm's home market (e.g. Choi and Prasad, 1995; Bodnar and Wong, 2003). However, at the same time it makes intuitive sense that for certain (high) levels of internationalization, the need for foreign exchange hedging may decrease due to diversification and operational hedging (matching of cash flows and operational flexibility). This facilitates the potential existence of an inverse U-shape relationship between internationalization and foreign exchange hedging. We empirically test such an existence and the underlying reasons.

Specifically, we investigate the relationship between internationalization and foreign exchange hedging for large German non-financial firms. German firms are especially relevant in this context because (1) Germany is the largest economy in Europe and (2) Germany is an open economy with total exports on par with the U.S. The size of the economy makes our findings economically relevant and the openness of the economy provides a relevant setting for the detection of a potential inverse U-shape relationship. New accounting standards provide us with geographical segment information in the annual reports. We use this information to go beyond a simple export ratio which would not make much sense in a German context due to the use of the Euro by many of Germany's major trading partners (e.g. France, Netherlands, and Italy). We measure internationalization by foreign sales outside Europe (and alternatively by foreign long-term assets outside Europe) and find strong support for an inverse U-shape relationship. In practical terms our findings indicate that large German non-financial firms increase their foreign exchange hedging up to the point where they have approximately half of their sales (or long-term assets) outside Europe. From that point on they tend to decrease their foreign exchange hedging. The inverse U-shape relationship is especially important for large firms and is economically significant. Thus, the median (largest) firm in term of size goes from a hedge ratio measured as the notional amount of foreign exchange derivatives divided by total sales of 1% (11%) when the firm has no sales outside Europe to 4% (33%) when the firm has half of its sales outside Europe and then again to 2% (15%) when the firm has all its sales outside Europe. Our findings are novel and contribute to the understanding of the relationship between risk management and internationalization at the firm-specific level. To the best of our knowledge, we are the first to show an inverse U-shape relationship between the extent of foreign exchange derivatives usage and internationalization.

Our study is related to Hutson and Laing (2014) who find an inverse relationship between the usage/non-usage of foreign exchange derivatives and foreign subsidiaries (number and location) in a sample of US non-financial firms. Our study distinguishes itself from Hutson and Laing in two important aspects. *First*, Hutson and Laing use a foreign exchange derivatives usage dummy. This is a crude measure that does not distinguish between e.g. a firm that has entered a single forward contract to offset a specific transaction exposure and a firm that uses foreign exchange derivatives extensively as part of a broader enterprise risk management program. We use a continuous variable to measure the extent of foreign exchange derivative usage. *Second*, Hutson and Laing investigate the inverse U-shape relationship between foreign exchange derivatives usage and internationalization only in terms of foreign subsidiaries[3] (foreign sales is a control variable). The number and distribution of foreign subsidiaries are relevant aspects of internationalization but give a partial picture of internationalization and they fail to distinguish between (1) small sales subsidiaries and large production subsidiaries and in this line of reasoning (2) subsidiaries that generate/constitute a minor versus a major part of total sales and long-term assets. We use foreign sales and foreign long-term assets ratios to measure firm-specific internationalization.

At least two arguments exist why an inverse U-shape relationship could exist. First, a firm that is international and sells its products to several markets may reduce foreign exchange risk through diversification following well-established theory (e.g. Markowitz, 1959; Sharpe, 1964; Agmon and Lessard, 1977). Second, a firm may reduce foreign exchange risk through operational hedging. This

and Ivarsson (2014) distinguish between (1) firms that are in a state of internationalization with limited geographical spread and/or coordination and (2) firms that have passed this stage and have become "globalized" with wide geographical spread and coordination of activities. Again, we use the term internationalization and encompass both "internationalized" and "globalized" firms.

[3] Hutson and Laing (2014) use three different measures related to foreign subsidiaries: the number of regions in which the firms has subsidiaries; the number of countries in which the firms has subsidiaries; and the number of foreign subsidiaries.