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Operating and Financial Hedging: Evidence from Trade

There is a large and growing literature that has modeled how real policies affect and interact with financial policies. It is important to consider such an interaction since a firm, just as a single value-maximizing agent, should make its strategic decisions optimally, taking into account all of its multi-dimensional facets (contracts with employees and suppliers, situation with market competitors, innovation, foreign-market operations and others – on the real side, and capital structure, dividend policy, IPO, hedging behavior – on the financial side). This policy brief introduces a new type of hedging exchange-rate risks through matching currencies of export revenues and import costs, and shows how it substitutes out financial hedging using currency derivatives.

Exchange-rate exposure and financial hedging around the world

Many firms are exposed to exchange-rate fluctuations in one way or the other. Because volatility is typically considered to be bad for a firm – either because small firms are risk-averse or because it may reduce the value of a risk-neutral firm through costly distress or agency costs – firms attempt to hedge it. Indeed many successfully do so. Bartram et al. (2009) report that about 60% of non-financial firms around the world use financial derivatives (forwards, futures, swaps, etc.), with the most popular type being currency derivatives (44%). These large numbers indicate the importance of risk management in general and hedging exchange-rate shocks in particular. There is also a considerable heterogeneity across countries. According to their investigation based on a subsample of world firms, currency derivative usage ranges from 6% in China and 15% in Malaysia, to 37% in the United States and 48% across Europe, to 80% in New Zealand and 88% in South Africa.

There is also some cross-sectional variation across firms. Geczy et al. (1997) report that among U.S. firms those with greater growth opportunities, tighter financial constraints, extensive foreign exchange-rate exposure and economies of scale in hedging activities are more likely to use currency derivatives.

Operational hedging

So what are potential alternatives to hedging exchange-rate exposure through currency derivatives? The literature has suggested other ways of reducing such cash-flow volatility – through operational hedges. The examples include diversifying the company's operations and production geographically (as in Allayannis et al., 2001). The authors provide an example of Schering-Plough (a United States-based pharmaceutical company) that in their 1995 annual report suggested that hedging using financial instruments was not considered cost-effective, since the company operated in many foreign countries where the currencies would not generally move in parallel. More recent studies (e.g. Kim et al., 2006; Hankins, 2011) also support the geographical diversification of production and acquisition of foreign subsidiaries as important channels of operational hedging, and as such they can act as substitutes for financial hedging.

These papers are also part of the larger literature on the interrelations between real and financial strategies, and in particular the literature that has modeled how real policies, aimed at lowering operational risks (or alternatively increasing operating flexibility), reflect in various financial decisions (such as e.g. capital structure). Examples of such policies include the use of flexible manufacturing systems that allow changing the level of output, the product mix, or the operating "mode" (as in Brennan and Schwartz, 1985; He and Pindyck, 1992; and Kulatilaka and Trigeorgis, 2004); employing a contingent workforce (e.g. part-time and seasonal labor, as in Hanka, 1998 or workers on temporary contracts, as in Kuzmina, 2014); adopting a defined contribution, rather than a defined benefit or pension plan (as in Petersen, 1994); and many others.

Trade-related operational hedges

In Kuzmina and Kuznetsova (2016), we explore a different type of operational hedging – the one arising from exporting final goods and importing intermediate inputs from abroad at the same time. As previous literature has suggested, firms that export their final goods are naturally more exposed to exchange-rate risks due to their foreign-denominated contract obligations that have to be translated into domestic currency when the transaction clears in the future, the so-called transaction exposure of companies (Glaum, 2005). As long as volatility is costly for firms, higher exchange-rate exposure leads to more financial hedging; so previous papers indeed find a positive

correlation between exporting and currency hedging (e.g. Geczy et al., 1997; He and Ng, 1998;Allayannis and Ofek, 2001).

This argument would similarly apply to firms that import their intermediate inputs from abroad, since they are similarly exposed to exchange-rate fluctuations on the cost side. In our paper, we attempt to provide new evidence on these channels, as well as to introduce a novel explanation to why not all firms hedge using financial derivatives. We show that firms that export and import at the same time hedge less using currency derivatives, and especially when volatility of exchange rate is high. We argue that when firms both export and import at the same time, their net foreign-denominated position (and thus exchange-rate exposure) becomes lower on average, and hence there is less incentive to hedge against it. This is consistent with foreign-currency matching of costs and revenues, which is a phenomenon also observable in other data. Although in our data we cannot observe currency of individual transactions for each firm, we do so in another project based on the data from Russia. Our calculations for Russian data, based on the whole universe of import and export declarations, suggest that for the major currencies, the probability of importing in the same currency is higher than in any other currency when a firm also exports in this currency. For example, out of all firms that have exports in Euro and some imports, 82% would import in Euro. The similar number for the U.S. dollar is 71%. Such trade-related operational hedge may arise naturally for firms in the global world, thus reducing their need to use financial instruments.

Germany as an interesting laboratory

To test our hypotheses, we use hand-collected data on a sample of German public firms during 2011-2014. Germany is a particularly relevant country for testing our hypotheses for at least three reasons.

First of all, it is the world's third largest exporter and importer and the top one in Europe. Second and most importantly, if we want to explore currency risk arising from exporting and importing, at least some (and preferably many) of the export and import transactions have to occur in a foreign currency. This means that, for example, looking at the U.S. data would not give us a lot of power in identifying our mechanism, since according to Goldberg and Tille (2008), only 5% of all U.S. export contracts are set in a currency other than the U.S. dollar. On the other hand, more than half of German exports and imports outside the euro area are denominated in a currency other than the Euro, and in particular about 30-40% of all contracts are set in U.S. dollars. This means that our measured shares of non-euro zone exports and imports will actually have a large component of non-euro-denominated contracts, and we will have more power to measure the actual exchange rate exposure arising from exporting and importing. Finally, we analyze the largest companies in Germany – those that trade on the Prime Standard segment of the Frankfurt Stock Exchange, since they have to disclose their use of derivatives due to the highest accounting and transparency requirements of this listing. These mandatory disclosure rules enable us to collect the data on hedging from companies' annual reports and perform the analysis.

Identification strategy and results

To start the analysis, we provide some cross-sectional correlations. We find that firms in industries with more out-of-euro-zone exporting (importing) have a higher propensity to hedge using currency derivatives. In particular, a firm in an industry with 10pp higher export (import) shares has on average a 10.5pp (28.9pp) higher probability of currency hedging.

Although many industries simultaneously export and import a lot, others have a substantial imbalance in terms of export and import shares. We are therefore interested in whether this translates into different hedging behaviors. By

adding the interaction between export and import shares in our regression specifications, we find that firms that simultaneously export and import hedge less than firms that just export or import. This is consistent with our hypothesis that firms decrease their effective exchange-rate exposure by having both revenues and costs in foreign currency and implies that operational hedging through matched currencies is a substitute for financial hedging.

In order to strengthen the result, we complement our cross-sectional correlations with a difference-in-differences methodology. To do this, we compare firms in industries with higher and lower out-of-euro-zone export and import shares during times of higher and lower exchange-rate volatility. We find that the higher the exchange-rate volatility, the larger this substitution effect is. This finding is stronger than a simple cross-sectional correlation between exporting, importing and hedging (which can be driven by omitted factors), since it uses an arguably exogenous volatility shock to show that operational hedging substitutes for financial hedging precisely during times when firms have highest incentives to hedge. The results are robust to using a set of control variables and firm and year fixed effects.

Implications

From an applied perspective, the interrelation between operational and financial strategies of the firm suggests that the decisions of the CEO and CFO should be complementary to each other to achieve the value-maximization goal of the firm. From a policy perspective, they imply that exogenous changes in government policies aimed at certain organizational changes in the firm (e.g. export promotion policies) could have indirect consequences for their riskiness and financing decisions.

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