



Offshore activities and financial vs operational hedging ☆

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Abstract

A key question is why many multinational firms forgo foreign exchange derivative (FX) hedging and instead use operational hedging. We propose an explanation based on illiquidity and the unique advantages of operational hedges. We use 10-K filings to construct dynamically updated text-based measures of the offshore sale of output, purchase of input, and ownership of assets. We find that firms use FX derivatives when they are liquid and generally available. Otherwise, they often favor purchasing input from the same nations they sell output to, an operational hedge. Quasi-natural experiments based on new derivative product launches suggest a likely causal relation.

Introduction

Existing research has a difficult time explaining why many firms with global activities do not hedge using foreign exchange derivatives. For example, Guay and Kothari (2003) state “corporate derivatives use appears to be a small piece of non-financial firms’ overall risk profile. This suggests a need to rethink past empirical research showing the importance of firms’ derivative use.” Because unwanted risk can expose firms to additional distress costs, financial constraints, or underinvestment,¹ most firms do have incentives to hedge. This paper suggests that foreign exchange derivative hedging (henceforth FX hedging) is not used in some cases due to illiquidity costs, and because a novel form of operational hedging might be more attractive. In particular, we show that firms can hedge using operations by ramping up purchases of production inputs from the same nations they sell their output to. This novel form of operational hedging is economically important, is a key focus of our paper, and has not been discussed in the existing literature.

Our paper highlights the importance of operational hedges when standard FX derivatives are illiquid. We find that many derivatives are illiquid or are not even exchange-traded during our sample period from 1997 to 2011. Material illiquidity can create frictions in the decision to hedge. The literature also suggests that FX derivatives might not work well for long-term projects (Kim et al., 2006), or that they are less effective when demand uncertainty (quantity risk) is high (Chowdhry and Howe, 1998).² The literature also suggests that

dynamic hedging, which uses exotic derivatives and high frequency rebalancing, can hedge both price and quantity risk (Kroner, Sultan, 1993, Brown, 2001, Brown, Toft, 2002). We show that operational hedging is likely most effective when both static and dynamic FX hedging are less effective or are too costly. For example, we find that operational hedging is more prevalent in subsamples in which the net benefits of operational hedging are particularly high. In all, our evidence is consistent with firms using both FX derivatives and operational hedging in a broader “portfolio approach” to risk management, as each tool can be more or less ideal in different markets.

Consistent with our empirical framework, the theoretical model in Tuzel and Zhang (2017) predicts that the overseas sale of output generates pro-cyclical risk exposure, and the purchase of input from the same nations is counter-cyclical and is a hedge.³ Hoberg and Moon (2014) find supporting evidence as firms selling output abroad have higher expected returns, consistent with exposure, and firms buying input abroad have lower expected returns, consistent with hedging properties.⁴ These studies motivate our central hypothesis: in markets in which FX hedges are illiquid or less effective, firms will consider operational hedging as a strong substitute. We also note that operational hedging does not preclude offshoring for other economic reasons (e.g., tapping low cost inputs or labor). Rather, on the margin, our results suggest that the benefits of operational hedging also contribute to a firm’s decision making process.

The intuition regarding the operational hedge is exemplified by BMW in a recent article:

BMW took a two-pronged approach to managing its foreign exchange exposure. One strategy was to use a “natural hedge” – meaning it would develop ways to spend money in the same currency as where sales were taking place, meaning revenues would also be in the local currency. However, not all exposure could be offset in this way, so BMW decided it would also use formal financial hedges. [. . .] The natural hedge strategy was implemented in two ways. The first involved establishing factories in the markets in which it sold its products; the second involved making more purchases denominated in the currencies of its main markets. (*Financial Times*).⁵

BMW’s example shows that the company views (A) purchasing inputs, and (B) operating plants in nations in which sales are realized as valid operational hedges. These strategies are complementary to (C) the use of FX derivatives. Our study suggests that (A) is the more effective of the two operational hedging strategies. However, we find some evidence that (A) is more cost effective when it is done alongside (B),⁶ as is the case for BMW. In particular, using both together can minimize transportation cost while maximizing hedging benefits.

We employ three different empirical settings to examine the link between FX hedging and the use of purchasing inputs as an operational hedge. First, we consider a measure of FX derivative market liquidity based on exchange trading. We find that operational hedging strategies increase when liquidity deteriorates. Second, we consider a measure of the efficacy of FX hedging given that demand uncertainty is heterogeneous across nations. We find that operational hedging increases when FX hedging efficacy decreases. Although we include numerous controls and rigid fixed effects to mitigate the impact of omitted variables, these initial tests do not fully establish causality. Hence, we consider quasi-natural experiments based on shocks to FX hedging liquidity following new derivative product launches by the Chicago Mercantile Exchange (CME). Our results uniformly support the conclusion that improved FX derivative liquidity likely causes substitutions away from operational hedging and toward FX hedging, and these hedges are indeed partial substitutes. These results are also stronger in subsamples in which hedging incentives are stronger.

Because the purchase of input from offshore sources not only serves as a hedge, but also entails economic activity with its own net present value, it is natural to ask whether our results are due to this non-hedging motive. There are two reasons why the hedging channel is more likely. First, we predict and find that only offshore input that is not bundled with the ownership of assets (external input) is strongly negatively related to both FX derivative liquidity and efficacy. The hedging motive predicts that these results will be weaker when offshore input is bundled with ownership of producing assets (internal input). The cost-saving motive predicts that both forms of offshore input, with and without ownership of assets, should be positively linked to FX liquidity, as economic activity should associate with improved liquidity. We instead find the negative link predicted by the hedging explanation, and we further confirm that this link only obtains for the most effective operational hedge (external input). Second, we find strong results in our main difference-in-differences (DD) test using quasi-natural experiments, in which only the cost of FX hedging is shocked.

Our quasi-natural experiments consider a DD approach that examines the use of operational hedging before and after the launch of new FX derivatives by the CME. These tests are discriminating because only a subset of nations are affected by the launch of each new product, and because these new product launches occur on four distinct dates: 1999, 2002, 2006, and 2009. We find the predicted result that improved liquidity and availability of FX derivatives resulted in a decrease in the use of operational hedging. The economic magnitudes of the estimated DD effects are significant: new CME product launches decrease the likelihood of external input by treated firms to the affected nations by 0.7–0.8 percentage points, which is an economically large 10% drop from the average level of external input in the affected nations prior to the shocks. At the same time, textual mentions of FX derivatives by treated firms increase by 15.6–17.1%, which translates as an approximately 0.2 more textual paragraphs. These findings support the conclusion that the link between FX hedging liquidity and the use of operational hedging is likely causal.

Our DD approach has two limitations. First, the launch of FX derivative products might coincide with a latent economic shock that causes the CME product launch, and at the same time, *reduces* the incentive to participate in offshore activities. We note that such a shock is unlikely to explain our findings, however, as new FX products are more likely to be launched when there is *more* (not less) incentive to do business with treated nations. Also less consistent with this alternative is that we specifically find less offshore purchase of input from treated nations when it is not bundled with producing assets, which is the activity most directly predicted to diminish under the operational hedging hypothesis. The second limitation is that the majority of corporate FX derivative contracts are traded in over-the-counter (OTC) markets, and not on the CME. Hence, it was possible to buy FX derivatives before the launch of the new CME products. However, this limitation is offset by the fact that visible trading of contracts on the CME, plus the possibility of profitable cross-market arbitrage, should create direct liquidity spillovers for the OTC markets.⁷ Moreover, if trading on the CME was irrelevant, then we should find no empirical results, and yet we find strong results.

Our paper makes several contributions. First, we present new operational hedging hypotheses where firms purchase input from the same nations they sell their output to. Our focus on the distinction between external versus internal input, notably, is not developed in the literature. Second, we use computational linguistic methods to identify FX hedging and offshore activities using a time-varying firm-nation-year network. This network, which should be useful to a broader set of research questions, identifies three types of offshoring activities (the sale of output and the purchase of input with and without ownership of assets) to more than 200 nations in each year from 1997 to 2011. Third, we present strong evidence supporting the hypothesized role of operational hedging using strict firm and nation fixed effects, and quasi-natural experiments.

Section snippets

Literature and hypotheses

Many early studies examine the value of corporate hedging in general.⁸ Other studies focus on measuring the extent of currency risk exposure, and then assess the effectiveness of FX hedging.⁹...

Data and variables

We collect and electronically process offshoring data and financial hedging data from the Securities and Exchange Commission (SEC) EDGAR 10-K filings. We utilize software provided by metaHeuristica LLC for parsing the text documents.¹⁴...

FX hedging cost and efficacy and offshore policies

In this section, we consider measures of the liquidity and efficacy of FX derivatives. We then present descriptive information. Our measure of FX liquidity is based on the currency market, as we expect the liquidity of the corresponding FX derivative market to be related to the liquidity of the currency itself.²²...

Operational hedging vs financial hedging

In this section, we examine the economic link between the illiquidity or the efficacy of FX hedging and the use of offshore external input. If the sale of offshore output generates exposure to stochastic foreign revenue, firms with offshore sales have incentives to hedge. If FX derivative instruments are less costly or more effective as hedges, then we would expect that firms will be more likely to use FX hedging. In contrast, firms will substitute toward operational hedging if FX derivatives...

Launch of new FX derivative products

In this section, we consider quasi-natural experiments to explore a potential causal relation between hedging costs and the decision to use FX versus operational hedging. Our experiments are based on a series of CME launches of new FX derivative products. These events are staggered in time and well-suited for our panel structure based on firm-nation-year observations. In particular, only the specific nations treated with the launch of the new currency derivatives should be materially affected...

Conclusion

We propose a novel operational hedging mechanism in which firms hedge FX cash flow exposures by purchasing inputs from the same nations in which they sell output. This hedge is particularly strong when firms do not bundle input purchases with ownership of producing assets, which can be pro-cyclical. We examine this mechanism using a dynamic firm-nation-year network that characterizes each firm's offshore activities with all nations in three categories: sale of output, purchase of input, and the ...

WongF.

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D. Nance *et al.*

On the determinants of corporate hedging

Journal of Finance (1993)

K. Kroner *et al.*

Time-varying distributions and dynamic hedging with foreign currency futures

Journal of Financial and Quantitative Analysis (1993)

Y. Kim *et al.*

Is operational hedging a substitute for or a complement to financial hedging?

Journal of Corporate Finance (2006)

P. Jorion

The exchange-rate exposure of U.S. multinationals

Journal of Business (1990)

W. Guay *et al.*

How much do firms hedge with derivatives?

Journal of Financial Economics (2003)

D. Garcia *et al.*

Geographic dispersion and stock returns

Journal of Financial Economics (2012)

K. Dominguez *et al.*

Exchange rate exposure

Journal of International Economics (2006)

K. Dewenter *et al.*

Can event study methods solve the currency exposure puzzle?

Pacific-Basin Finance Journal (2005)

ChanK. *et al.*

Global financial markets and the risk premium on US equity

Journal of Financial Economics (1992)



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