Offshore Activities and Financial vs Operational Hedging

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ABSTRACT

A key question is why many globally active firms forgo foreign exchange hedging despite its low costs. We propose an explanation based on incomplete hedging markets that further suggests that operational hedging is often a more effective hedge. We use 10-K filings to construct text-based measures of financial hedging and three offshore activities: the sale of output, the purchase of input, and the ownership of assets that produce input. We find that firms do use foreign exchange hedging when it is effective as a hedge against both foreign price risk and demand shocks (quantity risk). Otherwise, firms purchase input from the same nations they sell output to, a highly effective operational hedge. A series of natural experiments based on the introduction of new currency instruments confirms a likely causal relationship.

1 Introduction

Existing research has a difficult time explaining why many firms with global activities do not hedge using foreign exchange derivatives despite the fact that it is relatively inexpensive. Because unwanted risk can expose firms to potential distress, force them to issue securities at times of poor liquidity, or force them to postpone investments or reduce payouts, most firms have incentives to hedge.[1] This question is made more salient by recent evidence in Hoberg and Moon (2014) (henceforth HM) suggesting that investors demand risk premia when firms sell their output overseas to high consumption risk nations. In this paper, we consider the decision to hedge from the manager's perspective. We find that foreign exchange hedging (henceforth FX hedging) may not be used in many cases because it is not an effective hedge, and in these cases, operational hedging is a strong substitute.

A key tension surrounding the decision to hedge is incomplete hedging markets. Firms that sell output overseas are not only exposed to currency or price risk, but also to quantity risk in the form of potentially systematic demand shocks in the nations they sell to. For example, a large negative shock to consumption in target nations should translate to a negative demand shock for the U.S. firms selling output to the given nation. The link between demand shocks and shocks to consumption growth is strong, as the output the firm sells to the target nation is likely consumed there, either directly or through intermediate input to more finished products. FX hedging alone might be ineffective because consumption growth in the given nation might not correlate with exchange rates. In all, firms face both foreign exchange price risk and consumption quantity risk when they sell goods abroad, and face incomplete hedging markets because FX hedges are often only effective regarding the former.

Operational hedges come closer to completing this market. HM show that the purchase of input (when it is not bundled with the ownership of producing assets) is an effective hedge

[1]See Smith and Stulz (1985) for related details. One might argue that ultra-large and successful firms like Google or General Electric are exempt from this concern due to their extraordinary liquidity. We note, however, that the average firm in our sample is the average firm in the Compustat Universe, and such ultra-liquid firms are likely the exception.

against consumption growth risk. Hence, in markets where FX hedges have poor efficacy, the use of operational hedges (such as the purchase of input from the same nations a firm sells output to) is a strong substitute. For example, proceeds from the sale of output can be used to directly purchase input in the same nation. This (A) foregoes the need to convert the foreign currency to dollars and (B) also reduces the exposure to consumption growth risk because the purchase of input is counter-cyclical as documented in HM. Unlike FX derivatives, the operational hedge thus has the potential to neutralize both price risk and quantity risk.

We measure the efficacy of FX hedging by computing the R^2 of a regression of each nation's consumption growth on innovations in the same nation's exchange rates. A nation with a low R^2 lacks high quality FX hedging instruments, and firms engaged in offshore sales to such a nation have a strong incentive to consider operational hedges. We find that the R^2 varies strongly across nations. Among firms that engage in the offshore sale of output, firms are more likely to use financial hedging when the efficacy of FX derivatives as a hedge against consumption risk is higher (higher R^2). However, they are less likely to use financial hedging and are more likely to use operational hedging when the efficacy of FX hedging is poor. The central form of operational hedging we focus on is the purchase of input from the same nation where a firm sells output.

Because the purchase of input from offshore sources not only serves as a hedge, but also entails economic activity that has its own net present value, it is natural to ask whether the link we identify between FX hedging efficacy and the offshore purchase of input is due to this link instead of the operational hedging channel. There are two reasons why we reject this explanation. First, as we will discuss later, we consider difference-in-difference natural experiments where only the efficacy of FX hedging is shocked, and find strong results. Second, we note that the purchase of offshore input actually comes in two forms: (A) the purchase of input without ownership of producing assets, and (B) the purchase of input bundled with the ownership of producing assets. If the large shifts in the use of offshore input we find are due to economic incentives relating to the profitability of buying input abroad, we would

expect that both (A) and (B) should decrease when the efficacy of FX hedging increases. However, we find that (B) is not statistically linked to FX hedging efficacy, and in contrast, (A) is strongly negatively linked. Because HM document that only activity (A) is effective as a hedge, this finding is strongly consistent only with the hedging channel.

In all, our evidence is consistent with a causal role of FX hedging efficacy on the choice to use operational hedging policies. Despite the fact that our study benefits from direct measurement of highly specific activities, which improves identification, fully establishing causality in this international environment is difficult. Endogeneity concerns come in two forms: potential reverse causality and potential omitted variables. We first note that our key independent variable, the R^2 of nation-specific regressions of consumption growth on changes in FX rates, is measured using deeply lagged data. As a result, it is highly unlikely that reverse causality can explain our results, as that would require that offshoring activity after 1997 causes hedging efficacy in the 1970s and 1980s.

However, a host of omitted variables might endogenously explain both a low R^2 and also the purchase of offshore input, giving rise to more salient endogeneity concerns through the omitted variables channel. We consider three issues to address this concern: (1) controls for variables that are likely related to hedging efficacy and offshoring, (2) the use of both nation and firm fixed effects to fully rule out national characteristics and firm characteristics as omitted variables, and (3) quasi-natural experiments based on the launch of new FX derivative products. Regarding controls, we consider GDP levels, GNP per capita, distance from the U.S., political stability, a measure of the rule of law, and a measure of corruption.

The most convincing evidence against omitted variables is produced by our quasi-natural experiments. We consider a difference-in-difference methodology that examines the use of operational hedging before and after the launch of new FX derivative products on the floor of the Chicago Mercantile Exchange (CME). These tests are particularly discriminating because only specific nations are affected by the launch of each new product, and also because these new product launches occur on four distinct dates: 1999, 2002, 2006, and 2009. Moreover, we consider two types of new product launches: (1) the introduction of FX

derivatives for medium sized nations for which such contracts were not previously traded, and (2) the introduction of more liquid FX contracts with smaller denominations that resulted in improved liquidity due to trading from a larger set of agents. In all cases, we find that the introduction of the new products for the treated nations resulted in a decrease in the use of operational hedging.

Our difference-in-difference approach has two limitations. First, it is possible that the launch of these new FX derivative products associates with a latent economic shock that both causes the CME to launch the new products, and at the same time *reduces* the incentives to participate in offshore activities. We note that such a shock is highly unlikely, as it would seem more likely that new FX products would be launched when there is *more* (not less) demand for offshore activities with the treated nations. The second limitation relates to the fact that the majority of FX derivatives are traded over the counter and not on the CME. Hence, it was possible to do FX hedging using OTC contracts even before the launch of the new CME products. We note that this limitation is mitigated because the visible trading of contracts on the CME likely had material spillover effects onto the OTC markets due to the price transparency and cross market arbitrage this liquid trading entails. These OTC benefits are in addition to the direct benefits of trading on the CME itself. Furthermore, if trading on the CME was irrelevant, then we should not find any link to offshore activity. As we find strong results, we conclude that the improved efficacy of financial hedging likely causes substitutions away from operational hedging and toward FX hedging. This can jointly explain why some firms might not participate in FX hedging despite its low cost, and why many firms appear to use operational hedging.

In all, our paper makes several contributions. First, we present novel hypotheses regarding the use of operational hedging through the channel of offshore input that is done without the ownership of producing assets. Second, we illustrate how text analytic methods can be used to identify highly specialized activities associated with FX hedging and offshore activities using an extensive time-varying network of offshoring activities with over 200 nations, which has many additional research applications. This network, also used in HM, identifies

three types of offshoring activities (the sale of output, the purchase of input without ownership of assets, and the purchase of input with the ownership of assets) to more than 200 nations over a period extending from 1997 to 2011. Third, we present robust econometric results supporting the role of operational hedging through highly specialized associations in the data and also through strict controls and natural experiments.

The remainder of this paper proceeds as follows. In Section 2, we summarize the existing literature and discuss our key hypotheses. Section 3 describes our offshore data and financial hedging data in details. Section 4 presents descriptive statistics on our measures of hedging efficacy and offshore input activities. Section 5 presents our results on the link between hedging efficacy and financial vs. operational hedging decisions. In Section 6, we discuss our natural experiments using the CME's launching events of new FX derivative products and present the difference-in-differences estimations. Section 7 concludes.

2 Literature and Hypotheses

2.1 Foreign Exchange Risk and Hedging

Many existing studies examine whether corporate hedging activities can enhance firm value. See for example Smith and Stulz (1985), Froot, Scharfstein, and Stein (1993), DeMarzo and Duffie (1995), Haushalter (2000) and Graham and Rogers (2002) among others. In international finance, many earlier studies focus on measuring firm exposure to foreign exchange risk (Jorion (1990), Amihud (1994), and Bartov and Bodnar (1994)) based on international theories that predict that foreign exchange risk might be priced (see Solnik (1974), Solnik (1977), Stulz (1981), Adler and Dumas (1983), and Dumas and Solnik (1995)), and examining the effect of financial hedging on foreign exchange risk exposure. Geczy, Minton, and Schrand (1997) examine the use of currency derivatives and find that firms with greater foreign exchange-rate exposure are more likely to use currency derivatives. Allayannis and Ofek (2001) examine whether firms use currency derivatives either for hedging or for speculative purpose with a sample of S&P 500 non-financial firms, and suggest that the use of such

derivatives reduces exchange-rate risk that those firms with foreign sales might face. Allayannis and Weston (2001) find a positive relation between firm value and the use of foreign currency derivatives with a sample of large U.S. non financial firms in early 1990's. Brown (2001) finds that informational asymmetries, facilitation of international contracting, and competitive pricing concerns motivate financial hedging by examining the foreign exchange risk management programs at a single large multinational corporation in detail.

Allayannis, Ihrig, and Weston (2001), Pantzalis, Simkins, and Laux (2001) and Kim, Mathur, and Nam (2006) further expand the scope of FX hedging activities by comparing financial hedging and operational hedging. Allayannis, Ihrig, and Weston (2001) find that operational hedging is not an effective substitute for financial risk management, and increases firm value only when used in combination with financial hedging. In contrast, Pantzalis, Simkins, and Laux (2001) find that operational hedges are significant determinants of exchange rate risk for multinational corporations. Kim, Mathur, and Nam (2006) find that operational hedging can be effective in managing long-term exposure, while financial hedging can be effective for managing short-term exposure. Overall, the previous studies do not document substitution between financial hedging and operational hedging strategies.

Although these studies have made considerable headway in understanding firm decisions regarding financial hedging and operational hedging strategies, operational hedging has generally received little attention in the literature and is less well-understood. This is likely due in part to data limitations. We also note that some earlier studies define operational hedging as geographic dispersion in operations. This is distinct from the operational hedging we focus on, which is the decision to buy input from the same nation where a firm sells output. Hence, our study also expands the debate regarding the types of operational hedges that might be available to firms.

Our paper overcomes data limitations in the literature because we are able to measure offshoring activities at the firm level for multiple types of offshoring activities, and we can separately measure these activities in each year. This process, which is based on text analytics of 10-Ks, creates a rich time-varying network of offshoring activities for each firm.

Therefore, our empirical analysis can assess operational hedging in greater detail than in previous studies. Also, we are able to link theoretical predictions only to specific forms of offshoring activities and not to others, which improves our ability to test alternatives. We also use shocks to the liquidity of existing FX hedges as a quasi-natural experiment, which allows us to uniquely identify changes in offshoring activities that are uniquely related to the costs of hedging.

Also relevant to our study are the theoretical works relating to offshoring decisions. Some studies explore optimal firm organization in the international context based on incomplete contracting and the property-rights theory of firm boundaries (Spencer (2005) and Helpman (2006) provide surveys of this literature). Other studies view offshoring as trade in tasks, and seek to identify the characteristics of tasks that are good for offshoring (See Autor, Levy, and Murnane (2003), Antras, Garicano, and Rossi-Hansberg (2006), and Grossman and Rossi-Hansberg (2008)). However, little has been established empirically.

Regarding offshoring input, recent work by Moon and Phillips (2013) examines U.S. manufacturing firms' outsourcing decisions (both domestic and international) and their implications on financing decisions using purchase obligations data from firm 10-K filings. Many studies also consider industry-level outsourcing based on survey data. For links to firm innovation or financial performance, for example, see Kotabe (1990), and Kotabe and Murray (1999). For links to labor markets, see Feenstra and Hanson (1999) and Bergin, Feenstra, and Hanson (2007). Other studies consider plant-level or aggregate-level data from the Census Bureau and the Bureau of Economic Analysis. For example, see Bernard, Jensen, Redding, and Schott (2007) and Bernard, Jensen, and Schott (2009) for excellent reviews of this literature. Yet, no studies to our knowledge use firms' own disclosure about their offshoring activities to address financial and operational hedging motives.

2.2 Hypotheses

A stylized way to view the intuition of our paper is that a firm selling goods overseas is exposed to risks inherent to the revenues generated by overseas sales, which can be written

as $P \cdot Q$, where P is price and Q is quantity sold. The existing literature focuses on FX hedging, which directly hedges risk inherent to P (currency exchange rates should account for inflation and shocks to national price levels). Because any link between FX derivatives and quantity risk is not direct, these derivatives might or might not be an effective hedge against variation in Q. The first issue we focus on is that the existence of Q-risk, and the potential low efficacy of FX derivatives in hedging Q-risk, likely explain at least in part why many firms do not hedge using FX derivatives despite the low costs of doing so. In particular, this is because the market is incomplete regarding the ability to hedge Q-risk, an issue that receives little attention in the existing literature, which focuses on P-risk.

Our focus on Q-risk in this article is in part motivated by HM, who find that exposure to consumption growth risk (an important form of Q-risk) is likely priced by investors, and hence is likely difficult to diversify. Before we consider operational hedging, the initial prediction is that firms will use FX derivatives aggressively when they sell output to nations for which FX derivatives are effective as hedges against Q-risk (this argument takes it as given that they are relatively effective with respect to P-risk). Firms are more likely to eschew FX derivative hedging otherwise.

Hypothesis 1: *Firms will use more FX hedging when the efficacy of this FX hedge against consumption risk (an important form Q-risk) is strong.*

Our illustration is easily extended to explain when operational hedging can be more effective. If we assume that input costs are variable for simplicity, then by purchasing input from a target nation, a firm's overall exposure to the given nation becomes $PQ - \alpha PQ$, where α is the rate of variable cost.[2] This expression simplifies to $(1 - \alpha)PQ$, which is a smaller risk exposure than PQ (the exposure of a firm that does not purchase input in the target nation) whenever variable costs are positive ($\alpha > 0$). We further note that these expressions give that the purchase of input from the target nation (the operational hedge) is effective as a hedge against both P-risk and Q-risk, as higher α linearly scales down total exposure.

[2]We note that this requires the simplifying assumption that price levels of input and output are fully correlated. We note that in practice, some residual (likely idiosyncratic) risk will remain unhedged, and make this simplifying assumption only for illustrative purposes.

Hence, operational hedging through the purchase of input can complete the market, and motivates our second hypothesis.[3]

Hypothesis 2: *Firms will eschew FX hedging when its efficacy is poor, and instead, they will use operational hedging in the form of purchasing input from the same target nations they sell output to.*

We note that H2 specifically relates to external input (the purchase of input abroad without the simultaneous ownership of assets). The hedging efficacy of offshore input is based on the prediction that the cost of buying input in a nation is likely to be counter-cyclical. This is expected due to the high marginal utility that citizens in the target nation would face in bad times. In such times, employees should be willing to work for lower wages, and the cost of raw materials needed for input should be also lower due to reduced domestic demand. These predictions are supported by the production-based equilibrium model in Tuzel and Zhang (2013). HM provide strong supporting evidence that *offshore external input* is indeed associated with a negative risk premium.

The model in Tuzel and Zhang (2013), also with empirical support in HM, further suggests that purchasing input should be less counter-cyclical if the firm bundles this activity with the ownership of assets. In particular, the value of the assets themselves is likely to be pro-cyclical, counterbalancing the counter-cyclical nature of purchasing input. This leads to our final hypothesis.

Hypothesis 3: *The predicted link between FX hedging and offshore external input in Hypothesis 2 does not extend to offshore internal input (the purchase of input bundled with the ownership of assets), which is not a robust operational hedge for consumption risk.*

[3]It is natural to view the fact that operational hedging can only be scaled to the factor $(1-\alpha)$ of the total exposure as a potential limitation of operational hedging. We note that this limit is, in fact, fictitious. A firm can fully neutralize its risk exposure using operational hedging by purchasing more input from the target nation than it needs to produce its own output. For example, by purchasing $\frac{\alpha}{1-\alpha}PQ$ in additional excess input, its risk exposure to the target nation would be reduced to zero. Hence, a more extreme form of operational hedging would entail purchasing more input than is needed, and re-selling this excess input to domestic buyers. This example might seem extreme, but we note that many firms espouse vertical integration, and we make this point to illustrate that the operational hedge not only completes the market, but it can also be scaled.

Comparing Hypothesis 2 and Hypothesis 3 not only bears relevance due to the theoretical arguments raised by Tuzel and Zhang (2013). These predictions are also relevant because they disagree with the predictions of an important alternative hypothesis. The alternative is that any changes we might observe in the use of offshoring input are potentially driven by economic incentives relating to the profitability of acquiring input at lower costs (and not by hedging incentives). Importantly, this alternative does not distinguish strongly between external and internal input. Hence, this alternative likely predicts that both forms of offshoring input (external and internal) should be related to our key variables in a positive and significant way. In contrast, the hedging theory predicts that only external input will be positively related to incentives to hedge.

We therefore note that the hedging motives provide a sharp set of predictions overall that are likely separable from alternatives. Yet we also go beyond these predictions and consider natural experiments. We find strong support for our three hypotheses.

3 Data and Variables

We collect and electronically process offshoring data and financial hedging data from the SEC's Edgar 10-K filings. We utilize software provided by metaHeuristica LLC for parsing the text documents. We then merge the database with the Compustat data using the SEC Analytics table for CIK to gvkey links. Our sample period covers from 1997 to 2011, as 1997 is the first year of full electronic coverage of 10-K filings in the SEC Edgar database. We apply a number of basic screens to ensure that our analysis covers firms that are non-trivial publicly traded firms in the given year. We also discard firms with a missing SIC code or a SIC code in the range of 6000 to 6999 to exclude financial firms. We also require that each firm has a valid link from the 10-K CIK to the Compustat data.[4]

In the remainder of this section, we first describe our offshoring data in detail, including

[4]Our paper contributes to a growing literature that considers text-based analysis to test theoretical hypotheses in Finance. Early financial studies using text include Antweiler and Frank (2004) and Tetlock (2007). Regarding SEC disclosures, earlier work includes Hanley and Hoberg (2010), Hoberg and Phillips (2010a), Loughran and McDonald (2011) and Garcia and Norli (2012). See Sebastiani (2002) for a review of text analytic methods.

how we construct our lists of *nation words* and *offshoring words* to identify each firm's offshoring activities from its 10-K. Then, we discuss how we create our financial hedging data by identifying each firm's use of currency derivative products from its 10K.

3.1 Offshoring Data and Variables

We first compile a complete list of *nation words* for 236 nations and 25 regions, considering variations that include official and non-official nation names, and their adjective forms. Then, we create another extensive list of the nearest neighbor words that co-exist with *nation words* from 10-K filings in the base-year 1997. Nearest neighbor words are those that occur within a 25 word window of any of the nation words. We then manually categorize all roughly 5,000 nearest neighbor words that are mentioned more than 100 times, in order to determine whether the word refers to any of the following offshoring activities: A) Output, B) External input, C) Internal input, and D) Indeterminate input. For example,"Sell", "Sales", "Revenues", "Markets", "Consumers", "Store", "Export" and "Distribute" are regarded as A) Output. "Supplier", "Vendor", "Subcontract", "Import" and "Purchase & From" are regarded as B) External input. C) Internal input include "Subsidiary", "Facility", "Plant", "Venture", "Factory" and "Warehouse" for example. Finally, some input words that are not explicitly identified as either external input or internal input such as "Manufacture" and "Produce" are regarded as D) Indeterminate input, as the subject of the paragraph is not clear in these cases. We refer to the full list as *offshore words* throughout the paper. In Appendix 1, we report the complete list of words for each activity.

We then reexamine all 10-K filings in the base-year 1997 and extract all paragraphs that contain words from both lists: (*nation words* and *offshore words*). Our approach to extract paragraphs instead of sentences intends to reduce false negatives. This choice is due to the fact that many firms discuss their offshoring activities over several sentences, and hence just one sentence often misses pairings of *nation words* and *offshore words*. Our paragraph approach may generate false positives. To address this issue, we set a maximum distance between *nation words* and *offshore words* at 25 words, and drop hits when the two words

are more than 25 words apart even if they are in the same paragraph.[5]

For our 1997 database of hits, we then assess success rates based on whether each hit correctly identifies one of the four offshoring activities. Manual validation reveals that our success rate ranges from 75% to 90%. As an additional quality check, we examine paragraphs that contain *nation words* but no *offshore words*, and confirm that nearest neighbor words associated with *nation words* in these cases are not related to offshoring. For example, such unrelated discussions might mention words such as "University", "Patent", "Carry-forwards", "Airlines" and "Court".

Our final step is to run our final methodology for all 10K filings from 1997 to 2011. This generates a full panel of offshoring data of 293,050 observations with the raw counts of how many times a given firm mentions any of the four offshoring activities in each nation. Our final sample is then reduced to 212,613 observations where we observe non-zero offshore output activity (offshore output is the sale of output to the given nation-year of the observation). We focus on this reduced sample of offshore output activity because we are interested in examining how firms hedge the risk that their offshore sales might expose them to, and hence these are the observations that entail a material hedging decision. We provide more details regarding offshoring statistics in the next section.

In our tests, we focus on the following three offshoring variables: *External Input Dummy*, *Internal Input Dummy*, and *Relative External versus Internal Input*. The *External Input Dummy* and *Internal Input Dummy* are one if the firm discusses its offshore external and internal input respectively with the relevant vocabulary in our offshore words list along with the given nation word in a given year. *Relative External versus Internal Input* is computed as External Input Dummy divided by the sum of both External Input Dummy and Internal Input Dummy. By explicitly contrasting external input versus internal input activities, this measure directly assesses the extent to which the given firm engages in offshore external input relative to internal input activities. This variable cannot be computed for observations that

[5]We conclude that the distance of 25 words is robust and quite accurate after manually inspecting alternatives such as 5, 15, 30 or 50 words.

do not have either offshore external or internal input activities. All of our offshoring variables are firm-nation-year level observations from 1997 to 2011.

3.2 Financial Hedging Data and Variables

We create financial hedging variables by searching 10Ks for statements that indicate the use of FX currency derivative products. We consider searches based on the following three word lists: A) "Currency" or "Foreign Exchange", B) "Forward", "Future", "Option", "Swap", "Spot", "Derivative", "Hedge", "Hedging", or "Hedged", and C) "Contract", "Position", "Instrument", "Agreement", "Obligation", "Transaction", or "Strategy". In order to conclude that a firm uses FX derivatives hedging, we require that the firm mentions at least one word from each of these lists (or their plural forms if they are nouns) in close proximity within a paragraph.

We extract paragraphs instead of sentences for the purpose of reducing false negatives. In many cases, writers need more than one sentence to fully convey their use of these products. As before, we set the same maximum distance between words from the three lists at 25 words. More specifically, all three words must appear in a window where the furthest two words are no more than 25 words apart. We additionally exclude hits with phrases that would make them false positives. These phrases include "in the future" and "forward-looking" for example. We then manually assess hit success rates based on whether each hit correctly identifies the use of currency derivative products for our base-year 1997. Manual validation reveals that our success rate ranges from 80% to 97%.

Our text-based approach is particularly stable because our sample period starts in 1997, and FASB issued SFAS No. 119, *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments*, in October 1994. SFAS No. 119 requires firms to disclose their use of derivative financial instruments - futures, forwards, swaps, option contracts, and other financial instruments with similar characteristics.[6] Earlier studies that use this

[6]SFAS No. 119 was effective for financial statements issued during fiscal years ending after December 15, 1994 for entities with greater than $150 million in total assets, and effective after December 15, 1995 for the entities with less than $150 million in total assets.

approach to identify firm financial hedging motives include Wong (2000), Graham and Rogers (2002), and Kim, Mathur, and Nam (2006).

We use information from this text search to create the following two variables that measure financial hedging activities: *Financial Hedging Dummy* and *Log(1+#FHedge)*. The *Financial Hedging Dummy* is one if a firm discloses its use of any types of currency derivative products in its 10K in the given year. *Log(1+#FHedge)* is the natural logarithm of one plus the raw count of how many times a firm mentions currency derivatives in its 10K in the given year. These variables are firm-year level observations from 1997 to 2011. The dimensionality of this panel data thus differs from the offshoring variables we consider, which are defined at the firm-nation-year level. This difference is due to the fact that firms only disclose their use of currency derivative contracts, and they generally do not discuss them in adequate detail to assess which specific foreign currency products they hold. In contrast, as noted above, we are able to measure offshoring activities separately for each nation. Hence, when considering FX hedging, we limit our analysis to firm-year panel data models, although we use firm-nation-year panel data models when we assess operational hedging. Despite this limitation, we find strong support for all three hypotheses.

For robustness, we also consider U.S. firms' use of foreign currency debt in addition to their use of foreign currency derivatives. In contrast to foreign currency derivatives that are mainly used for hedging purposes, the motivation to use foreign currency debt is less clear. In some cases, firms might issue foreign debt because they offer cheaper interest rates. Because it would be difficult to separately identify when foreign debt might instead be used for hedging purposes, we consider a robustness specification where we assume that all foreign currency debt issues are potentially related to hedging activities. Hence we consider a financial hedging variable that includes foreign debt issues in the recent past. We obtain foreign currency debt issues data from both the Securities Data Corporation (SDC) and the DealScan databases. We obtain foreign public debt issuance data from the SDC, and private foreign debt placement data from the DealScan. The DealScan database contains private debt placement information including term loans and revolving credit lines made to

U.S. firms by foreign banks and syndicates of lenders. We exclude 364-day facilities and any other loan with less than a one year maturity. We thus consider a variable *Financial Hedging Dummy (with FX Debt)*, that is one if a firm either discloses its use of any types of currency derivative products in its 10K in the given year or if it issued any foreign currency debt during 5 years prior to the given year from 1997 to 2011. This variable is at the firm-year level and is analogous to *Financial Hedging Dummy*. The correlation between the *Financial Hedging Dummy (with FX Debt)* and *Financial Hedging Dummy* is 0.68.

4 Hedging Effectiveness and Offshore Input Activities

In this section, we describe how we measure the efficacy of FX hedging, and present descriptive statistics and figures to summarize our key variables and univariate relationships.

For each nation, we measure the efficacy of FX hedging (henceforth the FX RSQ) by computing the R^2 of a regression of each nation's consumption growth on the changes in the same nation's exchange rates. Annual consumption data from 1970 to 2011 are obtained from the World Bank, and each nation's consumption growth is defined as the natural logarithm of its consumption in U.S. dollars in the given year divided by its lagged consumption. We create both a static and a separate time-varying R^2 for robustness analyses. The static R^2 is the estimated R^2 of a regression using available consumption and exchange rate data from the World Bank from 1970 until 1990, which is seven years prior to the start year of our sample period.[7] We focus on the static R^2 as our main variable of interest in order to be conservative, and because this helps to rule out reverse causality in our regressions. The time-varying R^2 is computed analogously using a 20 prior year rolling window (including the year [t-5, t-25]) for our sample period. Although we focus on the static measure, we note that our results are robust to using time-varying R^2.

Figure 1 displays consumption growth and exchange rate changes for three different nations in different FX RSQ terciles.

[7]We additionally require at least 5 years of available data. If a nation has less than 5 years of available consumption and exchange rates data, we set its FX RSQ to zero.

[Insert Figure 1 Here]

The United Kingdom, Philippines, and China are in the highest, medium, and lowest tercile of FX RSQ among the over 150 nations with offshore outputs in our sample, respectively. The figure shows that our measure of FX hedging efficacy well captures the effectiveness of a nation's currency as a hedge against the nation's underlying consumption risk. In particular, the exchange rates almost perfectly comove with consumption growth in nations with a high FX RSQ, while the exchange rates shows no significant relation with consumption growth in nations with a low FX RSQ. We further note that there exist three rough categories of exchange rate regimes: free or managed exchange rates, fixed or pegged exchange rates, and currencies with a target zone or a crawling peg (see Bekaert and Hodrick (2012) for more details). For example, the United Kingdom allows the value of its currency to be determined freely (free floating regime), while the Philippines often intervenes in the foreign exchange market (managed floating regime), and China actively intervenes to stabilize its currency relative to major currencies (pegged regime).

We note that exchange rate regimes and many other potential factors might be relevant in determining the relationship between consumption growth and exchange rate changes. Despite this, our measure of R^2 will still correctly sort nations into hedging efficacy groups, as the actual changes in exchange rates are what matters in determining hedging efficacy. We also note that our controls for country fixed effects in our panel data regressions further ensure that any underlying country-specific factors relating to the issues determining exchange rate regimes are fully controlled for in our regressions, ruling out bias from this class of omitted variables.

Figure 2 shows the distribution of the FX RSQ measure and U.S. firms' offshoring input activities around the world. Figures (a) and (b) display each nation's estimated FX RSQ using the static and time-varying forms, respectively. Figure (c) and (d) display maps of the counter-party nations experiencing the most offshoring external and internal input respectively over our sample period from 1997 to 2011. Brighter shades of blue indicate

greater intensity for each measure.

[Insert Figure 2 Here]

The static and time-varying *FX RSQ* figures show that those two measures are qualitatively similar, with the exception of east European nations, for which FX RSQ increases over time. The external input figure (c) shows that U.S. firms significantly rely on sources in southeast Asia to obtain external input. The internal input figure in (d) shows that U.S. firms do more internal input than external input in Latin America and Europe, possibly due to the geographical proximity of these regions to the U.S., making ownership of assets easier to manage.

Table 1 displays a list of 150 nations where U.S. firms in our sample participate in offshore output activity over our sample period from 1997 to 2011. The table displays the estimated FX RSQ and the number of total mentions of each nation word by the firms in our sample. The table shows that large European nations tend to have reliably high FX RSQ. It is also worth noting that many nations with high levels of offshore output activity also have a low FX RSQ (for example China, Mexico, and Brazil).

[Insert Table 1 Here]

Table 2 presents summary statistics for our variables. In our extended dataset, 69% of U.S. firms participate in offshoring output, and most of these offshoring firms (about 85%) actually do both offshore output and input at the same time. Among the firms that participate in offshoring output, 28% and 73% of the U.S. firms use offshore external input and internal input, respectively. The table also presents descriptive statistics for our financial hedging variables. 57% of U.S. firms with offshoring output disclose in their 10Ks that they hold currency derivative contracts and the average count of textual mentions of currency derivatives is 2.5. Furthermore, 75% of U.S firms with offshoring output either use FX derivative instruments or have outstanding FX debt.

[Insert Table 2 Here]

The table also summarizes variables describing national characteristics and firm financial characteristics. These variables will be considered in the next table to examine the extent to which these variables correlate strongly with our key measures of offshoring and hedging. To facilitate the economic interpretation of the results, we standardize all variables prior to running regressions so that they have unit standard deviation and winsorize all non-binary variables at the top and bottom 1% of the distribution.

Table 3 displays Pearson correlation coefficients between our key offshoring and hedging variables and national (in Panel A) or firm (in Panel B) characteristic variables.

[Insert Table 3 Here]

We first note that our offshoring input variables correlate only weakly to moderately with all of the national or firm characteristic variables we consider. In particular, no correlation coefficient with the characteristic variables exceeds 20% in absolute magnitude. This finding illustrates that the information contained in our offshoring input variables is quite novel given variables in the existing literature.

Importantly, we note that our offshore external input measure (External Input Dummy) is negatively correlated with FX RSQ, and this is more pronounced for the alternative measure: Relative External versus Internal Input. We find that our hedging efficacy measure, FX RSQ, is positively correlated with many factors generally considered to be related to whether a nation is developed or not, including GDP, GNP per capita, political stability, corruption, and rule of law measures. The national governance measures including political stability, corruption control, rule of law, voice/accountability, government effectiveness, and regulatory quality are from the Worldwide Governance Indicators database, which is available from the World Bank website.[8] The correlation coefficients between these variables are as large as 70-85%. Therefore we use only one of these variables at a time in our regressions to avoid multicollinearity concerns.

In the next section, we will show that FX hedging efficacy is not simply a matter of

[8]See López de Silanes, La Porta, Shleifer, and Vishny (1998) for a discussion regarding some of these variables.

whether a nation is developed or developing. For example, we find strong links between FX RSQ and hedging policies even after controlling for all of the factors considered above. We also consider natural experiments based on the launch of new FX derivative products. These models also include nation-fixed effects, and hence we rule out the possibility that national characteristics can explain for our results. It is also worth noting that offshore external input is negatively correlated with GNP per capita, while offshore internal input is more strongly negatively correlated with the distance between the U.S. and the foreign nation.

We also note that several correlations between our key variables and other characteristics are of independent interest. The negative (positive) correlation between the external (internal) input dummy and firm size indicates that relatively small firms are more likely to participate in external input activities in foreign nations. Firm profitability measured by operating margin is positively correlated with both types of offshore input activities. Also, the financial hedging measure is strongly and positively related to both firm size and the percentage of foreign sales.

5 Operational Hedging vs. Financial Hedging

In this section, we examine the economic link between the efficacy of FX hedging regarding consumption risk (FX RSQ) and firm use of offshore external input. If the sale of offshore output generates exposure to consumption risk, firms with overseas sales would have incentives to hedge these activities. If FX derivative instruments are effective as hedges against consumption risk (not just against currency risk), we would then expect that firms with offshore output would be more likely to use financial derivative hedging. In contrast, firms will resort to operational hedging instead if FX derivatives are poor hedges as they face incomplete financial hedging markets.

5.1 Operational Hedging

[Insert Table 4 Here]

Table 4 displays summary statistics regarding offshore input decisions for firms with varying levels of FX hedging efficacy. One observation is one firm-nation-year based on our primary sample where offshore output activity is observed. In particular, we form quintiles by sorting observations on FX RSQ in each year. The mean FX RSQ in the first, third and fifth quintile is 0.007, 0.629, and 0.929, respectively. These statistics indicate that nations are highly heterogeneous regarding the comovement between exchange rates and consumption growth. We also note that roughly 40% of our sample has no offshore input operations despite having offshore output operations. We also note that U.S. firms participate in offshore internal input operations relatively more than external input operations. Most relevant, however, we note that the percentage of firms engaged in external input decreases significantly as FX RSQ increases. In contrast, the percentage of firms engaged in internal input increases weakly as FX RSQ increases.

We next consider firm-nation-year panel data regressions where the dependent variable is one of our text-based measures of offshore input activities. We first consider the offshore external input dummy. We are particularly interested in examining the link between a firm's offshore external input to a nation and the nation's FX RSQ measure. We control for each nation's economic characteristics including GDP, GNP per capita, geographical proximity to the U.S., and political stability. We do not include nation-fixed effects in all specifications because our variable of interest FX RSQ is a nation-specific variable. However, we include nation-fixed effects in the last specification where we examine the interaction between FX RSQ and the firm's offshore output focus, which serves to mitigate the concern that our results can be explained by unobserved national characteristics. We also consider natural experiments later in this study to fully address this concern. To facilitate the economic interpretation of the results, we standardize the independent variables so that they have unit standard deviation in all of our regressions. Firm specific control variables are lagged, and all specifications include year-fixed effects and standard errors are clustered by nation.

[Insert Table 5 Here]

The results are displayed in Table 5. Columns one to three examine the effect of FX

RSQ on firm external offshore input decisions. We consider industry, firm, and both firm and region fixed effects in addition to year-fixed effects. Columns four and five display specifications that additionally include the interaction term between FX RSQ and the percentage of offshore output to the given nation. This test is relevant because although all firms in our sample engage in offshore output (as described earlier), some firms focus more on some nations relative to others. Hence, the cross term examines whether offshore external input is more strongly related to the FX RSQ when the extensive margin of offshore output is larger with the given nation, which is an intuitive prediction that allows us to run our analysis even with nation-fixed effects. The first three rows of the table show our first main result: firms are less likely to participate in offshore external input with a given nation when its FX RSQ is higher. The latter two columns reinforce this conclusion as the cross term is also negative and highly significant. The economic impact of FX RSQ is comparable to that of national GDP or GNP per capita. These results support our Hypothesis 2 that the firms will use operational hedging when the efficacy of financial hedging is poor. Importantly, the main results are also robust to including nation-fixed effects in column five.

We next consider analogous tests for internal input in Table 6. From our Hypothesis 3, we expect that the link between financial hedging efficacy and external input will not apply to internal input. In particular, internal input is less likely to be a viable operational hedge for consumption risk because of the cyclical aspects of the offshore assets that offshore internal input firms own.

[Insert Table 6 Here]

The results in Table 6 show that the link between FX RSQ and internal input decisions is negative, but not as pronounced relative to external input decisions. Columns one to three reveal that the effect for internal input is in fact insignificant, which is consistent with Hypothesis 3. However, the last two columns show that the interaction between FX RSQ and the percentage of offshore output to the given nation is significant at the 5-10% level and the economic magnitudes are comparable to those for external input in Table 5. One potential explanation for these finding is that some firms engage in both external and internal input

activities, and this association might lead the results in Table 6 to partially resemble those in Table 5. If so, our quasi-natural experiment test should be more discriminating. We indeed find stronger results in those tests, and we also note later in this section that we also find stronger substitution evidence in Table 7.

We also note the following results that are of independent interest regarding Table 5 and Table 6. Both external and internal input decisions are positively related to the size of the nation, but only external input is significantly and negatively related to GNP per capita. It is also worth noting that the distance from the U.S. to each nation plays an important role for internal input decisions. This indicates that firms are more likely to use offshore internal input in large and nearby nations. In contrast, they are more likely to engage in external input with counter-party nations that might provide low cost labor and raw materials.

We next further stress test Hypothesis 3 by directly contrasting external input and internal input decisions.

[Insert Table 7 Here]

The dependent variable in Table 7 is a firm's relative choice between external and internal input with each nation. This is computed by taking the ratio of the external input dummy to the sum of the external input and internal input dummies. This variable is particularly useful to challenge whether our hedging results are indeed stronger for external input than they are for internal input, which is not clear given the previous tables. In particular, this variable offers the opportunity examine whether firms use more external input relative to internal input when the FX RSQ is low and the value of operational hedging is likely to be high.

Columns one to three of Table 7 show a strong negative link between the FX RSQ and the relative external input variable. Although results for the cross term are not significant in the fourth column, the result is robust in the most stringent test that includes nation-fixed effects in column five. In all, these results show strong support for our hypothesized negative link between FX RSQ and external input decisions through the operation hedging channel.

5.2 Financial Hedging

The results in the previous section show strong support for the conclusion that firms use operational hedging when the efficacy of financial hedging against consumption risk is poor. In this section, we now focus on the related financial hedging decision.

In Table 8, we estimate firm-year panel data regressions (as before, we limit the sample to firms engaged in offshore output) where the dependent variable is a measure of financial hedging activity. We note that we use a firm-year panel in this test, which is different from the firm-nation-year panel in the previous section. This choice is due to the fact that although we do measure offshore activity nation-by-nation, we do not have adequate data to separately measure whether firms specifically use FX derivatives to hedge activities in some nations but not in others.

Columns one and two of Table 8 consider our first measure of financial hedging, the financial hedging dummy. This variable is one if a firm discloses its use of any types of currency derivative products including forwards, futures, swaps and options in its 10K for a given year. Columns three and four consider a broader hedging dummy which includes the use of FX debt as an additional hedging vehicle for robustness. The dependent variable in those columns is one if a firm either discloses its use of any types of FX derivative products or if it issued any FX debt during the 5 years prior to the given year. We only consider this test as robustness as the literature is not clear regarding whether firms issue foreign debt due to hedging motives or if they do so to tap a cost of capital (or both).[9] The third dependent variable in columns five and six is the natural logarithm of one plus the raw count of a firm's mentions of FX derivatives in its 10K in the given year.

Because the panel data is based on firm-year observations as discussed above, we also note that any nation-specific independent variables included in the regressions such as FX

[9] As our baseline, we define financial hedgers as firms that use FX derivatives, as mentioned in their 10-K. Allayannis and Weston (2001) additionally include foreign debt issuers in their definition of hedgers in a test of robust analysis, and find that their results do not change. We follow this convention and examine the role of foreign debt as a matter of robustness. See Kedia and Mozumdar (2003) for empirical findings regarding the determinants of foreign debt issuers in detail.

RSQ, GDP, GNP per capita, the distance from U.S., and business environment proxies, are all based on annual firm averages over the nations where a firm has offshore outputs.

[Insert Table 8 Here]

The results are displayed in Table 8. The results are consistent across all specifications and show that the FX RSQ variable is significantly positively related to FX hedging activity. These findings strongly support our Hypothesis 1 that firms will use more financial hedging when currency hedging against consumption risk is more effective. We also note that hedging decisions are also positively related to firm size, foreign sales as the percentage of total sales, Cash/Assets, and the average distance to offshoring nations.

Overall, our results broadly support our hypotheses. Firms with offshore output activities are more (less) likely to use financial hedging using currency derivatives when the efficacy of financial hedging against consumption risk is superior (poor).

6 Natural Experiments

6.1 Launch of new FX Derivative Products

In this section, we consider natural experiments to explore a potential causal relationship between hedging efficacy and operational hedging decisions. Our experiments are based on a series of events where the Chicago Mercantile Exchange (CME) launched new FX derivative products. These events are well-suited for our refined panel data structure based on annual firm-nation observations. In particular, only the specific nations associated with the newly introduced currency derivatives should be affected by the launch of the new products. Although the majority of FX derivatives are traded over the counter due to the possibility of contract customization, standardized exchange trades have become popular over time. The likely reasons for the increasing use of exchange traded derivatives include the very large contract size used in OTC markets in general, price transparency, lower transaction costs, and reduced counter-party default risk. Even if corporations primarily trade financial derivatives using OTC contracts, they should still be affected by the launch of the new CME

products through significant spill-over effects through the liquidity and price transparency channels.[10]

The shocks to derivative hedging liquidity that these new product launches entail allow us to test our central hypothesis that the availability of high quality hedging instruments (complete markets with minimal friction) causes firms to reduce operational hedging in the form of offshore external input to the same nations where firms sell output. We also note a more refined prediction: the predicted decrease in operational hedging should only arise in nations where the FX RSQ is high (i.e., where currency price comoves strongly with a given nation's consumption growth). The foundation for this additional prediction is that improved hedge liquidity will not induce a firm to forgo operational hedging if the derivatives themselves in the given nation are not effective in hedging consumption risk in the first place. In two of our new product launch years, 2006 and 2009, our sample contains some treated nations with high FX RSQ and some with low FX RSQ, which allows us to consider a separate triple difference-in-difference estimation examining this more refined prediction.

During our sample period, new products are launched in five distinct years: 1999, 2002, 2004, 2006, 2009.[11] Our objective is to isolate nation-year new product launch events that are least contaminated by other major events in the same nations. Hence we carefully review all of the newly launched product events and discuss whether this exclusion criterion is met. In all cases, our tests are not contaminated by worldwide events as we are able to control for year-fixed effects. Because these shocks occur during the middle of our sample, we are additionally able to include nation-fixed effects and firm-fixed effects in various specifications. Our quasi-natural experiments thus benefit from being staggered in time series, in cross section across firms, and in cross section across various nations, a feature that with the numerous fixed effects helps to rule out the hypothesis that omitted variables might explain our findings. In particular, we employ a difference-in-difference approach and thus only consider treatment effects for the nations that are treated in that the CME launched new derivative products relating to their currencies. Generally, the nations treated with new

[10]See Dale (1981) for a discussion on the hedging effectiveness of currency futures markets.
[11]Table A.1 shows the complete list of new product launch histories for the CME.

product launches have few notable events occurring during the year of treatment with the exception of 2004. We now discuss each of the launch years.

In 1999, CME started trading EURO FX, E-mini EURO FX, and E-mini Japanese Yen.[12] This year was unusual relative to other event years because in January of 1999, the Euro became a new currency and unified monetary policy was introduced. The 11 treated nations include Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. We also importantly note that the 11 treated nations did not join the European Union (EU) in this same year.[13] Although the creation of the EU occurred in a different year, the EMU did launch a unified monetary policy in 1999, which might be a cause for concern. For example, a unified monetary policy might result in changes in the risk profile of these nations. For this reason, we will interpret results for 1999 with some caution. However, we include all of the treated nations including the Euro nations in our 1999 test because the introduction of the new currency (the Euro) is a particularly stark example of a shock to the efficacy of hedging. More succinctly, one can view the simultaneous launch of the new currency, alongside the launch of the CME derivative products, to be a single event that provides US firms with a strong positive shock to hedging efficacy.

Japan is also in the treated group in 1999 as its E-mini contacts started trading in the same year. The E-mini contract can be traded for a fraction of the value of a normal futures contracts traded on the CME's Globex electronic trading platform. E-mini contracts provide trading advantages, including higher liquidity, tighter spreads, greater affordability for individual investors due to lower margin requirements, and several tax advantages. Important from our perspective is the improved liquidity that they should bring to the Japanese

[12]The E-mini contract represents a fraction of the value of a normal futures contract traded on the CME's Globex electronic trading platform. E-micro is also available at the CME which is a futures contract representing an even smaller fraction of the value of the normal futures contracts than the corresponding E-mini. For example, the contract size of Euro FX E-mini and E-micro is 62,500 and 12,500 respectively, while the contract size of a normal futures contract is 125,000.

[13]These nations joined the European Union (EU) far before they joined the European Monetary Union (EMU). The year that each of the 11 treated nations joined the EU is as follows: Austria (1995), Belgium (1958), Finland (1995), France (1958), Germany (1958), Ireland (1973), Italy (1958), Luxembourg (1958), Netherlands (1958), Portugal (1986), Spain (1986). We note that these dates all precede our sample period, and hence our identification of hedging efficacy through the introduction of the Euro is not contaminated by other economic information associated with the distinct event of joining of the European Union.

Yen market as a whole. We consider a robustness test in which we exclude the European nations in 1999 from our sample (due to potential concerns about the aforementioned monetary policy), which would leave only Japan as a treated nation in 1999. We note that even in this stark setting based only on Japan, we continue to see statistically significant evidence consistent with our primary hypothesis that the shock was followed by a reduction in operational hedging activities, especially external offshore input activities in the treated nation. We report results for this test using only Japan in 1999 in the Online Appendix to this paper.

In 2002, the CME started trading contracts on Norwegian Krona and Swedish Krona, and these two nations are the treated group for the 2002 event. To our knowledge, this event is particularly free of contamination from other events as we are not aware of other major events for these two nations at this time. Hence results for our difference-in-difference test surrounding the 2002 event should be particularly indicative of a causal link between hedging efficacy and operational hedging through offshore external input.

In 2004, the CME started trading contracts on Czech Koruna, Hungarian Forint and Polish Zloty. However, this event is problematic because all three countries joined the EU in the same year. Because the economic impact of accession to the EU is likely greater than the effect of newly launched CME products, we drop this year from our analysis and do not consider it further. This decision is further reinforced by the fact that these three nations were previously relatively inactive regarding foreign trade.

In 2006, the CME started trading contracts on the Chinese Renminbi, Israel Shekel and Korean Won. The affected nations for 2006 are thus China, Israel, and South Korea. However, two of these nations (China and Israel) have FX RSQ values that are below 0.1, indicating that the newly launched derivative products have low efficacy in hedging consumption growth risk even if they are available with minimal transaction costs. Hence we do not predict any changes in operational hedging for China and Israel. In our primary test, we therefore only include South Korea as a treated nation. We additionally consider China and Israel in a final test reported at the end of this section that is based on a triple

difference-in-difference specification that allows us to test for differential treatment effects for nations with high versus low FX RSQ as discussed above.

Lastly, in 2009, the CME began trading E-Micro contracts on the EURO, GBP, AUD, JPY, CAD, CHF, and Turkish Lira. The 16 EMU member nations are thus affected by this event as they use the Euro. These nations include the previous 11 initial EMU members (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain) and five more nations (Greece, Slovenia, Cyprus, Malta, and Slovak Republic). Also, the United Kingdom, Australia, Japan, Canada, Switzerland, and Turkey are also included in the treated group for 2009. Three of these nations (Slovak Republic, Slovenia, and Turkey) have FX RSQ values that are below 0.1. Hence the newly launched derivative products for these three nations have low efficacy in hedging consumption growth risk even if they were freely available. In our primary test, as we did for China and Israel in 2006, we exclude these three nations from our sample of treated nations, but separately include them in a later triple differences test.

We use these events to identify the potential causal role of hedging efficacy on the choice of financial versus operational hedging policy. We compare U.S. firms' offshore external input decisions in the treated and control nations before and after each event using a difference-in-difference framework.

6.2 Difference-in-difference Tests

We consider three sets of difference-in-difference (DD) regressions. Analogous to our tests in Table 5 to Table 7, we consider the following three dependent variables in turn: external offshore input dummy, internal offshore input dummy, and relative external versus internal input. Our first test based on external offshore input is a direct test of operational hedging. We implement the DD model using a regression framework that includes a post-event dummy, a treated group dummy, and the post-event dummy interacted with the treated group dummy as independent variables. We also include a standard set of controls as before. The treated group dummy is one for nations that were affected by each event described in detail in the

previous section. The key variable of interest is the post-event dummy interacted with the treated group dummy. We expect that the interaction term will have a significant negative coefficient for each event.

[Insert Table 9 Here]

Table 9 presents the regression results for external input activities. All specifications include either firm and region or nation fixed effects in addition to year-fixed effects. We note that including nation-fixed effects is a particularly rigid test that sets a high bar. This specification rules out potential unobserved nation characteristics as omitted variables.

Throughout columns one to eight except for the 2006 event, we find strong support for the conclusion that the new product introductions by the CME for the treated nations resulted in a significant decrease in U.S. firms' use of operational hedging in the form of offshore external input activities. The economic interpretation for the estimated coefficients (-0.0147 to -0.0183) of the interaction terms between the post-event dummy and the treated group dummy implies that the improved FX hedging efficacy for the treated nations decreases a firm's likelihood of offshoring external input by roughly 1.5% to 2.0%. These results are consistent with our hypothesis that improved FX hedging efficacy, through the introductions of new currency derivative products, led to a decrease in firms' use of operational hedging. In particular, firms will more strongly favor financial hedging after the new products are launched particularly due to their improved liquidity.

We also note that the lack of significance in 2006, where the key cross term is negative but not significant, is likely due to lower power. The sample of treated nations in 2006 only includes a single nation, South Korea. Despite this low power, we will note later in this section that we do see a statistically significant substitution effect toward offshore internal input and away from offshore external input based on the relative external versus internal input variable in 2006.

[Insert Table 10 Here]

We next consider analogous tests for internal offshore input as the dependent variable in Table 10. Unlike external offshore input where the prediction of reduced operational hedging is clear, we note that predictions are ambiguous for internal input (see Tuzel and Zhang (2013) and Hoberg and Moon (2014)). Internal input bundles the purchase of input with the ownership of assets. Regarding efficacy as an operational hedge, the ownership of assets generates exposure and likely reduces hedge efficacy. However, the purchase of input serves as an operational hedge and improves hedge efficacy. These forces are in opposite directions, and it is thus an empirical question regarding whether the hedge-effect or the exposure-effect dominates. The results in Table 10 are somewhat mixed and are thus consistent with the aforementioned theoretical ambiguity. We find negative and significant coefficients for the key interaction term for some specifications, but we find a positive and significant effect for 2006.

[Insert Table 11 Here]

We next conduct an additional set of the tests that directly contrasts external and internal input in Table 11. We use the same dependent variable as in Table 7, which is the relative external versus internal input, which is computed as the external input dummy divided by the sum of both the external and internal input dummies. As before, we thus only include observations where either external or internal input is present, and we thus are assessing the relative choice between these two activities. Across all specifications in Table 11, we find that the key interaction term between the treated group and the post-event dummies (Treated * Post) is negative and significant. These results strongly support the conclusion that the launch of the new currency derivative products led to a decrease in external input operations relative to internal input operations. This is consistent with firms substituting toward internal input operations after the shocks due to reduced need for operational hedging after the shocks.

6.3 Triple Differences

In the previous difference-in-difference tests, we excluded nations with low FX RSQ from our set of treated nations (this only affected the 2006 and 2009 tests). The objective was to cleanly examine the impact of shocks to hedging cost for treated nations where the foreign exchange derivatives could be attractive as substitutes for operational hedges. As we discussed above, when FX RSQ is low, this is not the case. In this section, we include the treated nations in 2006 and 2009 with low FX RSQ and we thus consider a triple difference-in-difference specification. The objective is to examine our hypothesis that the shift away from operational hedging toward financial hedging will only occur for treated nations where FX hedging is effective as a hedge against consumption risk. Hence we expect a significant differential reaction for high and low FX RSQ treated nations, and the available data in 2006 and 2009 empowers us to consider this more refined prediction.

[Insert Table 12 Here]

In Table 12, we reconsider the tests in Tables 9 to 11 for 2006 and 2009 with one key change: we introduce a new dummy variable that equals one if the treated nation's estimated FX RSQ is greater than the median of all nations in our sample and we also include all of its three-way interaction terms with the treated group and the post-event dummies. From the Appendix Table A.2, we note that the treated nations with FX RSQ below the sample median (0.322) are China and Israel in 2006, and the Slovak Republic, Slovenia and Turkey in 2009. All of the other treated nations in our sample have FX RSQ that is greater than the sample median.

Rows 1 to 6, and rows 7 and 12 in Table 12 display the test results for 2006 and 2009, respectively. For each year, we consider all three dependent variables we considered in Tables 9 to 11 (external input dummy, internal input dummy, and relative external versus internal input). For each specification, we also consider a model with firm, region and year fixed effects, and also a model with nation and year fixed effects.

The table first shows that the key triple interaction term is negative regarding the external

input dummy for both events. However, they are strongly significant only for the 2006 event. The triple interaction is negative but is not significant in 2009. The internal input results are mixed, as the signs for the triple interaction are negative in 2006 and positive in 2009. The mixed findings for internal input echo our earlier discussions regarding mixed theoretical predictions for internal input, which bundles asset ownership with the purchase of input. Perhaps the most powerful test is the direct contrast between external and internal input in rows 5 and 6, and rows 11 and 12. These results suggest that for both 2006 and 2009, we find a significant decrease in external input operations relative to internal input operations. These findings support the conclusion that the introduction of the new currency products resulted in a decrease in operational hedging activities, but only for the treated nations with high FX efficacy (high FX RSQ) as a hedge against consumption risk.

Overall, our difference-in-difference results support the conclusion that poor financial hedge efficacy likely causes substitutions away from financial hedging and toward operational hedging in the form of offshore external input. These results cast new light on the debate regarding why some firms do not participate in FX hedging despite the fact that it is relatively inexpensive.

7 Conclusion

Our paper proposes novel economic hypotheses regarding why many firms with global activities do not financially hedge overseas risks despite the stylized fact that it is relatively inexpensive to do so. Based on recent evidence in Hoberg and Moon (2014) suggesting that investors demand risk premia when firms sell their output overseas to high consumption risk nations, we examine in this paper whether operational hedging is a strong substitute for financial hedging when financial hedging efficacy is poor. Our study also makes the intellectual contribution that the sale of output overseas generates revenues, and revenues are equal to price times quantity, and hence hedging policies must consider the risk inherent to both prices and quantities sold. The existing literature focuses primarily on price risk alone, which can be directly hedged through financial currency derivatives. Quantity risk, on the

other hand, is theoretically linked to consumption growth risk in the given nation, and we show that the efficacy of FX derivatives in hedging this risk varies widely across nations.

Our main hypothesis is that offshore external input (the purchasing input without owning input producing assets) is a strong operational hedge that firms will consider especially when FX derivatives are poor hedges against Q risk. The use of external input, in particular, should hedge both P and Q risk. In contrast, FX derivatives, while always effective against P risk, may or may not be effective against Q risk depending on the nation in question. We thus predict and find that the use of external input as an operational hedge should be most prevalent in nations for which exchange rates do not comove strongly with consumption growth (as measured using the RSQ of a regression of consumption growth on exchange rate changes).

We measure U.S. firms' operational hedging activities for each firm in each year across all nations using text analysis of firm 10-K discussions of offshore activities. We focus on firm-nation-year observations associated with observed offshore sales of output. This ensures that the firms in our sample have hedging motives, and hence we can explore which hedging tools they use across various nations. We also measure firm financial hedging strategies using 10-K disclosures.

Our findings support the conclusion that a key tension surrounding the decision to hedge is incomplete hedging markets. We find that firms are more likely to use financial hedging when the efficacy of currency derivatives as a hedge against consumption risk is higher. In contrast, they are less likely to use financial hedging, and are more likely to use operational hedging when the efficacy of financial hedging is poor.

We also consider quasi-natural experiments by identifying a number of new derivative product launches by the Chicago Mercantile Exchange. These shocks affect many nations in many different years, allowing us to construct difference-in-difference models that can strongly control for overall economic trends, unobserved nation characteristics, and that can focus on changes occurring with respect to treated nations only surrounding the date of treatment. We find strong results supporting the conclusion that shocks that improve the

efficacy of financial hedging cause firms to substitute away from operational hedging (offshore external input). Our results cast new light on the debate regarding why some firms with overseas risk exposure do not participate in FX hedging despite the fact that it is relatively inexpensive to do so.

Appendix 1 Offshore Words

Offshoring output words: SALES, MARKETS, CUSTOMERS, DISTRIBUTION, MARKETING, REVENUES, DISTRIBUTORS, REVENUE, EXPORT, CUSTOMER, DISTRIBUTOR, DEMAND, STORES, CONSUMER, MARKETED, DISTRIBUTE, DISTRIBUTES, DISTRIBUTED, SHIPMENTS, DEALERS, CLIENTS, WHOLESALE, EXPORTS, STORE, MARKETPLACE, CONSUMERS, DEALER, EXPORTED, CLIENT, DISTRIBUTING, DISTRIBUTIONS, DEMANDS, DISTRIBUTORSHIP, EXPORTING, WHOLESALERS, RECEIVABLE, RECEIVABLES.

Offshoring external input words: SUPPLIERS, IMPORT, SUPPLIER, IMPORTS, IMPORTED, IMPORTATION, VENDORS, SUBCONTRACTORS, SUBCONTRACTOR, VENDOR, IMPORTING, SUBCONTRACT, PURCHASE & FROM, PURCHASED & FROM, PURCHASES & FROM.

Offshoring internal input words: SUBSIDIARIES, SUBSIDIARY, FACILITIES, FACILITY, VENTURE, PLANT, EXPLORATION, PLANTS, VENTURES, WAREHOUSE, STORAGE, FACTORY, SUBSIDIARIES, WAREHOUSES, WAREHOUSING, FACTORIES.

Offshoring indeterminate input words: MANUFACTURING, PRODUCTION, MANUFACTURED, MANUFACTURE, MANUFACTURES, PRODUCED, PRODUCING, PRODUCE, PRODUCES, PRODUCTIONS.

Appendix 2 Variable Descriptions

External Input Dummy	is one if the firm discusses its offshore external input with the relevant vocabulary in our offshore words list along with the given nation word in a given year.
Internal Input Dummy	is one if the firm discusses its offshore internal input with the relevant vocabulary in our offshore words list along with the given nation word in a given year.
Relative External to Internal Input	is computed as External Input Dummy divided by the sum of both External Input Dummy and Internal Input Dummy.
Financial Hedging Dummy	is one if the firm discusses its use of foreign currency instruments in its 10K in a given year.
Financial Hedging Dummy (with Debt)	is one if a firm either discloses its use of any types of currency derivative products in its 10K in the given year or issued any foreign currency debt during 5 years prior to the given year from 1997 to 2011.
Log(1+#FHedge)	is the log of one plus the firm's number of total textual mentions of foreign currency instruments in its 10K in a given year.
FX RSQ	is the given nation's R-squared estimate from the regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990.
Log(GDP)	is the given nation's Gross Domestic Product in 1996 available from the World Bank.
Log(GNPpc)	is the given nation's Gross National Product per capital in 1996 available from the World Bank.
Distance from US	is the given nation's distance from US, computed using the latitude and longitude information of the nation's capital city.
Political Stability	is a measure of perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. The Worldwide Governance Indicators including Political Stability, Corruption Control, Rule of Law, Voice/Accountability, Government Effectiveness, and Regulatory Quality are available from the Word Bank website at http://info.worldbank.org/governance/wgi/index.aspx#home.
Corruption Control	is a measure of perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.
Rule of Law	is a measure of perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Voice/Accountability	is a measure of perceptions of the extent to which a nation's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Government Effectiveness	is a measure of perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Regulatory Quality	is a measure of perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Log(MV Assets)	is the log of market value of the firm's total assets. Market value of assets is market value of common equity plus book value of preferred stock plus debt (long-term debt + debt in current liabilities) plus book value of minority interest.
Log(1+Age)	is the log of one plus firm age, defined as a given year minus the year when the firm first appeared in Compustat.
Tobin Q	is market value of assets divided by book value of assets.
Operating Margin	is operating income before depreciation, scaled by sales.
Book Leverage	is the ratio of total debt to the book value of assets.
Dividend Payer	is one if the firm paid dividends at the given year.
Cash/Assets	is cash and short-term investments divided by total assets.
PPE/Assets	is gross property, plant and equipment divided by total total assets in the prior year.
CAPX/Sales	is capital expenditures divided by sales.
R&D/Sales	is R&D expenditures divided by sales.
% Foreign Sales	is the firm's percentage of oversea sales in a given year from the Datastream database.
% Output	is the firm's output focus on the given nation, which is computed as the number of times the firm mentions its offshore output to the given nation divided the total number of times the firm mentions its offshore output to any nation in our sample.

Table A.1: New Currency Product Launching Events on the CME

The table displays the complete list of the Chicago Mercantile Exchange (CME)'s new currency product launch events. The list is from the CME website. CME Globex is the global electronic trading system for futures and options. The E-mini contract represents a fraction of the value of a normal futures contract traded on the CME's Globex electronic trading platform. E-micro is a futures contract that represents an even smaller fraction of the value of the normal futures contracts than the corresponding E-mini. * indicates the events within our sample period from 1997 to 2011 that are potentially useful for our natal experiments.

Product	**Futures**	**Options**	**Globex Futures**	**Globex Options**
Australian Dollar	1/13/1987	1/11/1988	7/13/1992	7/13/1992
Brazilian Real	11/8/1995	11/8/1995	11/8/1995	11/8/1995
British Pound	5/16/1972	2/25/1985	7/13/1992	7/13/1992
Canadian Dollar	5/16/1972	6/18/1986	7/13/1992	7/13/1992
*Chinese Renminbi	8/28/2006	8/28/2006	8/28/2006	8/28/2006
Dow Jones CME FX$INDEX	7/26/2010	n/a	7/26/2010	n/a
*Czech Koruna	7/11/2004	7/11/2004	7/11/2004	7/11/2004
*E-Micro GBP/USD	3/23/2009	n/a	3/23/2009	n/a
*E-Micro EUR/USD	3/23/2009	n/a	3/23/2009	n/a
*E-Micro AUD/USD	3/23/2009	n/a	3/23/2009	n/a
*E-Micro USD/JPY	3/23/2009	n/a	3/23/2009	n/a
*E-Micro USD/CAD	3/23/2009	n/a	3/23/2009	n/a
*E-Micro USD/CHF	3/23/2009	n/a	3/23/2009	n/a
*E-Micro CAD/USD	12/20/2010	n/a	12/20/2010	n/a
*E-Micro JPY/USD	12/20/2010	n/a	12/20/2010	n/a
*E-Micro CHF/USD	12/20/2010	n/a	12/20/2010	n/a
*E-mini Euro FX	10/7/1999	n/a	10/7/1999	n/a
*E-mini Japanese Yen	10/7/1999	n/a	10/7/1999	n/a
*Euro FX	1/4/1999	1/4/1999	1/4/1999	1/4/1999
EUR/USD 3-Month Realized Volatility	2/7/2001	n/a	2/7/2001	n/a
EUR/USD 1-Month Realized Volatility	2/7/2001	n/a	2/7/2001	n/a
*Turkish Lira	1/26/2009	n/a	1/26/2009	n/a
*Hungarian Forint	7/11/2004	7/11/2004	7/11/2004	7/11/2004
*Israeli Shekel	5/8/2006	5/8/2006	5/8/2006	5/8/2006
Japanese Yen	5/16/1972	3/5/1986	6/26/1992	6/26/1992
*Korean Won	9/18/2006	9/18/2006	9/18/2006	9/18/2006
Mexican Peso	4/25/1995	4/25/1995	4/25/1995	4/25/1995
New Zealand Dollar	5/7/1997	5/7/1997	5/7/1997	5/7/1997
*Norwegian Krone	5/16/2002	n/a	5/16/2002	n/a
*Polish Zloty	7/11/2004	7/11/2004	7/11/2004	7/11/2004
Russian Ruble	4/21/1998	4/21/1998	4/21/1998	4/21/1998
South African Rand	5/7/1997	5/7/1997	5/7/1997	5/7/1997
*Swedish Krona	5/16/2002	n/a	5/16/2002	n/a
Swiss Franc	5/16/1972	2/25/1985	7/13/1992	7/13/1992

Table A.2: FX RSQ of the Nations with CME Product Launches

The table reports the estimated FX RSQ for each nation that experienced CME product launches. FX RSQ is the nation-level R-squared estimate from a regression of consumption growth on exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990. HighRSQ is a dummy variable that equals one if the nation's estimated FX RSQ is greater than the median (0.322) of all nations in our sample.

Event 1999			***Event 2002***			***Event 2006***			***Event 2009***		
Nations	FX RSQ	HighRSQ	Nations	FX RSQ	HighRSQ	Nations	FX RSQ	HighRSQ	Nations	FX RSQ	HighRSQ
Austria	0.938	1	Norway	0.838	1	China	0.005	0	Australia	0.466	1
Belgium	0.902	1	Sweden	0.947	1	Israel	0.076	0	Austria	0.938	1
Finland	0.805	1				South Korea	0.502	1	Belgium	0.902	1
France	0.897	1							Canada	0.638	1
Germany	0.957	1							Cyprus	0.393	1
Italy	0.842	1							Finland	0.805	1
Japan	0.872	1							France	0.897	1
Luxembourg	0.925	1							Germany	0.957	1
Netherlands	0.901	1							Greece	0.742	1
Portugal	0.755	1							Italy	0.842	1
Spain	0.861	1							Japan	0.872	1
									Luxembourg	0.925	1
									Malta	0.534	1
									Netherlands	0.901	1
									Portugal	0.755	1
									Slovak Republic	0.000	0
									Slovenia	0.000	0
									Spain	0.861	1
									Switzerland	0.962	1
									Turkey	0.008	0
									United Kingdom	0.907	1

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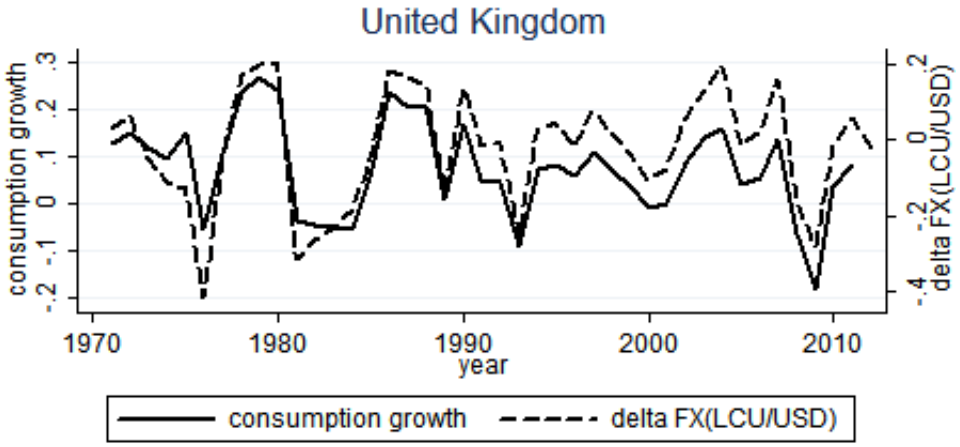
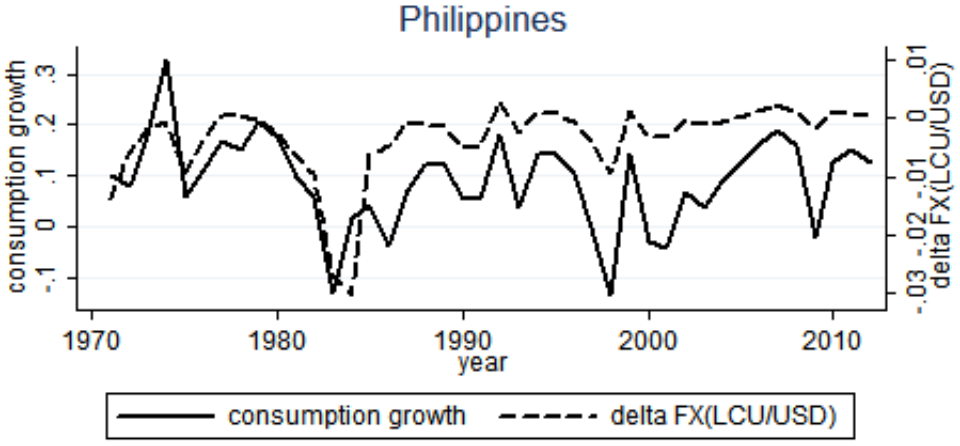
Figure 1: Consumption Growth and Exchange Rate Changes

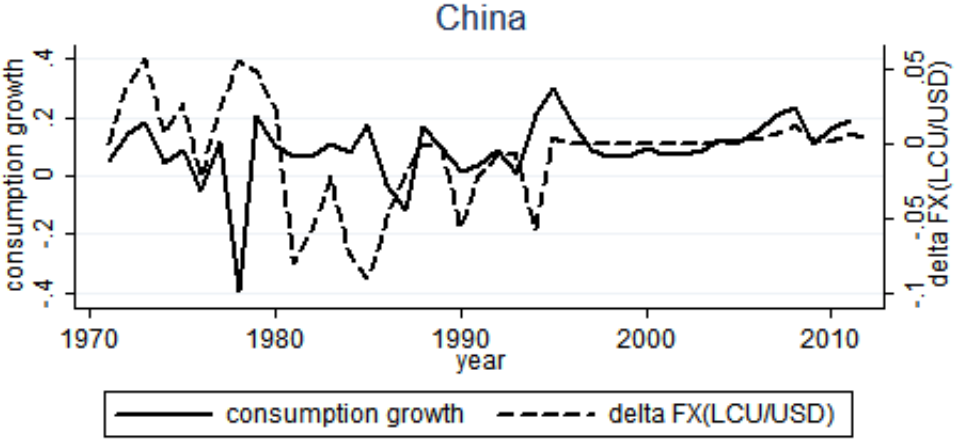
The figures display consumption growth and exchange rate changes for three sample nations in different FX RSQ groups for example over the period from 1970 to 2011. United Kingdom in (a), Philippines in (b), and China in (c) are in the highest, medium, and lowest tercile of FX RSQ among over 150 nations in our sample, respectively. FX RSQ is the nation-level R-squared estimate from regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990.



(a) Nation with a high FX RSQ



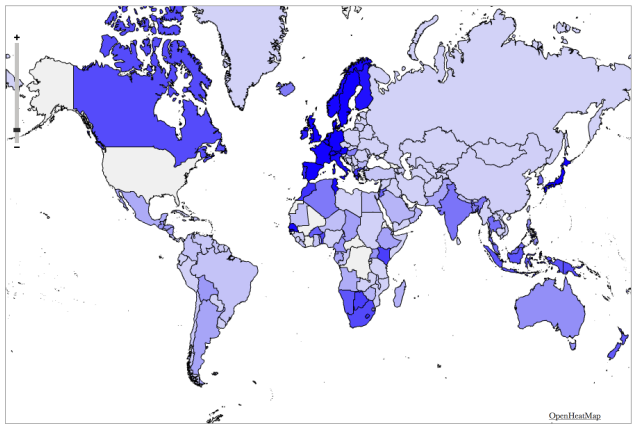
(b) Nation with a medium FX RSQ



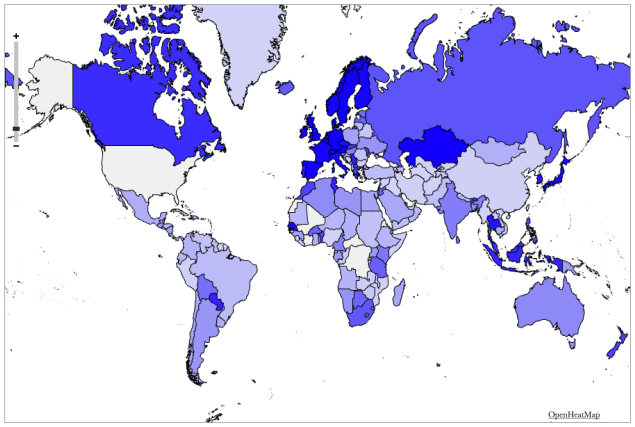
(c) Nation with a low FX RSQ

Figure 2: FX RSQ and Offshoring External Input vs. Internal Input by Nation

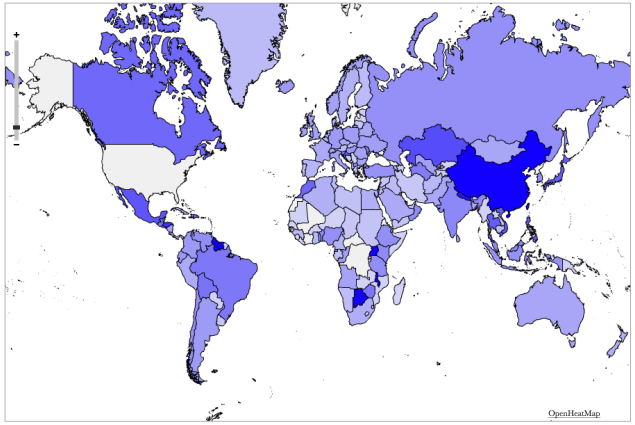
The figures display nations where the U.S. firms in our sample offshore their output and input over the sample period from 1997 to 2011 and each nation's FX RSQ. (a) and (b) display each nation's estimated FX RSQ from regressions of consumption growth on exchange rate changes. In (a), FX RSQ is estimated using the consumption and exchange rates data from 1970 to 1990 which are from the World Bank. In (b), FX RSQ is estimated at the nation-year level using 25 year rolling windows and then averaged out at the nation level. (c) and (d) display the average propensity over out sample period that a firm offshores its external input and internal input in each nation.



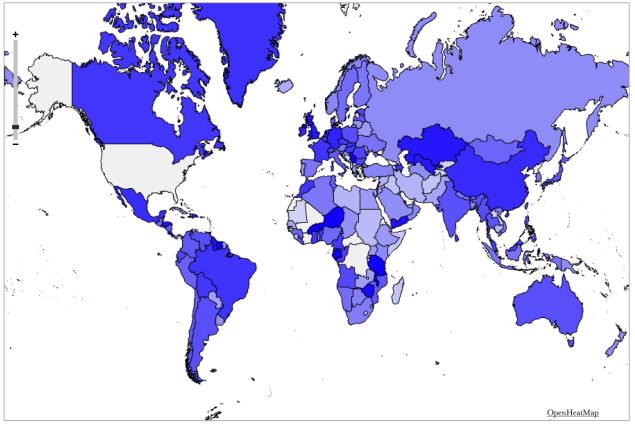
(a) R^2 Estimates (static)



(b) R^2 Estimates (time varying)



(c) Offshoring External Input



(d) Offshoring Internal Input

Table 1: Offshore Nations and FX RSQ

The table displays a list of nations where U.S. firms in our sample offshore their output over the sample period from 1997 to 2011 along with the total number of mentions of each nation word by any firm in our sample and the estimated FX RSQ. FX RSQ is the nation-level R-squared estimate from the regressions of consumption growth on the exchange rate changes using available consumption and exchange rate data from the World Bank from 1970 until 1990.

Rank	Nation	FX RSQ	# of Mentions	Rank	Nation	FX RSQ	# of Mentions	Rank	Nation	FX RSQ	# of Mentions
1	Canada	0.638	23421	51	Panama	0.000	382	101	Cameroon	0.195	59
2	United Kingdom	0.907	17563	52	Slovak Republic	0.000	356	102	Chad	0.150	59
3	Japan	0.872	13999	53	Uruguay	0.001	351	103	Papua New Guinea	0.591	57
4	China	0.005	12559	54	Ukraine	0.000	342	104	Yemen	0.000	51
5	Germany	0.957	11248	55	Nigeria	0.000	335	105	Liechtenstein	0.000	48
6	Mexico	0.000	10502	56	Guatemala	0.477	330	106	Mongolia	0.000	42
7	Australia	0.466	10469	57	Jordan	0.611	303	107	Macedonia	0.000	41
8	France	0.897	9769	58	Lebanon	0.000	259	108	Botswana	0.630	40
9	Italy	0.842	5994	59	Kuwait	0.000	249	109	Uzbekistan	0.000	40
10	India	0.406	5795	60	Pakistan	0.333	241	110	Guyana	0.039	39
11	South Korea	0.502	5590	61	Honduras	0.415	227	111	Mauritius	0.746	38
12	Singapore	0.245	5551	62	Iran	0.042	219	112	Armenia	0.000	38
13	Brazil	0.013	5458	63	El Salvador	0.000	217	113	Zambia	0.001	34
14	Netherlands	0.901	5155	64	Bolivia	0.348	216	114	Malawi	0.167	34
15	Spain	0.861	4819	65	Bahamas	0.000	213	115	Moldova	0.000	33
16	Hong Kong	0.623	4466	66	Kazakhstan	0.000	212	116	Tanzania	0.000	31
17	Switzerland	0.962	3405	67	Iceland	0.575	208	117	Samoa	0.000	29
18	Belgium	0.902	3133	68	Bulgaria	0.002	194	118	Andorra	0.000	29
19	New Zealand	0.606	3063	69	Barbados	0.021	181	119	Cambodia	0.000	29
20	South Africa	0.616	2850	70	Macao	0.807	164	120	Mozambique	0.158	28
21	Russia	0.000	2763	71	Jamaica	0.525	157	121	Marshall Islands	0.000	28
22	Sweden	0.947	2757	72	Morocco	0.768	155	122	Turkmenistan	0.000	26
23	Malaysia	0.524	2575	73	Guinea	0.000	149	123	Benin	0.612	23
24	Argentina	0.264	2369	74	Bahrain	0.076	146	124	Nepal	0.036	22
25	Israel	0.076	2367	75	Cuba	0.000	139	125	Madagascar	0.584	21
26	Thailand	0.512	1984	76	Syria	0.023	130	126	Uganda	0.347	20
27	Philippines	0.370	1776	77	Cyprus	0.393	129	127	Namibia	0.703	18
28	Austria	0.938	1708	78	Algeria	0.482	128	128	Belize	0.000	17
29	Denmark	0.859	1687	79	Paraguay	0.000	124	129	Suriname	0.000	15
30	Poland	0.000	1479	80	Slovenia	0.000	120	130	Mauritania	0.386	15
31	Norway	0.838	1454	81	Angola	0.000	114	131	Grenada	0.000	12
32	Venezuela	0.435	1425	82	Oman	0.189	113	132	Liberia	0.091	12
33	Indonesia	0.596	1420	83	Nicaragua	0.061	112	133	Ethiopia	0.000	11
34	Turkey	0.008	1308	84	Croatia	0.000	105	134	Bhutan	0.000	11
35	Portugal	0.755	1293	85	Sri Lanka	0.000	105	135	Sierra Leone	0.174	11
36	Chile	0.069	1258	86	Tunisia	0.830	99	136	Antigua and Barbuda	0.000	11
37	Finland	0.805	1128	87	Bangladesh	0.518	98	137	Rwanda	0.061	10
38	Colombia	0.327	898	88	Latvia	0.000	90	138	Niger	0.375	10
39	Greece	0.742	859	89	Trinidad and Tobago	0.464	88	139	Albania	0.000	9
40	Hungary	0.692	850	90	Sudan	0.141	87	140	Tonga	0.287	7
41	Saudi Arabia	0.163	725	91	Azerbaijan	0.000	84	141	Tajikistan	0.000	6
42	Peru	0.044	643	92	Lithuania	0.000	82	142	Lesotho	0.715	6
43	Costa Rica	0.277	518	93	Ghana	0.018	79	143	Senegal	0.748	5
44	Egypt	0.077	512	94	Gabon	0.326	76	144	Burkina Faso	0.671	4
45	Vietnam	0.000	462	95	Malta	0.534	67	145	Greenland	0.000	4
46	Dominica	0.000	451	96	Equatorial Guinea	0.099	63	146	Seychelles	0.000	4
47	Luxembourg	0.925	443	97	Kenya	0.658	62	147	Bosnia and Herzegovina	0.000	3
48	Dominican Republic	0.465	435	98	Belarus	0.000	62	148	Swaziland	0.228	3
49	Romania	0.000	423	99	Fiji	0.496	60	149	Laos	0.000	2
50	Ecuador	0.059	406	100	Zimbabwe	0.216	60	150	Saint Lucia	0.000	1

Table 2: Summary Statistics

Summary statistics are reported for our sample of 212,613 annual firm-nation (41,109 annual firm) observations from 1997 to 2011. Our sample is all firms with machine readable 10-Ks and having Compustat data. The *External Input Dummy* and *Internal Input Dummy* are one if the firm discusses its offshore external input and offshore internal input respectively with the relevant vocabulary in our offshore words list along with the given nation word in a given year. *Relative External versus Internal Input* is computed as the External Input Dummy divided by the sum of both the External Input Dummy and the Internal Input Dummy. The *Financial Hedging Dummy* is one if the firm discusses its use of foreign currency instruments in its 10K in a given year, and *Log(1+#FHedge)* is the log of one plus the firm's number of total textual mentions of foreign currency instruments in its 10K in a given year. FX RSQ is the nation-level R-squared estimate from the regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990. The definitions of all other variables are available in Appendix 2 in detail. All non-binary variables are winsorized at the top and bottom 1% of the distribution. Unless separately mentioned, all statistics are based on annual firm-nation observations.

Variable	Mean	Std. Dev.	Minimum	Median	Maximum	# Obs.
Offshoring and hedging variables						
External Input Dummy	0.098	0.298	0.000	0.000	1.000	212613
Internal Input Dummy	0.486	0.500	0.000	0.000	1.000	212613
Rel. External versus Internal Input	0.125	0.278	0.000	0.000	1.000	110042
Financial Hedging Dummy	0.708	0.455	0.000	1.000	1.000	212613
Financial Hedging Dummy (with Debt)	0.819	0.385	0.000	1.000	1.000	212613
Log(1+#FHedge)	1.133	0.937	0.000	1.099	4.290	212613
Offshoring and hedging variables (annual firm level)						
External Input Dummy	0.281	0.449	0.000	0.000	1.000	41109
Internal Input Dummy	0.729	0.445	0.000	1.000	1.000	41109
Rel. External versus Internal Input	0.207	0.288	0.000	0.000	1.000	31370
Financial Hedging Dummy	0.568	0.495	0.000	1.000	1.000	41109
Financial Hedging Dummy (with Debt)	0.753	0.431	0.000	1.000	1.000	41109
Log(1+#FHedge)	0.815	0.874	0.000	0.693	4.290	41109
Nation characteristics						
FX RSQ	0.559	0.347	0.000	0.638	0.962	212613
Log(GDP)	26.761	1.441	21.432	26.972	29.305	212613
Log(GNPpc)	9.270	1.308	6.040	9.937	10.727	212613
Distance from US	5.319	2.450	1.014	4.885	9.501	212613
Political Stability	0.417	0.800	-1.952	0.740	1.514	212613
Rule of Law	0.921	0.922	-1.432	1.318	1.948	212613
Corruption Control	1.049	1.074	-1.207	1.353	2.417	212613
Voice/Accountability	0.742	0.893	-1.662	1.064	1.676	212613
Government Effectiveness	1.110	0.855	-1.135	1.469	2.229	212613
Regulatory Quality	0.974	0.782	-1.336	1.213	2.077	212613
Firm characteristics						
Log(MV Assets)	6.730	2.097	2.340	6.675	12.020	212613
Log(1+Age)	2.296	1.013	0.000	2.398	3.871	212613
Tobin Q	2.296	1.832	0.640	1.687	11.340	212613
Operating Margin	-0.036	0.761	-5.540	0.114	0.557	212613
Book Leverage	0.196	0.195	0.000	0.157	0.852	212613
Dividend Payer	0.350	0.477	0.000	0.000	1.000	212613
Cash/Assets	0.210	0.215	0.001	0.128	0.852	212613
PPE/Assets	0.430	0.321	0.027	0.342	1.489	212613
CAPX/Sales	0.077	0.147	0.000	0.037	1.155	212613
R&D/Sales	0.138	0.399	0.000	0.023	3.068	212613
% Output	0.201	1.068	-0.650	-0.221	3.943	212613
% Foreign Sales	-0.013	0.993	-0.967	-0.235	4.139	212613

Table 3: Pearson Correlation Coefficients

Pearson Correlation Coefficients are reported for our sample of U.S. firms with foreign offshore output activities from 1997 to 2011. One observation is one firm-nation year, and we have total 212,613 observations. See Appendix 2 for the description of our variables in detail.

Panel A: Correlation Coefficients for Nation Characteristics Variables

	External Input Dummy	Internal Input Dummy	Relative External vs Internal Input	Financial Hedging Dummy	FX RSQ	Log (GDP)	Log (GNPpc)	Distance from US	Political Stability	Corruption Control	Rule of Law	Voice/ Acc.	Effective Gov.
Internal Input Dummy	0.128												
Rel. External versus Internal Input	0.931	-0.800											
Financial Hedging Dummy	0.021	0.152	-0.063										
FX RSQ	-0.083	0.015	-0.107	-0.008									
Log(GDP)	0.041	0.065	0.026	-0.017	0.488								
Log(GNPpc)	-0.085	0.011	-0.111	-0.027	0.734	0.409							
Distance from US	-0.010	-0.052	0.017	0.065	-0.107	-0.128	-0.194						
Political Stability	-0.060	0.018	-0.086	-0.039	0.619	0.272	0.807	-0.122					
Corruption Control	-0.076	0.030	-0.112	-0.045	0.680	0.269	0.844	-0.153	0.832				
Rule of Law	-0.074	0.023	-0.104	-0.033	0.749	0.336	0.848	-0.087	0.837	0.959			
Voice/Accountability	-0.104	0.009	-0.133	-0.033	0.733	0.289	0.786	-0.326	0.697	0.798	0.826		
Government Effectiveness	-0.065	0.036	-0.103	-0.036	0.694	0.321	0.845	-0.137	0.816	0.965	0.955	0.776	
Regulatory Quality	-0.077	0.038	-0.118	-0.030	0.636	0.235	0.836	-0.159	0.778	0.940	0.914	0.773	0.934

Panel B: Correlation Coefficients for Firm Characteristics Variables

	External Input Dummy	Internal Input Dummy	Relative External vs Internal Input	Financial Hedging Dummy	Log(MV Assets)	% Foreign Sales	Log (1+Age)	Tobin's Q	Operating Margin	Book Leverage	Cash/ Assets	PPE/ Assets	CAPX/ Sales
Internal Input Dummy	0.128												
Rel. External versus Internal Input	0.931	-0.800											
Financial Hedging Dummy	0.021	0.152	-0.063										
Log(MV Assets)	-0.011	0.121	-0.081	0.403									
% Foreign Sales	-0.007	0.119	-0.082	0.345	0.324								
Log(1+Age)	0.024	0.103	-0.020	0.185	0.337	0.186							
Tobin Q	-0.062	-0.107	-0.031	-0.086	0.093	-0.041	-0.211						
Operating Margin	0.024	0.105	-0.030	0.167	0.240	0.154	0.190	-0.198					
Book Leverage	0.033	0.089	-0.003	0.074	0.227	-0.015	0.103	-0.200	0.068				
Cash/Assets	-0.049	-0.136	0.003	-0.129	-0.224	-0.020	-0.301	0.397	-0.360	-0.427			
PPE/Assets	0.034	0.100	-0.002	0.021	0.141	0.007	0.265	-0.183	0.126	0.256	-0.393		
CAPX/Sales	-0.014	-0.019	-0.010	-0.087	0.030	-0.067	-0.149	0.096	-0.396	0.098	0.094	0.215	
R&D/Sales	-0.042	-0.122	0.007	-0.140	-0.162	-0.096	-0.165	0.254	-0.840	-0.111	0.465	-0.165	0.333

Table 4: FX RSQ and Offshoring Inputs

The table displays offshoring input activities for all firms with offshoring output activities in our sample from 1997 to 2011 for each FX RSQ quintile. One observation is one firm-nation year, and we have total 212,613 observations. FX RSQ is the nation-level R-squared estimate from the regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990. For each quintile group, Internal Input is the total count of the *Internal Input Dummy* over our firm-nation-year database. This variable is one if the firm discusses its offshore internal input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. Analogously, External Input is the total count of the *External Input Dummy*, which is one if the firm discusses its offshore external input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. No Input is the total count of firm-nation years with neither internal nor external input activities.

FX RSQ Quintile	Mean FX RSQ	No Input	Internal Input	External Input	Observations
1	0.007	17,333	17,044	6,474	43,393
		39.94 %	39.28%	14.92%	
2	0.376	19,807	16,836	3,730	42,636
		46.46%	39.49%	8.75 %	
3	0.629	18,380	16,646	4,384	41,904
		43.86 %	39.72%	10.46 %	
4	0.871	19,904	18,529	3,615	44,423
		44.81 %	41.71 %	8.14%	
5	0.929	15,907	20,121	2,663	40,257
		39.51%	49.98%	6.61%	

Table 5: Offshore External Input Predictions

The table analyzes the propensity to offshore external input. One observation is one firm-nation year, and we have total 212,613 observations. *External Input Dummy* is one if the firm discusses its offshore external input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. FX RSQ is the nation-level R-squared estimate from regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990. % Output is the firm's output focus on the given nation, which is computed as the number of times the firm mentions its offshore output to the given nation divided by the total number of times the firm mentions its offshore output to any nation in our sample. See Appendix 2 for the description of our variables in detail. All firm control variables are one year lagged. Industry fixed effects are at the 3-digit SIC code level. *t-statistics* (in parenthesis) are robust and adjusted for nation clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	External Input Dummy				
FX RSQ	-0.0268***	-0.0242***	-0.0180***	-0.00461	
	(-3.72)	(-4.27)	(-2.92)	(-0.80)	
FX RSQ*% Output				-0.0246***	-0.0280***
				(-3.69)	(-3.03)
% Output				0.0686***	0.0515***
				(8.50)	(5.29)
Log(GDP)	0.0387***	0.0353***	0.0289***	0.0262***	
	(5.37)	(5.69)	(7.57)	(6.93)	
Log(GNPpc)	-0.0294**	-0.0258**	-0.0258***	-0.0299***	
	(-2.18)	(-2.43)	(-3.73)	(-4.46)	
Distance from US	-0.00216	-0.00312	-0.00818	-0.00587	
	(-0.45)	(-0.92)	(-0.89)	(-0.67)	
Political Stability	0.0181*	0.0168**	0.00755*	0.00816*	0.00148
	(1.87)	(2.28)	(1.66)	(1.81)	(0.41)
Log(MV Assets)	-0.0120***	-0.00620	-0.00597	0.00254	-0.000554
	(-2.66)	(-1.37)	(-1.33)	(0.62)	(-0.14)
% Foreign Sales	0.00473***	-0.0000665	0.000332	0.00179	0.00962***
	(2.91)	(-0.03)	(0.14)	(0.77)	(5.38)
Log(1+Age)	-0.000160	-0.000792	-0.000666	-0.00122	0.00208
	(-0.10)	(-0.37)	(-0.31)	(-0.55)	(1.39)
Tobin Q	-0.00305**	0.00127	0.00133	0.000280	-0.00749***
	(-2.60)	(0.91)	(0.97)	(0.21)	(-8.72)
Operating Margin	-0.00154	-0.00293**	-0.00307**	-0.00282**	-0.00675***
	(-0.83)	(-2.06)	(-2.14)	(-2.04)	(-3.39)
Book Leverage	0.00321	0.00106	0.00105	0.000416	0.00284
	(1.64)	(0.65)	(0.66)	(0.27)	(1.47)
Dividend Payer	-0.00862**	0.00417	0.00406	0.00406	-0.000486
	(-2.47)	(1.10)	(1.07)	(1.07)	(-0.12)
Cash/Assets	0.00239	0.000789	0.000730	0.0000738	-0.00447**
	(1.31)	(0.72)	(0.66)	(0.06)	(-2.19)
PPE/Assets	-0.00319	-0.00406	-0.00441*	-0.00476*	-0.0000976
	(-0.98)	(-1.62)	(-1.80)	(-1.94)	(-0.03)
CAPX/Sales	0.00163	-0.00166*	-0.00176*	-0.00220**	-0.00530***
	(1.35)	(-1.66)	(-1.76)	(-2.23)	(-3.07)
R&D/Sales	-0.00719***	-0.00508***	-0.00526***	-0.00494***	-0.00977***
	(-3.47)	(-3.26)	(-3.30)	(-3.20)	(-4.41)
Observations	212613	212613	212613	212613	212613
Adjusted R^2	0.070	0.240	0.244	0.258	0.050
Fixed Effects	Ind, Year	Firm, Year	Firm, Region, Year	Firm, Region, Year	Nation, Year

Table 6: Offshore Internal Input Predictions

The table analyzes the propensity to offshore internal input. One observation is one firm-nation year, and we have total 212,613 observations. The dependent variable is *Internal Input Dummy* is one if the firm discusses its offshore internal input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. FX RSQ is the nation-level R-squared estimate from regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990. % Output is the firm's output focus on the given nation, which is computed as the number of times the firm mentions its offshore output to the given nation divided by the total number of times the firm mentions its offshore output to any nation in our sample. See Appendix 2 for the description of our variables in detail. All firm control variables are one year lagged. Industry fixed effects are at the 3-digit SIC code level. *t-statistics* (in parenthesis) are robust and adjusted for nation clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	Internal Input Dummy				
FX RSQ	-0.00488	-0.00801	-0.0198	-0.00301	
	(-0.30)	(-0.62)	(-1.29)	(-0.21)	
FX RSQ*% Output				-0.0211*	-0.0278**
				(-1.87)	(-2.16)
% Output				0.131***	0.0762***
				(16.72)	(7.55)
Log(GDP)	0.0444***	0.0468***	0.0546***	0.0479***	
	(3.52)	(4.32)	(6.35)	(5.71)	
Log(GNPpc)	-0.0163	-0.0110	-0.00702	-0.0169	
	(-0.96)	(-0.78)	(-0.45)	(-1.19)	
Distance from US	-0.0245***	-0.0232***	0.0513*	0.0596**	
	(-2.81)	(-3.34)	(1.85)	(2.06)	
Political Stability	0.0259*	0.0216*	0.00332	0.00386	0.00506
	(1.77)	(1.72)	(0.30)	(0.36)	(0.69)
Log(MV Assets)	0.0445***	-0.000992	-0.000188	0.0201**	0.0478***
	(6.38)	(-0.12)	(-0.02)	(2.44)	(7.22)
% Foreign Sales	0.0387***	0.0122***	0.0125***	0.0161***	0.0624***
	(10.91)	(4.04)	(3.90)	(4.48)	(21.23)
Log(1+Age)	0.00209	0.0195***	0.0192***	0.0179***	0.00751**
	(0.83)	(4.25)	(4.18)	(3.90)	(2.53)
Tobin Q	-0.0260***	-0.00216	-0.00220	-0.00477***	-0.0326***
	(-15.54)	(-1.13)	(-1.15)	(-2.68)	(-20.22)
Operating Margin	-0.00951***	-0.00528*	-0.00537*	-0.00483*	-0.0182***
	(-2.81)	(-1.92)	(-1.95)	(-1.91)	(-5.56)
Book Leverage	0.0156***	0.00767***	0.00733***	0.00603***	0.0142***
	(6.61)	(3.52)	(3.36)	(2.79)	(5.37)
Dividend Payer	-0.00378	0.00164	0.00162	0.00164	0.0251***
	(-0.89)	(0.49)	(0.48)	(0.50)	(4.86)
Cash/Assets	-0.0111***	-0.00301	-0.00295	-0.00445*	-0.0171***
	(-3.40)	(-1.21)	(-1.19)	(-1.68)	(-3.96)
PPE/Assets	0.0200***	-0.00467	-0.00463	-0.00526	0.0176***
	(4.33)	(-1.26)	(-1.25)	(-1.42)	(4.25)
CAPX/Sales	0.00539	0.00374	0.00367	0.00261	0.000733
	(1.55)	(1.64)	(1.60)	(1.14)	(0.23)
R&D/Sales	-0.0364***	-0.0141***	-0.0142***	-0.0136***	-0.0443***
	(-9.17)	(-5.59)	(-5.47)	(-5.49)	(-12.98)
Observations	212613	212613	212613	212613	212613
Adjusted R^2	0.096	0.321	0.326	0.352	0.090
Fixed Effects	Ind, Year	Firm, Year	Firm, Region, Year	Firm, Region, Year	Nation, Year

Table 7: Relative Intensity of Offshore External Input to Internal Input

The table analyzes the propensity to offshore external input versus internal input. One observation is one firm-nation year, and we have total 110,042 observations conditioned on either external or internal input activities of the firms in our sample. The dependent variable is the *Relative External versus Internal Input* is computed as External Input Dummy divided by the sum of both External Input Dummy and Internal Input Dummy. *External Input Dummy* is one if the firm discusses its offshore external input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. *Internal Input Dummy* is one if the firm discusses its offshore internal input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. FX RSQ is the nation-level R-squared estimate from the regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990. % Output is the firm's output focus on the given nation, which is computed as the number of times the firm mentions its offshore output to the given nation divided by the total number of times the firm mentions its offshore output to any nation in our sample. See Appendix 2 for the description of our variables in detail. All firm control variables are one year lagged. Industry fixed effects are at the 3-digit SIC code level. *t-statistics* (in parenthesis) are robust and adjusted for nation clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	Relative External versus Internal Input				
FX RSQ	-0.0256***	-0.0187***	-0.00710*	-0.00535	
	(-3.07)	(-4.06)	(-1.71)	(-1.21)	
FX RSQ*% Output				-0.00206	-0.0120**
				(-0.67)	(-1.98)
% Output				0.00899***	0.0208***
				(3.03)	(3.48)
Log(GDP)	0.0357***	0.0282***	0.0230***	0.0225***	
	(4.30)	(4.60)	(6.38)	(6.17)	
Log(GNPpc)	-0.0253***	-0.0226***	-0.0235***	-0.0243***	
	(-2.70)	(-3.95)	(-4.81)	(-4.95)	
Distance from US	0.00816	0.00462	-0.0263**	-0.0257**	
	(1.15)	(1.20)	(-2.24)	(-2.19)	
Political Stability	0.00994	0.00941**	0.00720*	0.00730*	-0.00132
	(1.18)	(2.11)	(1.82)	(1.82)	(-0.33)
Log(MV Assets)	-0.0291***	-0.0128**	-0.0127**	-0.0112**	-0.0162***
	(-6.05)	(-2.46)	(-2.40)	(-2.00)	(-3.98)
% Foreign Sales	-0.00948***	-0.00465**	-0.00429*	-0.00410*	-0.0137***
	(-3.13)	(-1.98)	(-1.85)	(-1.77)	(-3.86)
Log(1+Age)	-0.000584	-0.00563*	-0.00531*	-0.00525*	0.000769
	(-0.27)	(-1.85)	(-1.77)	(-1.74)	(0.40)
Tobin Q	0.00320	0.00508***	0.00503***	0.00473**	-0.00258*
	(1.47)	(2.76)	(2.77)	(2.55)	(-1.98)
Operating Margin	0.00101	0.00267	0.00254	0.00269	-0.00549*
	(0.39)	(1.37)	(1.28)	(1.37)	(-1.96)
Book Leverage	-0.000286	-0.000527	-0.000412	-0.000482	0.000118
	(-0.15)	(-0.25)	(-0.19)	(-0.23)	(0.06)
Dividend Payer	-0.00681*	0.00559	0.00540	0.00535	-0.00280
	(-1.84)	(1.49)	(1.45)	(1.44)	(-0.70)
Cash/Assets	0.00936***	0.00101	0.00111	0.00107	-0.000874
	(2.86)	(0.48)	(0.52)	(0.50)	(-0.25)
PPE/Assets	-0.00663***	-0.00166	-0.00187	-0.00180	-0.00152
	(-2.70)	(-0.48)	(-0.53)	(-0.52)	(-0.73)
CAPX/Sales	-0.000882	-0.00236	-0.00233	-0.00235	-0.00794***
	(-0.45)	(-1.44)	(-1.44)	(-1.44)	(-3.13)
R&D/Sales	0.00542**	0.00197	0.00156	0.00171	0.00256
	(2.04)	(0.74)	(0.58)	(0.64)	(0.75)
Observations	110042	110042	110042	110042	110042
Adjusted R^2	0.117	0.398	0.402	0.402	0.063
Fixed Effects	Ind, Year	Firm, Year	Firm, Region, Year	Firm, Region, Year	Nation, Year

Table 8: Financial Hedging Predictions

The table analyzes firm propensity to use financial hedging. One observation is one firm year, and we have total 41,109 observations. The *Financial Hedging Dummy* is one if the firm discusses its use of FX derivative instruments in its 10K in a given year. The *Financial Hedging Dummy (with Debt)* is one if a firm either discusses its use of any types of FX derivative products in its 10K in the given year or issued any FX debt during 5 years prior to the given year. *Log(1+#FHedge)* is the log of one plus the firm's number of total textual mentions of FX derivative instruments in its 10K in a given year. FX RSQ is the nation-level R-squared estimate from regressions of consumption growth on the exchange rate changes using available consumption and exchange rates data from the World Bank from 1970 until 1990. In this table, FX RSQ is averaged out over the nations for each firm year. See Appendix 2 for the description of our variables in detail. All firm control variables are one year lagged. Industry fixed effects are at the 3-digit SIC code level. *t-statistics* (in parenthesis) are robust and adjusted for firm clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	Financial Hedging Dummy		Financial Hedging Dummy (with Debt)		Log(1+#FHedge)	
FX RSQ	0.0209***	0.0274***	0.0143**	0.0178**	0.0461***	0.0310***
	(3.16)	(3.45)	(2.37)	(2.46)	(4.96)	(2.83)
Log(GDP)	-0.00699	-0.00110	-0.00105	-0.00419	-0.0233***	-0.0165**
	(-1.47)	(-0.19)	(-0.24)	(-0.79)	(-3.40)	(-2.11)
Log(GNPc)	0.0252***	-0.0210**	0.0218***	-0.0144	0.0240**	-0.0157
	(3.14)	(-2.37)	(2.84)	(-1.64)	(2.16)	(-1.33)
Distance from US	0.0545***	0.0148***	0.0213***	0.00278	0.0797***	0.0226***
	(16.01)	(3.32)	(6.82)	(0.68)	(16.78)	(3.81)
Political Stability	-0.00315	0.0150*	-0.0128*	0.00563	-0.0133	0.00926
	(-0.45)	(1.93)	(-1.93)	(0.77)	(-1.36)	(0.91)
Log(MV Assets)	0.179***	0.104***	0.149***	0.0729***	0.422***	0.230***
	(61.57)	(11.36)	(54.48)	(8.38)	(90.96)	(17.55)
% Foreign Sales	0.109***	0.0287***	0.0428***	0.00172	0.269***	0.112***
	(35.91)	(5.79)	(15.87)	(0.40)	(51.92)	(14.32)
Log(1+Age)	-0.00570**	0.0124**	-0.0224***	0.000272	0.0106***	-0.0175**
	(-2.20)	(2.27)	(-9.64)	(0.06)	(2.71)	(-2.16)
Tobin's Q	-0.0420***	-0.0233***	-0.0463***	-0.0191***	-0.0880***	-0.0529***
	(-16.69)	(-7.59)	(-18.41)	(-6.21)	(-26.11)	(-12.82)
Operating Margin	-0.00992***	-0.00337	0.0123***	0.000279	-0.0364***	-0.0133***
	(-2.59)	(-0.78)	(3.15)	(0.06)	(-7.94)	(-2.77)
Book Leverage	-0.00436*	0.00685**	0.0268***	0.0171***	-0.00507	0.00582
	(-1.77)	(2.10)	(12.16)	(5.97)	(-1.39)	(1.30)
Dividend Payer	-0.00424	0.0116*	-0.0325***	0.000215	0.0135	0.0270***
	(-0.78)	(1.68)	(-6.87)	(0.04)	(1.56)	(2.69)
Cash/Assets	-0.0143***	-0.0149***	-0.0625***	-0.0345***	-0.0439***	-0.0249***
	(-4.63)	(-4.10)	(-20.83)	(-9.50)	(-10.40)	(-5.11)
PPE/Assets	-0.000218	0.00120	0.00500*	0.00441	0.00852**	-0.0131*
	(-0.08)	(0.23)	(1.90)	(0.89)	(2.01)	(-1.86)
CAPX/Sales	-0.0121***	-0.00113	-0.00578**	0.000688	-0.0266***	-0.000146
	(-4.60)	(-0.38)	(-2.40)	(0.26)	(-7.36)	(-0.04)
R&D/Sales	-0.0138***	-0.00712	-0.00272	-0.0129**	-0.0318***	-0.0131**
	(-3.47)	(-1.41)	(-0.67)	(-2.54)	(-6.72)	(-2.20)
Observations	41109	41109	41109	41109	41109	41109
Adjusted R^2	0.292	0.651	0.244	0.626	0.477	0.782
Fixed Effects	Ind, Year	Firm, Year	Ind, Year	Firm, Year	Ind, Year	Firm, Year

Table 9: Difference-in-Differences of Offshore External Input

The table analyzes the difference-in-difference effects of four different shocks to the menu of financial instruments traded at the Chicago Mercantile Exchange (CME). See the Appendix table A.1 for the details of the CME events. One observation is one firm-nation year, and we have total 212,613 observations. We additionally drop nations that have FX RSQ values below 0.1 from the Appendix table A.2 (see 6.1 for a detailed discussion on this exclusion). The dependent variable, *External Input Dummy* is one if the firm discusses its offshore external input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. *Treated* is a nation dummy variable that equals one if the nation's currency product is included in the menu of new products introduced on the CME at the given event year. *Post* is a year dummy variable that equals one if the year is post the given CME event year. All nation and firm control variables previously used are included in the regressions, but not reported to conserve space. *t-statistics* (in parenthesis) are robust and adjusted for nation clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	External Input Dummy							
Treated1999	0.00152							
	(0.12)							
Post1999	0.0310***	0.0400***						
	(3.31)	(3.81)						
Treated*Post1999	-0.0147***	-0.0183***						
	(-3.04)	(-3.16)						
Treated2002			0.0275**					
			(2.21)					
Post2002			0.0273***	0.0356***				
			(3.09)	(3.64)				
Treated*Post2002			-0.0179***	-0.0151***				
			(-3.05)	(-2.86)				
Treated2006					-0.0242***			
					(-4.47)			
Post2006					0.0193***	0.0261***		
					(3.16)	(5.40)		
Treated*Post2006					-0.00286	-0.00273		
					(-0.66)	(-0.97)		
Treated2009							-0.0122	
							(-1.19)	
Post2009							0.0333***	0.0433***
							(3.12)	(3.40)
Treated*Post2009							-0.0130*	-0.0167*
							(-1.72)	(-1.87)
Observations	212613	212613	212613	212613	197687	197687	210829	210829
Adjusted R^2	0.244	0.040	0.244	0.040	0.238	0.024	0.244	0.040
Fixed Effects	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nation Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 10: Difference-in-Differences of Offshore Internal Input

The table analyzes the difference-in-difference effects of four different shocks to the menu of financial instruments traded at the Chicago Mercantile Exchange (CME). See the Appendix table A.1 for the details of the CME events. One observation is one firm-nation year, and we have total 212,613 observations. We additionally drop nations that have FX RSQ values below 0.1 from the Appendix table A.2 (see 6.1 for a detailed discussion on this exclusion). The dependent variable, *Internal Input Dummy* is one if the firm discusses its offshore internal input with the relevant vocabulary in our offshore words list along with the given nation word in a given year. *Treated* is a nation dummy variable that equals one if the nation's currency product is included in the menu of new products introduced on the CME at the given event year. *Post* is a year dummy variable that equals one if the year is post the given CME event year. All nation and firm control variables previously used are included in the regressions, but not reported to conserve space. *t-statistics* (in parenthesis) are robust and adjusted for nation clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	Internal Input Dummy							
Treated1999	-0.0269							
	(-0.77)							
Post1999	-0.00337	-0.0183						
	(-0.24)	(-1.35)						
Treated*Post1999	-0.0137	-0.0268*						
	(-1.10)	(-1.87)						
Treated2002			-0.138***					
			(-4.46)					
Post2002			-0.00649	-0.0251*				
			(-0.50)	(-1.94)				
Treated*Post2002			-0.0233***	-0.00241				
			(-3.47)	(-0.32)				
Treated2006					-0.0516**			
					(-2.16)			
Post2006					-0.0118	-0.0351***		
					(-0.86)	(-3.19)		
Treated*Post2006					0.0202***	0.0102*		
					(3.05)	(1.77)		
Treated2009							0.0595**	
							(2.05)	
Post2009							0.00206	-0.0106
							(0.16)	(-0.81)
Treated*Post2009							-0.0175	-0.0279**
							(-1.24)	(-2.04)
Observations	212613	212613	212613	212613	197687	197687	210829	210829
Adjusted R^2	0.326	0.079	0.327	0.079	0.332	0.080	0.326	0.079
Fixed Effects	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nation Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11: Difference-in-Differences of Relative External Input Focus

The table analyzes the difference-in-difference effects of four different shocks to the menu of financial instruments traded at the Chicago Mercantile Exchange (CME). See the Appendix table A.1 for the details of the CME events. One observation is one firm-nation year, and we have total 110,042 observations, conditioned on either external or internal input activities. We additionally drop nations that have FX RSQ values below 0.1 from the Appendix table A.2 (see 6.1 for a detailed discussion on this exclusion). The dependent variable, *Relative External versus Internal Input* is computed as External Input Dummy divided by the sum of both External Input Dummy and Internal Input Dummy. *Treated* is a nation dummy variable that equals one if the nation's currency product is included in the menu of new products introduced on the CME at the given event year. *Post* is a year dummy variable that equals one if the year is post the given CME event year. All nation and firm control variables previously used are included in the regressions, but not reported to conserve space. *t-statistics* (in parenthesis) are robust and adjusted for nation clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	Relative External versus Internal Input							
Treated1999	0.0176							
	(1.43)							
Post1999	0.0347***	0.0454***						
	(3.74)	(5.79)						
Treated*Post1999	-0.0171***	-0.0111*						
	(-3.36)	(-1.78)						
Treated2002			0.0598***					
			(4.51)					
Post2002			0.0301***	0.0427***				
			(3.44)	(6.07)				
Treated*Post2002			-0.0196***	-0.0142***				
			(-3.22)	(-4.00)				
Treated2006					-0.00834			
					(-0.79)			
Post2006					0.0243***	0.0379***		
					(3.09)	(7.16)		
Treated*Post2006					-0.0105*	-0.0182***		
					(-1.85)	(-7.02)		
Treated2009							-0.0151	
							(-1.37)	
Post2009							0.0342***	0.0451***
							(3.96)	(5.45)
Treated*Post2009							-0.0104**	-0.00739
							(-2.05)	(-1.42)
Observations	110042	110042	110042	110042	101058	101058	109295	109295
Adjusted R^2	0.402	0.061	0.402	0.061	0.401	0.043	0.402	0.061
Fixed Effects	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year	Firm, Region, Year	Nation, Year
Firm Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nation Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 12: Triple Difference-in-Difference with FX RSQ

The table analyzes triple difference-in-difference effects of shocks to the menu of financial instruments traded at the CME in 2006 and 2009. See the Appendix table A.1 for the details of the CME events. One observation is one firm-nation year, and we have total 212,613 observations (110,042 observations for rows 5, 6, 11 and 12, conditioned on either external or internal input activities). *Treated* is a nation dummy variable that equals one if the nation's currency product is included in the menu of new products introduced on the CME at the given event year. *Post* is a year dummy variable that equals one if the year is post the given CME event year. *HighRSQ* is a nation dummy variable that equals one if the nation's estimated FX RSQ is greater than the median (0.322) of all nations in our sample. All nation and firm control variables previously used are included in the regressions, but not reported to conserve space. *t-statistics* (in parenthesis) are robust and adjusted for nation clustering. ***, **, and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Event Year	Dependent Variable	Treated* Post* HighRSQ	Treated	Post	HighRSQ	Treated* Post	Treated* HighRSQ	Post* HighRSQ	Fixed Effects	Obs.	Adj. R^2
2006	External Input Dummy	-0.0664***	0.0676***	0.0242***	0.00408	0.0619***	-0.0892***	-0.00311	Firm, Region	212613	0.246
		(-5.17)	(9.67)	(3.90)	(0.92)	(6.16)	(-14.35)	(-0.59)	Year		
2006	External Input Dummy	-0.0570***		0.0376***		0.0565***		-0.00937	Nation	212613	0.040
		(-5.39)		(5.38)		(5.82)		(-1.46)	Year		
2006	Internal Input Dummy	-0.0518***	0.0841***	-0.0141	0.00812	0.0686***	-0.131***	0.000922	Firm, Region	212613	0.327
		(-3.74)	(3.18)	(-1.14)	(0.43)	(6.88)	(-6.19)	(0.09)	Year		
2006	Internal Input Dummy	-0.0495***		-0.0248**		0.0615***		-0.00760	Nation	212613	0.079
		(-4.97)		(-2.38)		(11.39)		(-0.79)	Year		
2006	Rel. External vs Internal Input	-0.0277***	0.0332***	0.0318***	0.00303	0.0174***	-0.0368***	-0.00458	Firm, Region	110042	0.402
		(-3.51)	(2.83)	(3.57)	(0.47)	(3.24)	(-3.60)	(-0.80)	Year		
2006	Rel. External vs Internal Input	-0.0246***		0.0498***		0.00929		-0.0113	Nation	110042	0.061
		(-2.64)		(5.72)		(1.08)		(-1.30)	Year		
2009	External Input Dummy	-0.0283	-0.0397*	0.0387***	-0.0268***	0.0261	0.0324	-0.0173	Firm, Region	212613	0.244
		(-1.16)	(-1.90)	(3.21)	(-3.21)	(1.16)	(1.44)	(-1.36)	Year		
2009	External Input Dummy	-0.0139		0.0534***		0.0125		-0.0256**	Nation	212613	0.040
		(-0.62)		(3.81)		(0.60)		(-2.14)	Year		
2009	Internal Input Dummy	0.0546**	-0.0124	0.00849	-0.0405*	-0.0573***	0.0804	-0.0239	Firm, Region	212613	0.327
		(2.55)	(-0.24)	(0.57)	(-1.93)	(-4.00)	(1.42)	(-1.62)	Year		
2009	Internal Input Dummy	0.0383**		-0.00120		-0.0515***		-0.0247*	Nation	212613	0.079
		(2.03)		(-0.08)		(-3.76)		(-1.77)	Year		
2009	Rel. External vs Internal Input	-0.0806***	-0.0378***	0.0345***	-0.0106*	0.0705**	0.0246	-0.000146	Firm, Region	110042	0.402
		(-2.71)	(-3.17)	(4.29)	(-1.79)	(2.49)	(1.55)	(-0.01)	Year		
2009	Rel. External vs Internal Input	-0.0566*		0.0511***		0.0590*		-0.0153	Nation	110042	0.061
		(-1.69)		(8.11)		(1.86)		(-1.45)	Year		