Financial Hedging and Corporate Investment: Evidence from Mergers and Acquisitions*

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Abstract

M&As are the most important form of corporate investment. Their capital intensiveness makes the financing decision key to the M&A process. Given the well-documented relationship between corporate financial hedging and the firm's borrowing costs and capacity, this study examines the impact of corporate financial hedging on the likelihood of undertaking acquisition investments as well as the associated financing choices. Results show that utilizing financial derivatives enables firms to pursue inorganic growth opportunities in the form of M&As. Acquiring firms with financial hedging programs in place are more likely to finance their acquisitions with cash as well as external borrowing. Our study contributes to existing literature by showing that nancial hedging could serve as an effective vehicle for firms to bring their inorganic investment plans to fruition by facilitating their financing.

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1 Introduction

M&A activity has recovered after a slump in the aftermath of the financial crisis with the global volume reaching $4.3 trillion in 2015, an all-time high.[1] With many firms struggling to identify organic growth opportunities, acquisitions are frequently used as the main path for growth (inorganic) and are the most important form of corporate investment. Moreover, acquisition decisions are of critical importance to firms' fortunes and tend to impinge on their shareholders' wealth (e.g., Bruner, 2002; Moeller et al., 2005; Betton et al., 2008; Alexandridis et al., 2017). Due to the fact that M&A deals are capital intensive, they tend to require significant funding capacity and hence, both the acquisition decision and as well as the financing choice greatly depend on a firm's ability to borrow externally. Accordingly, U.S. firms externally finance 67% of their capital expenditures and 83% of their acquisition deals (Elsas et al., 2014), making the financing decision, borrowing capacity, as well as the cost of capital central to M&As. Cash, stock, or a combination comprise the main payment modes in acquisition deals while prior literature has highlighted the importance of public debt and bank loans as key sources of funding in cash-financed transactions (e.g., Bharadwaj and Shivdasani, 2003; Faccio and Masulis, 2005; Harford et al., 2009; Uysal, 2011). Accordingly, a firm's access to credit markets can have a significant impact on its M&A financing choices as well as its likelihood to undertake such large investment projects (Jensen, 1986; Jung et al., 1996; Harford, 1999; Karampatsas et al., 2014). Given that M&A deals are typically associated with a significant degree of financial risk this study examines the role of corporate financial hedging in the firms' acquisition decisions and financing choices.

Financial derivatives have been extensively utilized by firms to hedge financial risks, more so during times of hefty volatility in interest and exchange rates. A 2009 survey conducted by the International Swaps and Derivatives Association (ISDA) shows that 94% of the world's 500 largest companies use financial derivatives to manage their business and financial risks. Similarly, the 2010 CitiFX Global Corporate Risk Management survey

[1] Mergermarket – April 2016

reports that among 307 major corporate clients that participated in a survey, 77% hedge existing net assets or liabilities denominated in foreign currency and 76% hedge forecasted foreign currency transactions. By adding frictions to the Modigliani and Miller's (1958) perfect market model, optimal hedging theories identify various benefits from financial hedging, such as reducing financial distress costs (Mayers and Smith, 1982) and effective tax payments (Smith and Stulz, 1985), mitigating agency costs related to risk-shifting and under-investment as well as information asymmetry between firm managers and investors (Campbell and Kracaw, 1990; Froot et al., 1993), and increasing the firm's external financing capacity (Leland, 1998). More importantly financial hedging can alleviate a firm's investment constraints and facilitate access to external capital markets by reducing its cost of capital while it can also improve its internal financing ability by mitigating future cash flow volatility and reducing the likelihood of negative future cash flows (Froot et al., 1993).

Along these lines, Campello et al. (2011) show that U.S. firms using interest rate (IR) and foreign currency (FX) derivatives attain more favorable bank loan terms. Chen and King (2014) also document that financial hedging is associated with a lower cost of public debt financing. Because financial hedging may reduce the incidence of investment restrictions in loan agreements, Campello et al. (2011) report a positive effect of corproate financial hedging on firms' capital expenditures. Building on this work in this paper we investigate the relationship between corporate financial hedging, investment decisions, and the associated financing choices.

Given the risk reduction properties of financial derivatives, firms that use such instruments are subject to lower borrowing costs and less external financing constraints, making them more likely to carry out sizable investments relative to non-users. Moreover, financial hedging can have a bearing on the choice of the investment financing mode. Arguably, M&As provide an ideal setting to study the effect of financial hedging on corporate investment behavior since they comprise the most important form of corporate investment. U.S. deal volume reached $2.53 trillion in 2015 according to SDC while the total value of

CAPEX for all U.S. firms for the same year was $1.68 trillion.[2] Moreover, while CAPEX includes also outflows for the maintenance or replacement of existing assets, a sample of M&As might more fully capture a firm's strategic investment behavior while one might argue that risk management is more of an issue for acquisition deals which naturally entail more risk due to their inorganic nature and have been shown to frequently destroy value. Moreover, M&As are more likely (relative to CAPEX) to be financed through external debt while the payment mode data for acquisition deals are widely available, allowing us to directly investigate the impact of financial hedging on corporate investment financing choices.

We study a sample of public U.S. acquisitions announced between 1998 and 2012. Following Hoberg and Moon (2016), we collect financial hedging data for acquiring firms from their 10-K reports filed prior to the deal announcement with the software provided by MetaHeuristica LLC. Among M&A deals, 61% of acquirers use at least one of two types of financial derivatives: interest rate derivatives (Ird) and foreign currency derivatives (Fcd), in the fiscal year prior to the deal announcement. Around 47.5% of our sample acquirers use Ird and 42.7% use Fcd in the fiscal year prior to consummating acquisitions.

We first examine the impact of corporate financial hedging on acquisitiveness: the probability of a firm carrying out acquisition investments. When comparing acquirers to randomly selected non-acquirers in the same industry we find the former are more likely to be financial derivatives users. Matching acquirers to non-acquiring firms with similar characteristics also points to a positive association between the utilization of financial heding instruments and the probability of a firm becoming an acquirer. Firms with IR risk hedging experience have a 8.2% higher probability of being acquirers than those without such experience, controlling for other firm characteristics. Both univariate and multivariate tests results corroborate that firms with financial hedging programs in place are more likely to engage in acquisitions. The probability of a firm carrying out acquisitions is also higher when multiple types of financial derivatives are utilized. Along these lines, our results

[2] All the figures here reported are for all the U.S. firms listed on either NYSE, AMEX or NASDAQ.

are consistent with the view that corporate financial hedging has a significant impact on a firm's investment behavior; the use of financial derivatives at the corporate level alleviates financial constraints, enabling firms to carry out their inorganic growth plans by consummating more M&A investments.

Next we examine whether corporate financial hedging has an impact on M&A financing choices. We conjecture that the portion of cash financing should increase with financial hedging activity for two reasons. First, financial hedging can facilitate access to external capital markets by reducing the probability of negative future cash flows, making derivatives users more likely to meet interest payments to creditors than non-users. Second, financial hedging can improve access to debt financing by lowering the cost of capital. In accord with our hypothesis, we document a positive relation between acquiring firms' hedging activity and the use of cash in financing M&As. Acquirers with interest rate risk hedging experience have a 7.8% higher probability of using pure cash payment than those without such experience. In terms of the percentage of cash paid in M&A transactions, we find that Ird users pay 22.3% more cash than non-users. It is important to note that derivatives users generally have lower cash holdings than non-users in our M&A sample. Therefore, the higher cash element in this case is driven either by the stability in cash flow facilitated by financial hedging or, more likely, associated with additional external borrowing. Along these lines, we show that acquirers with financial hedging experience tend to use more external borrowing when paying for acquisitions. For instance, acquirers employing Ird hedging have a 6.5% higher probability to utilize external financing than those without such experience. In addition, hedging multiple risk types makes it more likely to use cash or external borrowing when carrying out acquisition investments.

To address the possibility that our results are driven by omitted variables, we adopt an instrumental variable (IV) approach by using linear regression models augmented with an endogenous binary treatment variable. The instrumental variable in the first step regression should significantly affects firms' financial hedging decisions but is not correlated with the dependent variable in the second step. Based on prior literature (e.g., Smith and Stulz,

1985; Nance et al., 1993; Geczy et al., 1997; Graham and Smith, 1999), one of the major reasons for firms to carry out financial hedging activity is the associated tax benefit. To the best of our knowlede, there is no literature pointing to a significant relation between tax convexity and M&A method of payment. Following Graham and Smith (1999), we utilize the tax convexity measure as our instrumental variable which is also in line with Campello et al. (2011) and Chen and King (2014). We use a bivariate probit model if the endogenous regressor is discrete (e.g., Angrist, 2001; Karampatsas et al., 2014) and a treatment effect model if the endogenous regressor is continuous. As an alternative way to address endogeneity concerns associated with any potential self-selection bias, we also apply the propensity score matching (PSM) method by pairing derivatives users with similar (in terms of leverage, cash holdings, growth opportunities, and deal relative size) non-users in our M&A sample. We then compare the financing characteristics of these two pairs. Controlling for endogeneity with either approach yields similar results about the impact of financial hedging on firms' M&A financing decisions.

Our study contributes to existing financial hedging and M&A literature in several important ways. First, we provide evidence that financial hedging and investment activities are inter-related; acquirers with financial hedging experience are more likely to undertake M&A investment projects, taking advantage of more favorable financing terms and ample access to external financing. Second, this is to our knowledge the first study providing direct evidence on the the role of financial hedging in investment financing decisions. Our results are consistent with the view that financial hedging can improve a firm's borrowing capacity and reduce its borrowing cost. They also provide support to the pecking order theory predicting that cost of capital has a significant impact on a firm's investment and financing choices. Third, our findings point to financial hedging comprising a significant M&A payment method determinant over and above a firm's capital structure and other factors identified by the extant literature on acquisition financing choices and their drivers (e.g., Travlos, 1987; Martin, 1996; Faccio and Masulis, 2005; Karampatsas et al., 2014). With lower borrowing costs and more access to external financing, acquirers with financial

hedging experience tend to use more cash and debt in the financing of M&A deals.

The rest of the paper is structured as follows. Section 2 reviews the related literature in corporate financial hedging as well as the determinants of M&A financing choice. Section 3 develops the main hypotheses and predictions. Section 4 describes the sample, financial hedging variables utilized and summary statistics. Section 5 reports the main empirical results along with the endogeneity tests. Finally, Section 6 concludes the paper.

2 Related literature and discussion of control variables

2.1 Financial hedging, cost of borrowing, and firm investment

Previous studies of corporate financial hedging mainly focus on why firms use financial derivatives (Smith and Stulz, 1985; Nance et al., 1993; Geczy et al., 1997; Graham and Rogers, 2002) and how financial hedging affects firm value (Guay, 1999; Hentschel and Kothari, 2001; Allayannis et al., 2001; Carter et al., 2006; Bartram et al., 2011). In their seminal work, Modigliani and Miller (1958) define a perfect capital market in which financial hedging does not improve firm value. However, a large stream of literature subsequently shows that firms have various motivations to hedge due to the market frictions such as taxes, information asymmetry, and transaction costs (e.g. Mayers and Smith, 1982; Smith and Stulz, 1985; Campbell and Kracaw, 1990; Froot et al., 1993; Leland, 1998). However, the empirical findings of hedging benefits are still mixed. Some studies document a positive effect of financial hedging on firm value (e.g. Allayannis et al., 2001; Mackay and Moeller, 2007; Bartram et al., 2011), while the others do not find any significant results (e.g. Guay, 1999; Hentschel and Kothari, 2001; Jin and Jorion, 2006). Two most common concerns about the benefits of corporate financial hedging are that the size of the hedging positions is too small, relative to firms' risk exposure, to make a difference (Guay, 1999) and the costs of rolling over financial derivatives positions are very high in practice

(Garfinkel and Hankins, 2011).

A growing body of literature begins to examine the exact channels through which financial hedging improves firm value. Froot et al. (1993) indicate that financial hedging can improve a firm's ability to use internal cash and thus mitigate financing restrictions on investment. Campello et al. (2011) find that financial hedging reduces a firm's financial distress cost and mitigates the agency cost of risk-shifting. As a result, firms with financial hedging programs tend to receive more favorable bank loan terms. They also show that financial hedging can enhance a firm's access to external capital and increase a firm's investment opportunities. Chen and King (2014) likewise show that firms with financial hedging experience have lower borrowing costs in public debt markets. They attribute this benefit to the reduced bankruptcy risk, lower agency cost related to risk-shifting and under-investment, and less information asymmetry. Overall, financial hedging may reduce the possibilities of negative cash flow realizations, therefore firms with hedging programs have a lower cost of borrowing and a stronger capability of accessing credit markets. While Petersen and Thiagarajan (2000) and Campello et al. (2011) examine the impact of financial hedging on corporate investment by investigating firms' gold exploration expenditure and asset-scaled capital expenditure respectively, few studies have yet shown the hedging benefits in one of the most important corporate investment activities: M&As. In this paper, we fill this gap by studying the impact of financial hedging on the probability of a firm being a deal acquirer, the method of payment, and the financing choices in M&As.

2.2 Cost of borrowing and financing decisions

As pointed out by Marina and Renneboog (2009), the determinants of firms' financing choices can be categorized into two main streams: the cost of capital and factors related to the agency problem. In this paper, we focus on the cost of capital stream. Myers and Majluf (1984) discuss the two major capital structure theories: the trade-off theory and the pecking order theory. The trade-off theory suggests that a firm weights its benefits and costs of borrowing when making its financing decisions. Pecking order theory proposes

that three are three sources of funds for a firm: internal capital first, then debt, and equity last. According to the pecking order theory, if the amount of investment exceeds a firm's retained cash, the firm may seek external financing. When the cost of debt is reduced, an acquirer with financial hedging programs is more likely to choose debt to finance the deal. Faulkender and Petersen (2012) find that the reduced cost of public debt affects a firm's capital structure choices. Harford and Uysal (2014) suggest that firms with credit rating have a better access to public debt markets and are more likely to initiate acquisitions. Following these two studies, we argue that the reduced borrowing cost due to financial hedging shapes a firm's M&A activity.

2.3 Determinants of payment method in M&A

The method of payment is important to both acquirers and targets in M&A because it affects the market reaction to the deal announcements. Travlos (1987) finds negative acquirer announcement returns for stock deals with public targets, while Chang (1998) documents positive acquirer announcement returns for stock deals with private targets. Given the importance of the payment methods on deal performance, recent studies have documented several determinants of payment methods in M&A. We summarize these determinants in this section and include the corresponding control variables in our empirical analyses.[3] All the control variables discussed in this section are constructed prior to the deal announcement. The detailed variable definitions can be found in Appendix A.

The first main determinant of payment methods is firm capital structure. The pecking order theory predicts that acquirers with adequate internal cash and external borrowing capacities pay targets with cash. Martin (1996) confirms this prediction and document a negative relationship between firm cash reserves and the use of stock payment. This is also evidenced by the work of Duchin et al. (2010) who find that the reduced external financing induced by financial crisis forces firms to cut their investment. Disatnik et al.

[3]Please refer to Martin (1996), Faccio and Masulis (2005), and Karampatsas et al. (2014) for detailed discussions.

(2014) document that firms with financial hedging programs tend to hold less cash. We need to control for firms' cash holdings in order to examine the impact of financial hedging on payment choices in M&A. Related to firms' cash holdings, Jensen (1986) proposes that firms with higher free cash flows are more likely to engage in deals with cash payment. Karampatsas et al. (2014) provide empirical evidence for Jensen's (1986) theory. Besides the cash related control variables, collateral and financial leverage are usually controlled for in the studies of payment methods (e.g. Faccio and Masulis, 2005). Collateral indicates a firm's ability to make a cash payment and leverage is used to measure a firm's capital structure. We use the variable $cashflows\_to\_equity$ to control for acquirers' free cash flow. We also use $debt\_assetbv$ and $collateral$ to control for acquirers' debt capacity.

The second main determinant of payment methods is market timing. Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) find that at the individual firm level, acquirers tend to use overvalued stocks to finance their acquisitions. At the market level, the behavioral explanation of merger waves suggests that an overvalued stock market may stimulate firms' stock acquisition activities. Dittmar and Dittmar (2008) provide empirical evidence that the acquirers have low cost of equity and finance their deals by stocks during the expansion periods of economy. Related to the market timing, several studies document that stock payments decrease dramatically in the recent years. Boone et al. (2014) find that the percentage of stock payments decreases from 60% in the 1990s to 20% recently. Similarly, De Bodt et al. (2015) find a significant decrease in the pure stock payment after 2001 when Financial Accounting Standards 141 and 142 became effective. We use the variable *Runup* to control for the market timing effect.

The third main determinant of payment methods is information asymmetry. Hansen (1987) utilizes the Nash bargaining equilibrium and predicts that acquirers are more likely pay overvalued stocks when information asymmetry is high. Brown and Ryngaert (1991) develop a theoretical model and show that acquirers are more likely to choose stock payments when they have information about their stock valuation which is not available to the targets. Rhodes-Kropf and Viswanathan (2004) argue that target shareholders may

overestimate the deal synergy due to information asymmetry and accept the overvalued acquirer stocks. Boone et al. (2014) provide the empirical evidence that stock deals are more often when the valuation risk is high. Recent studies examine the connection between acquirers and targets that may alleviate the information asymmetry issue. Renneboog and Zhao (2011) find that common directors between acquirers and targets help targets evaluate acquirer stocks, so that the targets are more likely to accept acquirer stocks as payment methods. Furthermore, Ishii and Xuan (2014) find that deals with a higher social connection between acquirer and target board directors are more likely to be pure stock deals. We use the variable $Average\_EPSSD$ to control for the information asymmetry.

The forth main determinant of payment methods is the control of merged firms after the deal completion. Stulz (1988) and Harris and Raviv (1990) propose that acquirers may be reluctant to pay stocks when the stock payments weaken their control of the merged firm. Yook et al. (1999) provide empirical evidence that firms with larger managerial ownership have a higher probability of paying cash in M&A deals. In addition, Martin (1996) document a non-linear relationship between acquirer managerial ownership and the probability of stock payment. The negative relationship only exists when the acquirer management ownership is moderate. On the target side, Chang and Mais (2000) find that acquirers tend to pay cash rather than stock when the target firm's ownership is concentrated. They attribute this to the management team's incentive to avoid the strong monitoring impact from blockholders. Besides, the listing status of the target also comes into this consideration. Compared with public firms, private firms tend to have a more concentrated ownership structure. Acquisitions of private targets are thus more likely to be cash deals, as the acquiring shareholders want more influence in the combined firm (Harford et al., 2012). We use $blockholder\_ownership$ to control for firm ownership.

The last determinant of payment methods is the acquirer stocks' desirability. Martin (1996) proposes that when acquiring firms have good future investment opportunities, they prefer to use stocks to finance the deals so that they may avoid potential financial constraints and their stocks are more desired by the target firms. Dass et al. (2016) find

that higher acquirers stock liquidity increases the desirability of its stocks to the target shareholders and therefore is associated with higher percentage of stock payment in M&A deals. Further, Rossi and Volpin (2004) find that better shareholder protection in the acquirers country means that target shareholders are more likely to accept a stock payment. We construct the variable Tobin's Q to control for acquirer shares' desirability.

3 Hypotheses and empirical predictions

In this paper, we study the impact of corporate financial hedging on the firm's investment activities and financing choices. As suggested by Campello et al. (2011), derivatives users may receive more favorable bank financing terms in their loan agreements and have better access to credit market than non-users. Chen and King (2014) also document that financial hedging is associated with a lower cost of public debt. Therefore, acquirers with financial hedging programs may have better access to credit markets and enjoy lower cost of borrowing.[4] Because of the better access to credit markets, all else equal, it is easier for derivatives users to raise cash through external borrowing than non-users, which may in turn have an impact on the firms' acquisition decisions as well as their M&A financing choices.

Further, Disatnik et al. (2014) suggest that cash flow hedging reduces a company's precautionary cash reserve. Yet it is more cash-rich companies that are more likely to engage in M&As Harford (1999). Ceteris paribus, we would therefore expect that companies with financial hedging programs are less likely to make acquisitions. However, both Campello et al. (2011) and Chen and King (2014) find that financial derivatives users have lower external borrowing costs and better access to credit markets. Harford and Uysal (2014) also find that better access to credit markets increases a company's acquisition probability while Rehman (2007) argue that borrowing costs have a significant effect on a

[4] Rauh and Sufi (2010) find that on average, total debt accounts for 50.2% of company's total capital, while public bonds and private bank loans account for 19.2% and 13.2% of the total capital separately, ranking as the top two sources of borrowing.

firm's acquisition behavior. Hence, one might argue that better access to credit markets and lower cost of borrowing are likely to be more acquisitive despite their typically lower cash holdings.

- ***Hypothesis (H1):*** *Firms with financial hedging programs are more likely to engage in M&As.*

Martin (1996) classify M&A payment forms in three categories: cash, stock, or a combination of both. The two main sources of cash payments are firm internal funds and external debt.[5] There are two reasons why we might expect financial derivatives users to utilize more cash in M&A financing. First, Froot et al. (1993) and Altuntas et al. (2017) find that cash flow volatility is lower when utilising financial derivatives while cash flow volatility is found to be negatively associated with corporate investment (Minton and Schrand, 1999). Even firms utilising financial derivatives tend to have lower cash reserves (Disatnik et al., 2014), stability in its cash flow can allow it to more effectively plan ahead and utilize its cash flow cash to pay for value increasing M&A opportunities. Second, since financial hedging provides acquirers with better access to external borrowing, acquiring firms utilising financial derivatives are more likely to finance a deal with cash.

- ***Hypothesis (H2):*** *Acquirers with financial hedging programs are more likely to finance their acquisitions with cash.*

A strand of M&A literature investigates the sources of cash payments in M&A (e.g., Denis and Mihov, 2003; P.Schlingemann, 2004; Harford et al., 2009; Marina and Renneboog, 2009; Vladimirov, 2015). Cash financing can stem either from internal cash holdings or external debt. According to the pecking order theory (Myers and Majluf, 1984), acquirers use external borrowing only if their internal cash holdings are not sufficient to cover deal

[5]Although it is possible that an acquirer may issue new shares of stocks and use the cash proceedings to pay a target, this secondary equity offering (SEO) practice is relatively rare in M&A deals. Marina and Renneboog (2009) find that only 11% of equity-financed deals in their sample involve SEOs, while an outright stock swap is used in 89% of their equity-financed deals. Both Karampatsas et al. (2014) and Golubov et al. (2015) exclude SEO as the source of financing in cash deals.

payments. Given the capital intensiveness of M&A investments and the fact that financial derivatives users tend to have lower cash holdings than non-users, the lower borrowing costs facilitated by corporate financial hedging are expected to lead to more external debt financing.

- ***Hypothesis (H3):*** *Acquirers with financial hedging programs are more likely to finance the deals by external debt.*

4 Data and sample description

4.1 M&A sample

Our M&A sample is from Thomson SDC. Deals are announced between 1998 and 2012 and both acquirers and targets are U.S. listed firms.[6] We also impose additional selection criteria: i) the status of the deal is either completed or withdrawn; ii) since our focus is on deals involving a change in control we exclude all minority stake purchases, acquisitions of remaining interest, privatizations, repurchases, exchange offers, self-tenders, recapitalizations or spinoffs; iii) the transaction value is at least $1 mil and corresponds to no less than 5% of the acquirer's market value; iv) the acquirer owns less than 50% of target's shares before the transaction and seeks to end up with at least 90% at completion. v) the acquirer has data in Compustat and CRSP; vi) due to the scope of utilising financial derivatives being different among financial institutions we exclude financial firms with SIC codes 6000–6199 and 6200–6799.

4.2 Financial hedging data

For each deal acquirer, we collect its financial hedging data from the 10-K report filed at the fiscal year prior to the deal announcement. Following Hoberg and Moon (2016), we

[6]Financial Hedging company level data from a financial statement search index developed by Meta-Heuristica LLC are only available for the period 1997-2011 and thus our sample period restriction. For more detail please see Section 4.2.

use the text analysis software developed by MetaHeuristica LLC accesed via JAVA API to search for financial hedging information in acquirers' 10-K reports.[7] The MetaHeuristica database only covers firm electronic filings in the EDGAR database between 1997 and 2011. We only focus on interest rate (IR) and foreign exchange (FX) derivatives because they are directly related to a firm's external financing costs (Campello et al., 2011; Chen and King, 2014). We collect IR hedging data as follows:

1. To be considered as one hit for IR derivatives, we require that there is at least one word (or their plural forms) from each of the following three groups:
   - interest rate
   - forward, future, option, swap, spot, collar, cap, ceiling, floor, lock, derivative, hedge, hedging, hedged
   - contract, position, instrument, agreement, obligation, transaction, strategy
2. We require that the distance between any two words from the above lists is no more than 25 words.
3. We exclude false positive hits with phrases: in the future, not, or insignificant.
4. We record how many related hits appeared as the variable IRD for each CIK code and fiscal year.

We use similar steps in the classification of FX derivatives information but replace the terms "interest rate" by "currency, foreign exchange, exchange rate" (in singular or plural form). Search criteria are otherwise the same as for IR derivatives. We try different versions of the data collection steps mentioned above including alternative specifications of the key word list and the distance between key words. We also go through the 10-K reports of a small sample of firms manually and compare the results with the electronically

[7] As in Hoberg we delete "hits" that merely provide the definitions of financial derivatives. Other than 10-K and 10-K405 reports, we also include EX-13 and EX-13.1 since financial hedging information is often reported within these two sections.

collected ones. The process described above produces the most accurate results. Employing the criteria and data collection steps above produces a final sample of 1,738 deals with financial hedging data for acquiring firms.

Based on the "hits" collected from the above steps, we derive an indicator variable Ird which equals to one if there is at least one hit pointing to use of interest rate derivatives, and zero otherwise. Similarly, Fcd is a dummy variable that equals to one if there is at least one FX derivatives related hit and zero otherwise. Fcd/Ird is equals to one if either the Fcd or Ird indicators are equal to one. Finally, $Hedging\_scope$ is an indicator capturing the number of financial derivatives' categories a firm uses, and can take a value ranging from zero to two.

4.3 Descriptive statistics

Table 1 presents the distribution of deals in our M&A sample by announcement year and industrial segment. Panel A shows that our sample includes more deals from the early years although most years are well represented.[8] Panel B of Table 1 presents the acquirer industry distribution of our sample deals according to the Fama–French 10 industry clarification (Fama and French, 1997). Business Equipment accounts for the largest share of M&A deals in our sample (37.51%), followed by other (13.35%), healthcare (13.18%), and manufacturing (11.85%). This distribution is considered normal in M&A studies.

Table 2 reports the summary statistics of the financial hedging proxy variables for our sample of acquiring firms. Detailed definitions of these variables are provided in Appendix A. Within our M&A sample, 61.0% of the acquirers utilize at least one type of IR and FX derivatives (Fcd/Ird). 47.5% of the acquirers make use of FX derivatives (Fcd) while 42.7% use IR derivatives (Ird). The mean of $Hedging\_scope$ indicates that on average, our sample acquirers utilize 0.9 different categories of financial derivatives. Our mean value for Ird is similar to Chen et al. (2016) (43.2%), though the mean value for Fcd

[8]The period 1998–2001 includes the technology bubble boom when deal-making hit a record high.

is significantly smaller (63.2%). Yet, Chen et al. (2016) study a sample of cross-border M&A in which acquirers have more FX exposures and thus are more likely to hedge these exposures through FX derivatives relative to our M&A sample which does not include deals made abroad. The mean values of Ird and Fcd are also somewhat higher than those reported in Bartram et al. (2011) (40.4% and 37.8%) and Campello et al. (2011) (35.6% and 27.3%). This divergence can be explained by the fact that our study utilizes a more recent sample period and the use of financial derivatives among firms has increased over time.

Panel B of Table 2 reports the summary statistics of our M&A sample for a number of deal and acquirer characteristics, partitioned by derivatives' users and non-users. Variable definitions are provided in Appendix A. Derivatives users (non-users) are firms with an Fcd/Ird dummy equal to 1 (0). The main purpose of the table is to provide a comparison of variables' mean values for these two groups of acquirers. There are in total 1,451 (83.5%) completed deals and 287 (16.5%) withdrawn deals. Consistent with Chen et al. (2016), deals carried out by derivatives users are associated with a higher completion probability. The firm size of the derivatives users is larger than that of the non-users, but the relative size of the deal is smaller for derivatives users than non-users. Further, acquirers utilizing financial derivatives have higher leverage, lower Tobin's Q, lower Runup, higher free cash flow to equity, and less collateral. Consistent with Disatnik et al. (2014), derivatives users have significantly lower cash holdings than non-users at the end of the fiscal year prior to the deal announcement. So, in case derivatives users are more acquisitive, this is not likely to be driven by higher cash holdings.

5 Empirical test results

5.1 Financial hedging and acquisition likelihood

In this section, we examine the impact of financial hedging on acquisition probability. Since corporate financial hedging can reduce cash flow volatility as well as borrowing

costs, our first hypothesis predicts that it would pave the way for a firm to invest more. Accordingly, if financial hedging enables firms to invest more we would expect that firms with financial hedging experience would be more likely to undertake inorganic investment in the form of M&As (i.e. be more acquisitive). We investigate this empirical question by examining the acquisition activities of firms that utilize hedging instruments versus those that do not.

For the univariate tests reported in Table 3 we match each acquirer with random non-acquiring firms from Compustat. In the spirit of Ishii and Xuan (2014), each sample acquirer is paired with a random firm drawn from the sample acquirer's industry in the year of the acquisition and we repeat this procedure 500 times. The randomly selected firms picked using this bootstrapping approach serve as the control group. Table 3 reports the percentage of acquirers that use financial derivatives in our M&A sample as well as the control sample. Panels A, B, and C report the results for a matching process based on the Fama–French 10, 30, and 48 industry classifications, respectively. For all four financial hedging proxy variables: Ird, Fcd, Fcd/Ird, and $Hedging\_scope$, the percentages of derivatives users in our M&A sample are higher than those in the simulated sample, and the differences are statistically significant at the 1% level. For instance, in Panel A, 61% of deal acquirers employ either Ird or Fcd derivatives compared to only 41% of randomly selected firms. The univariate test results indicate that firms with financial hedging programs in place are more likely to carry out acquisition investments.

Next, we examine the association between the use of corporate financial hedging and the likelihood of engaging in acquisition investments in a multivariate framework where we control for a number of confounding effects (our derivatives indicators might be capturing) that might affect the probability of becoming an acquirer. Following Harford (1999) and Khan et al. (2012), we use the logit regression to examine the likelihood of a firm carrying out an acquisition. The dependent variable $Acquirer\_dummy$ is a binary variable taking a value of 1 if a sample firm is an acquirer and 0 otherwise. Acquiring firms in our sample are first matched to non-acquirers in the same fiscal year (to the year of each acquisition

announcement) from the Compustat/CRSP merged database. We also match acquirers to non-acquirers based on various combinations of firm characteristics including industry (Fama-French 10 industries), firm size, stock returns, cash reserves, Tobin's Q, and asset growth rates. We apply a ±20% range for these firm characteristics. So an acquiring firm with a Tobin's Q of 1 is matched only to non-acquirers with a Tobin's Q between 0.8 and 1.2 in the fiscal year preceding the acquisition announcement. The number of control matches for each acquirer is limited to five as in Bena and Li (2014). When there are more than five eligible matches then five are selected randomly without replacement.

The main independent variables of interest are our four financial hedging proxies. To control for the variations in market valuation and growth opportunities, we include the one-year firm stock return over the fiscal year prior to the deal announcement $One-year\_return$ (Khan et al., 2012) as well as $Tobin's\ Q$ (Shleifer and Vishny, 2003; Rhodes-Kropf et al., 2005). We also include the cash holding, $Holding\_cash$ (Harford, 1999), in the regressions to control for the value of a company's cash reserves. Finally, we control for acquirer size ($Size$), asset growth ($Asset\_growth$), leverage ($Leverage$), return on equity (ROA), as well as industry and year fixed effects.

Columns 1–4 of Table 4 report the test results for the full sample that include all acquirers and their matched counterparts with the only criterion for the pairing process being the same fiscal year. Columns 5–8 report the results based on the combinations of different matching criteria indicated on the top of each column. For brevity, in Columns 5–8 we only report coefficients for the key independent variable of interest, Fcd/Ird.[9] As shown in Table 4, the coefficients of financial hedging variables are all positive and statistically significant across different specifications and irrespective of the matching approaches. These results are consistent with corporate financial hedging being instrumental in determining the probability of a firm becoming an acquirer. Further, the more types of financial risk a firm hedges, the more likely it carries out acquisitions. The effect of financial hedging on the likelihood of becoming an acquirer is economically significant. In

[9]Results are similar for Ird, Fcd, and $Hedging\_scope$.

Column 7 for example, financial hedging increases the probability of consummating M&A deals by 6.4%. Overall, our findings corroborate to Hypothesis H1 that financial hedging experience can exert a positive influence on the firm's ability to pursuing inorganic growth through undertaking M&A investments.

5.2 Financial hedging and M&A payment method

In this section we examine the relationship between corporate financial hedging and the financing choice in M&A deals. As hypothesised earlier, corporate financial hedging should enable firms to finance their investments with cash either through alleviating extreme cash flow fluctuations or – most importantly – easing their borrowing costs and facilitating the access to credit markets. According to the pecking order theory, financing corporate investments through cash reserves, cash flows, or external debt should be preferred given the relatively high cost of equity financing. Therefore, ceteris paribus, corporate financial hedging should serve as a vehicle to achieve more optimal investment financing.

5.2.1 Univariate analysis

In M&A deals, the acquiring firm may mainly pay by cash, stock, or a combination of both.[10] To study the relation between corporate financial hedging and the choice of payment method in M&As we employ three measures. $Pure\_cash$ is an indicator variable equal to 1 for deals with 100% cash payment, and 0 otherwise. $Cash\_major$ is an indicator variable equal to 1 if more than 50% of the payment is in cash, and 0 otherwise. In addition, we employ a continuous variable, Pct_cash, which measures the percentage of cash consideration in the offer.

Table 5 presents the summary statistics (number of observations, means, and standard deviations) for the full sample, the sample of derivatives users as well as the non-user sample. Derivatives users and non-users are classified based on three financial hedging

[10]Exotic and option-like payment methods are also used but relatively infrequently.

proxy variables: Ird, Fcd, and Fcd/Ird. The last column of the table reports the mean differences between derivatives users and non-users. Overall, more than one third (34.9%) of the full sample of 1,738 M&A deals are paid for entirely with cash while 806 (46.4% of deals) involve mainly cash ($Cash\_major$). On average, 46.7% of the M&A transaction value is paid in cash. The univariate tests show that the mean values of $Pure\_cash$ and $Cash\_major$ are significantly higher for the derivatives user sample than for non-users suggesting that the former are more likely to finance their deals entirely with cash. Along these lines, derivatives users tend to pay a higher percentage of cash in M&A deals than non-users. Our results are robust across all three derivatives user categories Ird, Fcd, and Fcd/Ird. Mean differences in cash proxy variables are statistically significant at the 1% level.[11] The univariate test results are consistent with the view that acquirers with financial hedging programs tend to employ more cash in the financing of M&A deals compared to acquirers that do not utilize such derivatives products.

5.2.2 Multivariate analysis

In this section, we perform multivariate regressions to control for firm and deal characteristics that have been shown to affect the choice of payment method in acquisitions. Table 6 reports the results of multivariate regressions in which the dependent variables are $Pure\_cash$, $Cash\_major$, and Pct_cash respectively. If the dependent variable is a binary variable, $Pure\_cash$ or $Cash\_major$, we employ a probit regression model. If the dependent variable is a continuous variable that lies in the range between 0 and 1, Pct_cash, we employ a tobit regression model. The independent variables of interest in these regressions are the financial hedging proxy variables Ird, Fcd, Fcd/Ird, and $Hedging\_scope$. The various firm and deal characteristic control variables are discussed in Section 2.3. The descriptions of control variables are in Appendix A. Year and industry fixed effects are included in all the regressions.

The positive and statistically significant coefficients of financial hedging binary vari-

[11] In unreported tests, we find that the median differences between the two samples are also significant at the 1% level

ables (Ird, Fcd, and Fcd/Ird) in most specifications show that the use of both FX derivatives and IR derivatives contributes to a higher likelihood of cash being used as the payment mode in M&As. In Columns 1 and 2, for example, there is a 7.8% (5.7%) higher probability that deals carried out by IR (FX) derivatives users are financed entirely with cash relative to those carried out by non-IR-users (non-FX-users). Further, Column 3 shows that the probability for pure cash financing is by 9.5% higher if the acquirer utilizes either IR or FX derivatives (compared to non-users). Finally, deals consummated by acquirers that hedge more types of financial risks ($Hedging\_scope$) are also more likely financed with pure cash. Our results for $Cash\_major$ are in the same direction.

$Pure\_Cash$ and $Cash\_major$ used in Columns 1–8 are binary variables. In Columns 9–12, we directly examine the relation between acquirer's hedging activities and the percentage of cash payment. Pct_cash is the percentage of cash involved in the M&A deal payment reported in SDC. The coefficients of all three financial hedging binary variables remain positive and statistically significant, suggesting that the use of either IR or FX derivatives contributes to a higher percentage of cash payment in M&A. Column 11 shows that on average, the occurrence of corporate financial hedging through either FX or IR derivatives increases the percentage of cash consideration in an acquisition offer by 32%. We also find that the more types of risks an acquirer hedges ($Hedging\_scope$) the more likely the acquisition offer will comprise a higher percentage of cash.

The coefficients of our control variables show that tender offers and smaller relative size deals are more likely to be paid with cash. We also find that acquirers tend to use more cash payment to preempt other competing bidders, consistent with Fishman (1989). The coefficient of Tobin's Q is negative and statistically significant, which is consistent with Martin's (1996) in that firms with higher growth opportunities are less likely to use cash when financing acquisitions. Alternatively, if Tobin's Q also captures a firm's valuation it is possible that a highly valued firm will use more stock (instead of cash) as a currency to pay for acquisitions, which is consistent with the market timing theory (Shleifer and Vishny, 2003).

Overall, our test results so far provide support to our Hypothesis H2 that financial derivatives users are more likely to use cash in the financing of M&A deals. While this result is important and suggests that corporate financial hedging enables firms to directly finance their inorganic growth with cash this can be due to both its impact on mitigating cash flow volatility as well as on reducing borrowing costs. A reduction in the cost of borrowing would induce more external debt financing while more stable cash flow would encourage the use of free cash flow. In the next section, we focus specifically on the impact of derivatives instruments on the use of debt.

5.3 Financial hedging and external financing

To examine the impact of corporate financial hedging on the external financing of acquisition deals we construct a debt financing indicator variable, *Borrowing_dummy*, based on the deal financing data collected from SDC (item: Source of Funds). SDC reports six different external borrowing forms for M&A deals: bank loan, debt, line of credit, bridge loan, foreign lenders, and junk bonds. As long as an acquirer employs at least one of these six borrowing forms (304 cases), we set the variable *Borrowing_dummy* equal to 1 and 0 otherwise.[12]

Table 7 shows that about 17.5% of our sample deals are financed by external borrowing. On average, 20.3% of derivatives users finance their deals through external borrowing while only 13.3% of non-users use debt. Mean and median differences between users and non-users statistically significant. Results are similar for different financial derivatives variables, except *Fcd* where the difference is not statistically significant. One possible explanation is that the use of foreign exchange derivatives is more relevant to hedge foreign exchange rate risk rather than interest rate risk. The results of the univariate tests suggest that all else equal, derivatives users are more likely to use external borrowing to finance their M&A deals compared with non-users.

[12]We also set *Borrowing_dummy* equal to one if either bank loan or debt is reported by SDC and zero otherwise. There are 206 sample deals where the acquirers use these two methods to finance the transaction. Our results are similar when we employ this specification.

Table 8 reports the multivariate test results. We employ the probit model and control for various deal and firm characteristics in our analysis. The multivariate results are largely consistent with our univariate findings. The positive and statistically significant coefficients of Ird suggest that the use of IR derivatives contribute to more external borrowing to finance M&As. Acquirers with IR hedging experience have a 6.5% higher probability of using external financing in M&A than those without such experience. As in the univariate results, although the coefficient of FX derivatives is positive, it is not statistically significant. So IR derivatives are more instrumental in driving M&A financing decisions than FX derivatives. Yet, the coefficients of the Ird/Fcd and $Hedging\_scope$ are still positive and statistically significant, suggesting that the likelihood of external borrowing does increase the more types of risk an acquirer hedges. Overall, our results suggest that corporate financial hedging has a pertinent impact on the likelihood firms raise funds through external borrowing to finance acquisitions. This is consistent with both our Hypothesis H3 and Hypothesis H1 predicting that the use of financial derivatives can lead to lower cost of borrowing, therefore, enabling firms to finance capital-intensive investment projects such as M&As with external debt which can also explain why derivatives users tend to be more acquisitive.

5.4 Endogeneity Control

5.4.1 Instrument variable methods

One of the major concerns on corporate financial hedging studies is that firms' financial hedging decisions are not random (Campello et al., 2011). Corporate financial hedging may be associated with unobservable firm characteristics that also affect the payment method and financing decisions in M&As. Although we control for a set of important firm and deal characteristics as well as industry and year fixed effects in our previous tests, the omitted variable problem may still lead to potential biased results.

In order to mitigate this endogeneity concern, we use an instrumental variable (IV)

model to check the robustness of our results (e.g. Heckman, 1978; Greene, 2007; Wooldridge, 2010; Allayannis et al., 2012). In the first step regression, we estimate an acquirer's decision to use financial derivatives (Ird/Fcd) as a function of various deal and firm characteristics that have been documented to be relevant, controlling for the year and industry fixed effects as well. The IV used in the first step regression is *Tax_convexity*. Previous financial hedging studies show that tax loss carryforward may create a convex tax schedule (Geczy et al., 1997), so the tax benefit is one of the important reasons that firms choose to hedge with financial derivatives. For firm's with non-linear tax functions, financial hedging can reduce the volatility of their taxable income and thus reduce their expected tax liability. Graham and Smith (1999) develop a model to estimate the tax convexity based on a 5% reduction in the volatility of taxable income. The tax convexity estimated by Graham and Smith's (1999) model has been adopted in Campello et al. (2011) and Chen and King (2014) as the IV to address the endogeneity of corporate financial hedging decisions. Following these studies, we use *Tax_convexity* as the IV in our models.[13] Our IV satisfies the exclusion restriction because it is unlikely that tax convexity is associated directly with the M&A financing decisions. Our IV also satisfies the relevancy condition because both Geczy et al. (1997) and Graham and Smith (1999) find that firms with a higher tax convexity are more likely to use financial derivatives.

In the second step regression, we replace the financial hedging indicator variables in the model examined in Section 5.2 and 5.3 with the predicted probability of financial hedging in the first step regression. According to Angrist (2001), when the endogenous explanatory variables are binary, the non-linear models in the second step do not produce consistent estimates if the model is not absolutely correct. Therefore, we employ the bivariate probit models when the dependent variable in the second step is discrete (Karampatsas et al., 2014) and the treatment effect models when the dependent variable in the second step is continuous (Heckman, 1978; Wooldridge, 2010).

Table 9 presents the results of our IV model regressions. In the first step treatment

[13]For the detailed calculation of *Tax_convexity*, please refer to Graham and Smith (1999), page 2256.

regressions, we conduct the probit tests in which the dependent variable is the hedging indicator variable Ird, Fcd, and Ird/Fcd. The coefficients of $Tax\_convexity$ are all statistically significant in the first step regressions, suggesting that $Tax\_convexity$ is a valid IV. In the second step regressions with the dependent variables being $Pure\_cash$, $Cash\_major$, Pct_cash, and $Borrowing\_dummy$, the estimated coefficients for the predicted hedging indicator variables are all positive and statistically significant. Overall, the results of IV models in Table 9 indicate that after controlling for the potential endogeneity issue, we still find a positive and significant relationship between corporate financial hedging and acquirers' financing decisions in M&A.

5.4.2 Propensity score matching

In our previous empirical analyses, we have controlled for the firm and deal-specific characteristics that are found to be related to the acquirer's payment method and financing decisions in the M&A literature. We also adopt the IV model in section 5.4.1 to mitigate the endogeneity issue. In this section, we employ the propensity score matching (PSM) as an alternative to further mitigate the endogeneity concern. The main difference between the IV and PSM methods is that the IV model relies on an instrumental variable made from unmeasured or unobserved variables while the PSM model utilizes observable variables to construct a weight based on the selection. One advantage of using the IV model is that it accounts for unobserved confounding variables, but the major weakness of the IV model is that it is difficult to completely validate the exclusion restriction of the selected instrumental variable.

To apply our PSM tests, we run the logit models for each deal acquirer in our sample to calculate the propensity scores with dependent variables being Ird, Fcd, and Fcd/Ird, respectively. The explanatory variables we include in the logit models are $Leverage$, $Cash/assets$, $Tobin'sQ$, and $Relative\_size$. We then use the estimated propensity scores from the logit models to construct matched samples using both nearest-neighbour matching and Gaussian kernel matching methods. To eliminate any biased matched sample concerns,

we test the difference in each explanatory variable used in the logit models between the derivatives users' samples and the matched non-user samples in untabulated tests. The differences are not significant.[14] In Table 10, we report the difference in the firm's payment and financing variables between derivatives users and matched non-user samples. The positive and significant difference shows that our conclusions remain unchanged.[15]

6 Conclusions

This paper examines the impact of corporate financial hedging on M&As which comprise the most important form of corporate investment. First, we present evidence that the use of financial derivatives at the firm level increases the likelihood of a firm undertaking investment in the form of M&As. This is consistent with the view that financial hedging, through its impact on the cost of borrowing and accessibility to capital, acts as a vehicle for a firm to mitigate any financing restrictions and support its investment activies by pursuing inorganic growth opportunities. Second, we find that acquiring firms with financial hedging programs in place are more likely to finance their acquisitions with cash as well as external borrowing. Our results are consistent with optimal hedging theories that corporate financial hedging may reduce firms' future cash flow volatility and improves their access to external financing. Our paper contributes to existing financial hedging literature and in particular on the importance of financial hedging in facilitating corporate investment and shaping the choice of investment financing.

[14] The results are available upon request.

[15] After matching, we also include the matching criteria as control variables in the second stage regressions rather than doing t-tests. Our results remain robust.

Appendix A

Table A1: Variable definitions

This table presents variable definitions and the corresponding data sources. SDC refers to the Thomson Reuters Securities Data Company, CRSP refers to the Centre for Research in Security Prices, IBES refers to the Institutional Brokers Estimate System, 13-F refers to the Thomson Reuters 13F Database, and EDGAR refers to the SEC Electronic Data Gathering, Analysis, and Retrieval.

Variable	Definition	Source
Dependent variables of interest		
Pure_cash	Indicator variable: 1 for deals with 100% cash payment, 0 otherwise.	SDC
Cash_major	Indicator variable: 1 for deals with more than 50% cash payment, 0 otherwise.	SDC
Pct_cash	The percentage of cash payment involved in the total payment of the transaction.	SDC
Borrowing_dummy	Indicator variable: 1 for deals financed with external borrowing, 0 otherwise.	SDC
Acquirer_dummy	Indicator variable: 1 for firms attempt at least one acquisition, 0 otherwise.	SDC
Deal characteristics		
Complete	Indicator variable: 1 for deals that are completed, 0 for withdrawn deals.	SDC
Toehold	Indicator variable: 1 if the acquirer already holds a certain percentage of the target shares at the announcement, 0otherwise.	SDC
Hostile	Indicator variable: 1 for hostile deals, 0 otherwise.	SDC
Tender_offer	Indicator variable: 1 for tender offers, 0 otherwise.	SDC
Related_industry	Indicator variable: 1 if the target and acquirer have different two-digit SIC Codes, 0 otherwise	SDC
Competition	Indicator variable: 1 if more than one firm is bidding for the target, 0 otherwise	SDC
Relative_size	The ratio of transaction value to acquirer market value at the end of the fiscal year before the deal was announced.	SDC/Compustat
Firm characteristics		
Size	The acquirer's book value of total assets at the end of the fiscal year before the announcement, in 2012 U.S.$ billions.	Compustat
Tobin's Q	The acquirer's Tobin's Q at the end of the fiscal year before the deal announcement.	Compustat

Continued on next page

Table A1 – continued from previous page

Variable	Definition	Source
Leverage	The acquirer's ratio of the book value of debt to the book of value of total assets at the end of the fiscal year before the deal announcement	Compustat
Cash flow/Equity	Acquirer's income before extraordinary items plus depreciation minus dividends on common and preferred stocks divided by the acquirer's market value at the end of the fiscal year before the deal announcement (Karampatsas et al., 2014).	Compustat
Holding_cash	The acquirer's cash holdings, including cash and marketable securities, normalized by the book value of total assets.	Compustat
Collateral	The value of the acquirer's property, plant and equipment to total assets at the end of the fiscal year before the deal announcement	Compustat
Runup	Market adjusted buy-and-hold return of the acquirer's stock over a $(-205, -6)$ window (Golubov et al., 2012).	CRSP
Average_EPSSD	The standard deviation of analyst's forcasts about the acquirer's stock price in the fiscal year preceding the deal announcement.	IBES
Blockholder_ownership	The total ownership of blockholders that hold at least 5% of firm stocks. (Karampatsas et al., 2014)	13-F
One-year_return	The stock return of the acquirer over the 1 year window preceding the deal announcement.	CRSP
Asset_growth	The growth of the total asset of the acquirer over the 1 year window preceding the deal announcement.	Compustat
Financial hedging variables		
Ird	Indicator variable: 1 if the acquirer uses interest rate derivatives in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K
Fcd	Indicator variable: 1 if the acquirer uses foreign currency derivatives in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K
Ird/Fcd	Indicator variable: 1 if the acquirer uses either foreign currency derivatives or interest rate derivatives in the fiscal year before the deal announcement, 0 otherwise.	EDGAR 10-K
Hedging_scope	Indicator variable: 2 if the acquirer uses both of the two types of derivatives contracts (FX and IR) in the fiscal year before the deal announcement, 1 if the acquirer uses only one of the two types of derivatives contracts (FX or IR), 0 if the acquirer does not use foreign currency derivatives or interest rate derivatives.	EDGAR 10-K

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Table 1: Sample distribution

This table reports the distribution of M&A deals in our sample. Our final sample includes 1,738 U.S. public to public M&As between 1998 and 2012. Both the acquirers and targets have complete CRSP and Compustat data, and the acquirers have 10-K reports available on EDGAR for the fiscal year prior to the deal announcement. Panel A reports the distribution of M&A deals in our sample by deal announcement year and Panel B reports the distribution of M&A deals in our sample by acquirer industry. We assign 1,738 deal acquirers into FamaFrench 10 industries based on their SIC codes.

Panel A. Distribution of M&As by announcement year.

Year	Frequency	Percentage
1998	216	12.43%
1999	226	13.00%
2000	196	11.28%
2001	158	9.09%
2002	96	5.52%
2003	106	6.10%
2004	88	5.06%
2005	95	5.47%
2006	105	6.04%
2007	94	5.41%
2008	89	5.12%
2009	67	3.86%
2010	80	4.60%
2011	58	3.34%
2012	64	3.68%
Total	1,738	100.00%

Panel B. Distribution of M&As by acquirer industry.

Fama–French 10 industries	Number	Percentage
Business Equipment	652	37.51
Other	232	13.35
Healthcare, Medical Equipment, Drugs	229	13.18
Manufacturing	206	11.85
Wholesale, Retail, and Some Services	115	6.62
Telephone and Television Transmission	82	4.72
Oil, Gas, and Coal Extraction and Products	75	4.32
Consumer NonDurables	65	3.74
Utilities	51	2.93
Consumer Durables	31	1.78
Total	1,738	100

Table 2: Descriptive statistics

Panel A. Summary statistics of financial hedging proxy variables. This panel reports the use of financial derivatives for our sample acquirers. Our final sample includes 1,738 U.S. public to public M&As between 1998 and 2012. Both the acquirers and the targets have complete CRSP and Compustat data, and the acquirers have 10-K reports available on EDGAR for the fiscal year prior to the deal announcement. We electronically parse the acquirers' 10-K reports on EDGAR using MetaHeuristica software to collect the financial hedging data. All variables are created in the fiscal year preceding the deal announcement. Ird is a binary variable indicating whether an acquirer engages in IR hedging or not. Fcd is a binary variable indicating whether an acquirer engages in FX hedging or not. Fcd/Ird is a binary variable indicating whether an acquirer engages in at least one of the FX and IR hedging or not. $Hedging\_scope$ indicates the number of financial hedging categories which an acquirer engages in.

Variable	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Ird	1,738	0.475	0.500	0	1
Fcd	1,738	0.427	0.495	0	1
Ird/Fcd	1,738	0.610	0.488	0	1
Hedging_scope	1,738	0.902	0.820	0	2

Panel B. Summary statistics of control variables. This panel reports the summary statistics of 1,738 U.S. public to public M&A deals between 1998 and 2012. Both the acquirers and the targets have complete CRSP and Compustat data, and the acquirers have 10-K reports available on EDGAR for the fiscal year prior to the deal announcement. The number of observations, means, and standard deviations of each variable for full sample, derivative users, and non-users are displayed accordingly. The derivatives users and nonusers are defined based on the variable Fcd/Ird. The last column (Diff) presents the significance levels of the t-test on the mean difference between the derivatives users and non-users. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels are indicated by $***$, $**$, and $*$.

	Full sample			Derivatives user			Derivatives non-user			
Variable	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Diff**
Deal characteristics										
Complete	1,738	0.835	0.371	1,164	0.872	0.334	574	0.761	0.427	***
Toehold	1,738	0.032	0.175	1,164	0.032	0.176	574	0.031	0.174	
Hostile	1,738	0.024	0.154	1,164	0.026	0.159	574	0.021	0.143	
Tender_offer	1,738	0.187	0.390	1,164	0.210	0.407	574	0.141	0.348	***
Related_industry	1,738	0.631	0.483	1,164	0.608	0.488	574	0.676	0.468	***
Competition	1,738	0.078	0.268	1,164	0.081	0.273	574	0.071	0.258	
Relative_size	1,692	0.431	0.944	1,144	0.389	1.002	548	0.521	0.802	***
Acquirer characteristics										
Size	1,738	14.352	39.324	1,061	20.680	42.738	677	4.434	30.792	***
Tobin's Q	1,697	2.746	4.279	1,136	2.388	2.521	561	3.472	6.464	***
Leverage	1,738	49.096	24.807	1,164	53.264	22.566	574	40.646	26.928	***
Cash flow/Equity	1,735	-0.005	0.901	1,162	0.038	0.316	573	-0.092	1.499	***
Holding_cash	1,738	0.199	0.211	1,164	0.163	0.179	574	0.272	0.249	***
Collateral	1,729	0.233	0.217	1,156	0.251	0.218	573	0.198	0.211	***
Runup	1,733	1.206	0.738	1,163	1.157	0.606	570	1.306	0.944	***
Average_EPSSD	1,460	1.285	17.430	1,015	1.684	20.657	445	0.376	4.757	
Blockholder_ownership	1,738	0.149	0.135	1,164	0.148	0.132	574	0.151	0.142	
One-year_return	6,456	0.085	0.824	3,763	0.143	0.728	2,693	0.003	0.936	***
Asset_growth	5,314	0.256	1.080	3,216	0.196	0.395	2,098	0.348	1.643	***

Table 3: Financial hedging and acquisitiveness: Univariate tests

This table examines whether financial hedging has a direct impact on the probability of firms being acquirers in M&As. We pair each sample acquirer with a random firm drawn from the sample acquirer's industry in the deal announcement year and bootstrap five hundred random acquirers. The percentage of our M&A sample acquirers that use financial derivatives, the percentage of bootstrapped acquirers in our control sample that use financial derivatives, and the difference between these two are reported. Fama–French 10, 30, and 48 industry classifications are used in Panel A, B, and C, respectively. Significance at the 0.01, 0.05, and 0.10 levels are indicated by $***$, $**$, and $*$.

Panel A. Fama-French 10 industries

	M&A Sample		Control Sample		Difference
	Mean	**S.D.**	**Mean**	**S.D.**	**M&A−Control**
Ird	0.475	0.500	0.312	0.169	0.163 ***
Fcd	0.427	0.495	0.226	0.105	0.201 ***
Ird/Fcd	0.610	0.488	0.410	0.152	0.200 ***
Hedging_scope	0.902	0.820	0.538	0.224	0.364 ***

Panel B. Fama-French 30 industries

	M&A Sample		Control Sample		Difference
	Mean	**S.D.**	**Mean**	**S.D.**	**M&A−Control**
Ird	0.475	0.500	0.306	0.160	0.170 ***
Fcd	0.427	0.495	0.221	0.113	0.206 ***
Ird/Fcd	0.610	0.488	0.401	0.152	0.210 ***
Hedging_scope	0.902	0.820	0.527	0.232	0.375 ***

Panel C. Fama-French 48 industries

	M&A Sample		Control Sample		Difference
	Mean	**S.D.**	**Mean**	**S.D.**	**M&A−Control**
Ird	0.475	0.500	0.300	0.164	0.175 ***
Fcd	0.427	0.495	0.226	0.118	0.201 ***
Ird/Fcd	0.610	0.488	0.398	0.157	0.212 ***
Hedging_scope	0.902	0.820	0.526	0.240	0.376 ***

Table 4: Financial hedging and acquisitiveness: Multivariate analyses

This table reports the results of logit regressions. The dependent variable is *Acquirer_dummy*, the binary variable that is equal to one for firms that are the acquirers in our sample, and zero for the matched firms in the control groups. In Columns 1–4, the control group includes five randomly drawn firms from the Compustat/CRSP merged database in the deal announcement year and within the same industry as our sample deal acquirers. In Column 5, we match each deal acquirer with a group of similar firms in the deal announcement year: same industry, 80%-120% total assets, and 80%-120% Tobin's Q. In Columns 6–8, we replace the matching criteria Tobin's Q by one year stock return, one year asset growth rate, and cash holdings, respectively. Detailed definitions of all variables can be found in Appendix A. Industry, year, and deal fixed effects are included in all regressions. The p-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels are indicated by $***$, $**$, and $*$.

	Industry				**Industry, Size, & Tobin's Q**	**Industry, Size & Stock return**	**Industry, Size, & Asset growth**	**Industry, Size, & Cash holdings**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Ird	0.628***							
	(0.000)							
Fcd		0.795***						
		(0.000)						
Fcd/Ird			0.754***		0.186***	0.199***	0.308***	0.205***
			(0.000)		(0.006)	(0.009)	(0.000)	(0.005)
Hedging_scope				0.555***				
				(0.000)				
One-year_Return	0.055**	0.060**	0.056**	0.056**	-0.025	0.147***	0.011	-0.012
	(0.023)	(0.014)	(0.022)	(0.021)	(0.422)	(0.004)	(0.741)	(0.531)
Tobin's Q	0.002	0.003	0.005	0.004	0.130***	0.064***	0.021	0.068***
	(0.814)	(0.798)	(0.632)	(0.677)	(0.000)	(0.002)	(0.136)	(0.000)
Leverage	-0.005***	-0.003**	-0.005***	-0.005***	-0.006***	-0.007***	-0.008***	-0.007***
	(0.001)	(0.013)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.606***	0.524***	0.529***	0.496***	1.030***	1.574***	1.109***	1.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Holding_cash	-0.303*	-0.453***	-0.335*	-0.268	0.077	0.118	0.230	-1.180***
	(0.084)	(0.010)	(0.057)	(0.128)	(0.694)	(0.586)	(0.300)	(0.000)
Asset_growth	0.044**	0.048**	0.046**	0.048**	0.012	0.002	0.206***	0.028
	(0.037)	(0.024)	(0.026)	(0.021)	(0.489)	(0.868)	(0.000)	(0.147)

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Table 4 – Continued from previous page

	Industry				Industry, Size, & Tobin's Q	Industry, Size & Stock return	Industry, Size, & Asset growth	Industry, Size, & Cash holdings
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Size	0.010***	0.008***	0.009***	0.008***	0.015***	0.034***	0.032***	0.034***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Intercept	-2.737***	-2.607***	-2.824***	-2.798***	-1.563***	-0.667***	-0.813***	-0.991***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.009)	(0.001)	(0.000)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,502	9,502	9,502	9,502	6,637	4,390	4,120	5,371
Pseudo R-squared	0.080	0.087	0.086	0.091	0.051	0.109	0.104	0.113

Table 5: Financial hedging and payment method in acquisitions : Univariate tests

This table presents the univariate test results of payment method proxy variables: *Pure_cash*, *Cash_major*, and *Pct_cash*. *Pure_cash* is a binary variable which is equal to 1 for deals with 100% cash payment, and 0 otherwise. Cash_major is a binary variable which is equal to one for deals with over 50% cash payment, and zero otherwise. *Pct_cash* is the percentage of cash payment in the total M&A transaction payment. We report the summary statistics of these three variables for full sample, derivatives users, and non-users. The derivatives users and non-users are defined by the financial hedging proxy variables: Ird, Fcd, and Fcd/Ird, respectively. The last column reports the significance levels of the t-test on the difference between the derivatives user sample and non-user sample. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels is indicated by $***$, $**$, and $*$.

	Full sample			Derivatives user			Non-user			Difference
Variable	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**t-value**
					Ird					
Pure_cash	1,738	0.349	0.477	826	0.426	0.495	912	0.280	0.449	6.4727***
Cash_major	1,738	0.464	0.499	826	0.546	0.498	912	0.390	0.488	6.5743***
Pct_cash	1,738	0.467	0.451	826	0.554	0.446	912	0.389	0.441	7.7456***
					Fcd					
Pure_cash				742	0.464	0.499	996	0.264	0.441	8.8178***
Cash_major				742	0.582	0.494	996	0.377	0.485	8.6830***
Pct_cash				742	0.581	0.450	996	0.383	0.433	9.2808***
					Ird/Fcd					
Pure_cash				1,061	0.422	0.494	677	0.235	0.424	8.1369***
Cash_major				1,061	0.540	0.499	677	0.346	0.476	8.0674***
Pct_cash				1,061	0.548	0.448	677	0.340	0.426	9.6034***

Table 6: Financial hedging and payment method in acquisitions : Multivariate analyses

This table presents the regression results of acquirer payment methods on financial hedging proxy variables for the sample of 1,393 U.S. public to public M&A deals between 1998 and 2012 with required data for the regressions. In Columns 1–4, the dependent variable in the probit regressions is *Pure_cash*, the binary variable that is equal to one for deals with 100% cash payment, and zero otherwise. In Columns 5–8, the dependent variable in the probit regressions is *Cash_major*, the binary variable that is equal to one for deals with more than 50% cash payment, and zero otherwise. In Columns 9–12, the dependent variable in the tobit regressions is *Pct_cash*, the percentage of cash payment in the total M&A transaction payment. *Fcd*, *Ird*, *Fcd/Ird*, and *Hedging_scope* are acquirer financial hedging characteristics, which are the independent variables of interests in this table. Detailed definitions of all variables can be found in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for all regressions. The p-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels are indicated by ***, **, and *.

	Pure_cash				**Cash_major**				**Pct_cash**			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Ird	0.270***				0.121				0.230**			
	(0.003)				(0.171)				(0.012)			
Fcd		0.197**				0.205**				0.223***		
		(0.021)				(0.015)				(0.009)		
Fcd/Ird			0.332***				0.197**				0.320***	
			(0.000)				(0.026)				(0.000)	
Hedging_scope				0.184***				0.129**				0.178***
				(0.001)				(0.017)				(0.001)
Toehold	0.188	0.177	0.197	0.186	-0.106	-0.110	-0.104	-0.108	-0.041	-0.041	-0.033	-0.039
	(0.423)	(0.454)	(0.401)	(0.430)	(0.651)	(0.642)	(0.659)	(0.646)	(0.872)	(0.873)	(0.898)	(0.877)
Hostile	0.066	0.068	0.059	0.059	0.084	0.084	0.082	0.082	-0.071	-0.074	-0.075	-0.075
	(0.786)	(0.780)	(0.808)	(0.808)	(0.726)	(0.726)	(0.733)	(0.732)	(0.823)	(0.815)	(0.814)	(0.814)
Tender_offer	0.897***	0.899***	0.894***	0.894***	1.257***	1.257***	1.254***	1.252***	1.287***	1.288***	1.278***	1.281***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Related_industry	-0.094	-0.102	-0.104	-0.096	0.007	0.005	0.004	0.007	-0.065	-0.072	-0.073	-0.067
	(0.270)	(0.230)	(0.222)	(0.259)	(0.930)	(0.956)	(0.966)	(0.931)	(0.446)	(0.398)	(0.395)	(0.431)
Competition	0.406***	0.399***	0.412***	0.411***	0.410***	0.412***	0.412***	0.413***	0.382**	0.384**	0.389**	0.388**
	(0.007)	(0.008)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)	(0.018)	(0.019)	(0.017)	(0.017)
Relative_size	-0.732***	-0.701***	-0.709***	-0.705***	-0.473***	-0.447***	-0.462***	-0.457***	-0.398***	-0.373***	-0.380***	-0.377***

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Table 6 - continued from previous page

	Pure_cash				Cash_major				Pct_cash			
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.001	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001
	(0.522)	(0.570)	(0.564)	(0.407)	(0.212)	(0.150)	(0.197)	(0.136)	(0.280)	(0.248)	(0.272)	(0.166)
Tobin's Q	-0.034*	-0.034*	-0.034*	-0.034*	-0.048**	-0.049**	-0.048**	-0.048**	-0.051**	-0.052**	-0.052**	-0.052**
	(0.092)	(0.095)	(0.089)	(0.092)	(0.021)	(0.020)	(0.019)	(0.020)	(0.014)	(0.016)	(0.014)	(0.014)
Leverage	0.000	0.001	-0.000	0.000	-0.000	-0.000	-0.001	-0.001	0.001	0.001	-0.000	0.000
	(0.992)	(0.661)	(0.847)	(0.993)	(0.929)	(0.961)	(0.744)	(0.786)	(0.809)	(0.587)	(0.957)	(0.877)
Cash Flow/Equity	0.328	0.322	0.295	0.307	0.592**	0.569**	0.569**	0.568**	0.325	0.309	0.300	0.305
	(0.165)	(0.175)	(0.205)	(0.192)	(0.012)	(0.016)	(0.017)	(0.017)	(0.102)	(0.126)	(0.120)	(0.118)
Holding_cash	-0.177	-0.270	-0.209	-0.194	-0.367	-0.399	-0.372	-0.352	-0.351	-0.420*	-0.357	-0.350
	(0.488)	(0.285)	(0.412)	(0.445)	(0.139)	(0.105)	(0.131)	(0.154)	(0.153)	(0.086)	(0.144)	(0.153)
Collateral	-0.156	-0.139	-0.162	-0.155	0.126	0.126	0.119	0.123	0.028	0.031	0.024	0.027
	(0.560)	(0.603)	(0.546)	(0.563)	(0.622)	(0.622)	(0.640)	(0.630)	(0.910)	(0.902)	(0.922)	(0.913)
Runup	-0.107	-0.097	-0.097	-0.098	-0.133*	-0.123	-0.127	-0.126	-0.114	-0.103	-0.104	-0.104
	(0.210)	(0.253)	(0.260)	(0.252)	(0.099)	(0.127)	(0.117)	(0.119)	(0.155)	(0.198)	(0.190)	(0.194)
Average_EPSSD	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004*	0.004*	0.004*	0.004*
	(0.220)	(0.222)	(0.235)	(0.224)	(0.185)	(0.186)	(0.191)	(0.185)	(0.093)	(0.092)	(0.096)	(0.086)
Blockholder_ownership	0.058	0.052	0.037	0.106	-0.433	-0.391	-0.437	-0.379	-0.142	-0.120	-0.150	-0.090
	(0.852)	(0.866)	(0.904)	(0.733)	(0.157)	(0.202)	(0.152)	(0.217)	(0.648)	(0.698)	(0.627)	(0.771)
Intercept	0.057	0.113	0.039	0.027	0.754**	0.741**	0.730**	0.700**	1.238***	1.272***	1.207***	1.194***
	(0.848)	(0.700)	(0.894)	(0.928)	(0.012)	(0.013)	(0.015)	(0.020)	(0.000)	(0.000)	(0.000)	(0.000)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,393	1,393	1,393	1,393	1,393	1,393	1,393	1,393	1,393	1,393	1,393	1,393
Pseudo R-squared	0.233	0.231	0.235	0.234	0.236	0.238	0.238	0.238	0.164	0.164	0.166	0.165

Table 7: Financial hedging and external financing : Univariate tests

This table presents the univariate test results of the acquirer external financing decision variable: *Borrowing_dummy*. *Borrowing_dummy* is an indicator variable that is equal to one for deals financed with external borrowing, and zero otherwise. We report the summary statistics of these three variables for full sample, derivatives users, and non-users. The derivatives users and non-users are defined by the financial hedging proxy variables: Ird, Fcd, and Fcd/Ird, respectively. The last column reports the significance levels of the t-test on the difference between the derivatives user sample and non-user sample. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels are indicated by $***$, $**$, and $*$.

	Full Sample			Derivatives User			Derivatives Nonuser			Difference
Variable	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**Obs.**	**Mean**	**Std. Dev.**	**t-value**
						Ird				
Borrowing_dummy	1,738	0.175	0.380	826	0.228	0.420	912	0.128	0.335	5.479***
						Fcd				
Borrowing_dummy				742	0.173	0.378	996	0.178	0.382	- 0.282
						Fcd/Ird				
Borrowing_dummy				1,061	0.203	0.402	677	0.133	0.340	3.738***

Table 8: Financial hedging and External Financing : Multivariate analyses

This table presents the results of the probit regressions for the sample of 1,393 U.S. public to public M&A deals between 1998 and 2012 with required data for the regressions. The dependent variable is *Borrowing_dummy*, the binary variable that is equal to one for deals with external financing, and zero otherwise. *Fcd*, *Ird*, *Fcd/Ird*, and *Hedging_scope* are acquirer financial hedging characteristics, which are the independent variables of interests in this table. Detailed definitions of all variables can be found in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for all regressions. The p-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels are indicated by $***$, $**$, and $*$.

	Borrowing_dummy			
	1	**2**	**3**	**4**
Ird	0.324***			
	(0.002)			
Fcd		0.055		
		(0.592)		
Fcd/Ird			0.235**	
			(0.031)	
Hedging_scope				0.145**
				(0.025)
Toehold	0.031	-0.004	0.023	0.020
	(0.909)	(0.989)	(0.931)	(0.943)
Hostile	-0.413	-0.407	-0.410	-0.418
	(0.136)	(0.140)	(0.136)	(0.131)
Tender_offer	1.186***	1.185***	1.185***	1.184***
	(0.000)	(0.000)	(0.000)	(0.000)
Related_industry	0.089	0.082	0.078	0.084
	(0.378)	(0.414)	(0.436)	(0.402)
Competition	-0.070	-0.094	-0.080	-0.076
	(0.688)	(0.590)	(0.645)	(0.663)
Relative_size	0.282***	0.291***	0.293***	0.297***
	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.010***	-0.008***	-0.009***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)
Tobin's Q	-0.038	-0.041	-0.040	-0.041
	(0.278)	(0.244)	(0.253)	(0.244)
Leverage	-0.005*	-0.003	-0.004	-0.004
	(0.083)	(0.220)	(0.114)	(0.125)
Cash Flow/Equity	0.803**	0.842**	0.816**	0.813**
	(0.022)	(0.019)	(0.021)	(0.021)
Holding_cash	-1.710***	-1.862***	-1.810***	-1.797***
	(0.000)	(0.000)	(0.000)	(0.000)
Collateral	0.200	0.196	0.200	0.203
	(0.480)	(0.487)	(0.479)	(0.472)
Runup	-0.242**	-0.242**	-0.241**	-0.239**
	(0.039)	(0.037)	(0.040)	(0.041)
Average_EPSSD	-0.432	-0.431	-0.435	-0.433
	(0.231)	(0.230)	(0.227)	(0.231)
Blockholder_ownership	0.075	0.047	0.044	0.095
	(0.841)	(0.900)	(0.905)	(0.798)
Intercept	0.159	0.298	0.218	0.199
	(0.646)	(0.384)	(0.527)	(0.564)
Industry Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1393	1393	1393	1393
Pseudo R-squared	0.246	0.239	0.243	0.243

Table 9: Financial hedging and the M&A financing decision : Endogeneity control

This table presents the results of regressions to control for the endogeneity. In the first step (Reduced) regressions, the dependent variable is Fcd/Ird. Following Campello et al. (2011) and Chen and King (2014), the instrumental variable used in the first step regressions is $Tax\_convexity$. In the second step (Structural) regressions, the dependent variables are $Pure\_cash$, $Cash\_major$, Pct_cash, and $Borrowing\_dummy$ respectively. The bivariate probit model is applied for $Pure\_cash$, $Cash\_major$, and $Borrowing\_dummy$. The treatment effect model is applied for Pct_cash. Detailed definitions of all variables can be found in Appendix A. Year and Fama–French 10 industry fixed effects are controlled for all regressions. The p-values are reported in parentheses. Significance at the 0.01, 0.05, and 0.10 levels are indicated by $***$, $**$, and $*$.

	Pure_cash		**Cash_major**		**Pct_cash**		**Borrowing_dummy**	
	Reduced	**Structural**	**Reduced**	**Structural**	**Reduced**	**Structural**	**Reduced**	**Structural**
Ird/Fcd		1.110***		1.213***		0.309**		1.339***
		(0.003)		(0.002)		(0.026)		(0.001)
Toehold	-0.198	0.250	-0.200	-0.023		0.001	-0.208	0.068
	(0.399)	(0.269)	(0.388)	(0.919)		(0.993)	(0.375)	(0.781)
Hostile	0.228	-0.025	0.297	0.007		-0.001	0.197	-0.464*
	(0.430)	(0.938)	(0.338)	(0.984)		(0.989)	(0.463)	(0.065)
Tender_offer	0.173	0.813***	0.188*	1.079***		0.364***	0.204*	0.960***
	(0.106)	(0.000)	(0.079)	(0.000)		(0.000)	(0.070)	(0.000)
Related_industry	0.065	-0.133	0.069	-0.028		-0.022	0.059	0.061
	(0.448)	(0.112)	(0.419)	(0.733)		(0.334)	(0.492)	(0.526)
Competition	-0.093	0.404***	-0.091	0.411**		0.126***	-0.098	-0.091
	(0.546)	(0.010)	(0.562)	(0.011)		(0.002)	(0.512)	(0.583)
Relative_size	-0.199***	-0.565***	-0.204***	-0.313***		-0.108***	-0.221***	0.352***
	(0.005)	(0.006)	(0.003)	(0.009)		(0.000)	(0.001)	(0.000)
Size	-0.002	-0.001	-0.001	-0.002**	-0.001	-0.001	-0.001	-0.011***
	(0.611)	(0.238)	(0.661)	(0.024)	(0.550)	(0.143)	(0.754)	(0.000)
Tobin's Q	0.015	-0.028	0.016	-0.039*	0.019	-0.006	0.014	-0.043
	(0.319)	(0.194)	(0.301)	(0.076)	(0.170)	(0.121)	(0.349)	(0.270)
Leverage	0.020***	-0.006*	0.020***	-0.007**	0.019***	-0.002	0.020***	-0.011***
	(0.000)	(0.077)	(0.000)	(0.016)	(0.000)	(0.135)	(0.000)	(0.003)
Cash flow/Equity	0.114	0.244	0.115	0.443*	0.111	0.010	0.114	0.727*
	(0.477)	(0.350)	(0.478)	(0.069)	(0.392)	(0.356)	(0.476)	(0.066)
Holding_cash	-0.805***	0.063	-0.787***	0.014	-0.833***	-0.044	-0.797***	-1.228**

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Table 9 – continued from previous page

	Pure_cash		Cash_major		Pct_cash		Borrowing_dummy	
	Reduced	**Structural**	**Reduced**	**Structural**	**Reduced**	**Structural**	**Reduced**	**Structural**
	(0.001)	(0.808)	(0.001)	(0.959)	(0.000)	(0.571)	(0.001)	(0.014)
Collateral	0.132	-0.161	0.141	0.076		0.034	0.131	0.127
	(0.614)	(0.554)	(0.593)	(0.768)		(0.631)	(0.608)	(0.629)
Runup	-0.059	-0.065	-0.056	-0.092	-0.088	-0.019	-0.056	-0.163
	(0.408)	(0.432)	(0.430)	(0.236)	(0.214)	(0.374)	(0.441)	(0.158)
Average_EPSSD	0.008***	0.003	0.008**	0.003	0.007	0.001*	0.008**	-0.360
	(0.006)	(0.284)	(0.015)	(0.260)	(0.484)	(0.074)	(0.036)	(0.177)
Blockholder_ownership	-0.325	0.164	-0.272	-0.250		-0.010	-0.469	0.275
	(0.319)	(0.613)	(0.413)	(0.442)		(0.903)	(0.151)	(0.441)
Tax_convexity	0.029***		0.027***		0.031***		0.026***	
	(0.000)		(0.000)		(0.000)		(0.000)	
Intercept	-0.467	-0.415	-0.481	0.148	-0.561**	0.592***	-0.451	-0.395
	(0.123)	(0.245)	(0.112)	(0.707)	(0.047)	(0.000)	(0.139)	(0.299)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339
Pseudo R-squared	0.227		0.200		0.279		0.142	

Table 10: Financial hedging and the M&A financing decision : Propensity score matching

This table reports acquirers' payment and financing choices adjusted using propensity score matching methods. We use logit regressions to estimate the likelihood of a firm to undertake corporate financial hedging with the dependent variables being Ird, Fcd, and Fcd/Ird, respectively. The independent variables included in the logit regressions are $Relative\_size$, $Leverage$, $Cash/assets$, and Tobin's Q. Using the propensity score generated in the logit regressions, we construct the matched samples using both nearest-neighbor matching and Gaussian kernel matching. Then the difference in the payment and financing methods variables ($Pure\_cash$, $Cash\_major$, Pct_cash, and $Borrowing\_dummy$) between deals with acquirer being derivatives users and matched non-users are reported. Detailed definitions of all variables can be found in Appendix A. Significance at the 0.01, 0.05, and 0.10 levels are indicated by $***$, $**$, and $*$.

	5 Nearest	**10 Nearest**	**50 Nearest**	**Gaussian kernel**
			Ird	
Pure_cash	0.169 ***	0.163 ***	0.168 ***	0.100 ***
	(0.000)	(0.000)	(0.000)	(0.003)
Cash_major	0.160 ***	0.152 ***	0.151 ***	0.072 **
	(0.000)	(0.000)	(0.000)	(0.043)
Pct_cash	0.168 ***	0.162 ***	0.164 ***	0.094 ***
	(0.000)	(0.000)	(0.000)	(0.003)
Borrowing_dummy	0.068 ***	0.056 **	0.054 **	0.025
	(0.003)	(0.014)	(0.017)	(0.389)
			Fcd	
Pure_cash	0.144 ***	0.150 ***	0.136 ***	0.094 ***
	(0.000)	(0.000)	(0.000)	(0.006)
Cash_major	0.161 ***	0.156 ***	0.145 ***	0.112 ***
	(0.000)	(0.000)	(0.000)	(0.001)
Pct_cash	0.152 ***	0.149 ***	0.140 ***	0.112 ***
	(0.000)	(0.000)	(0.000)	(0.000)
Borrowing_dummy	-0.020	-0.011	-0.017	-0.011
	(0.360)	(0.601)	(0.408)	(0.670)
			Fcd/Ird	
Pure_cash	0.175 ***	0.175 ***	0.173 ***	0.126 ***
	(0.000)	(0.000)	(0.000)	(0.000)
Cash_major	0.160 ***	0.167 ***	0.168 ***	0.126 ***
	(0.000)	(0.000)	(0.000)	(0.000)
Pct_cash	0.181 ***	0.185 ***	0.185 ***	0.148 ***
	(0.000)	(0.000)	(0.000)	(0.000)
Borrowing_dummy	0.042 *	0.031	0.032	0.056 **
	(0.082)	(0.185)	(0.186)	(0.037)