Will I Get Paid? Employee Stock Options and Mergers and Acquisitions*

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ABSTRACT

We analyze how rank-and-file employee compensation contracts of target firms affect the negotiations of merger terms and merger outcomes. Using unique data from merger agreements, we document that in 79.9% of all deals at least some of the target's employee stock options are canceled by the acquirer. Employees lose approximately half of their option value in the average M&A deal. By exploiting the exogenous variation in option grants, we find that the offer price premium is larger when the target firm has many employee options. Further, the bidders that cancel stock options earn on average 1.6% higher announcement return. We find some evidence of strategic targeting of firms with options. Our results are consistent with the bidders trading off the costs of compensation liabilities against the resistance of employees.

Keywords: Mergers and acquisitions, non-executive compensation, employee stock options, takeover premium, target selection, takeover defenses

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Employee stock options (ESOs) have grown in use more than nine-fold since the late 1980s and represent an integral component of modern employee compensation packages, particularly for firms in the high-tech industry (see e.g., Core and Guay (2001), Ittner et al. (2003), and Chang, Fu, Low, and Zhang (2015)).[1] Because of the nature of competition for employee talent and because financing constraints can make it difficult to pay high wages, the small highly innovative firms, which can make attractive acquisition targets (Bena and Li (2014), Hoberg and Phillips (2010), and Phillips and Zhdanov (2013)), have an especially high concentration of ESOs in their compensation plans. In this study, we analyze how acquirers treat the broad-based option plans of target firms, document the magnitudes of wealth transfers that take place between employees to shareholders in change of control, and examine how ESOs affect the merger terms and outcomes. We focus on the option part of compensation for two reasons: their popularity and the discretion with which they can be treated by new owners.

Using unique data from merger agreements on 1,277 deals announced over the period of 2006 to 2014, we document that ESO compensation is typically reduced or modified by acquirers in a way that does not benefit employees. In 79.9% of all completed M&A deals, some of the target's outstanding employee stock options are terminated by the acquirer. While the most common scenario is cancelling all out-of-the-money stock options of the target firm, sometimes even in-the-money stock options are terminated without any payment to employees, and vested and unvested stock options can all be fair game.[2] Further, employees are often forced to accept the intrinsic value of their vested in-the-money stock options in lieu of the Black-Scholes value; we find that this handling happens in 76.2% of all deals. Finally, even in cases when acquirers assume the target option plans, the Black-Scholes value of options typically drops because the newly converted options are written on the acquirer's stock that tends to be less volatile than the target's stock (stock return volatility of 34.4% vs. 53.7%). Overall, we estimate that the average M&A deal reduces the value of stock options to

[1] According to the National Center for Employee Ownership, options were the most prominent form of individual equity compensation in 2014. For example, the General Social Survey estimates that 7.2 million employees held stock options in 2014. Furthermore, more than 80 percent of all options are offered to rank-and-file employees rather than firm executives (see Core and Guay (2001) and Babenko, Lemmon, and Tserlukevich (2011)).

[2] For example, when Microsoft was buying Skype in 2011, employees were not even able to keep the vested portion of their stock options.

employees by approximately 48.8%, which is equivalent to 2.4% of the market capitalization of the target firm prior to the merger. In addition, we find no evidence that these options are replaced by the new equity-based grants after the acquisition.

Why do acquirers cancel option compensation? A possible explanation is that they attempt to control labor-related costs as the value of ESOs can increase manyfold in the M&A transaction if these contracts are left unchanged. This is because an offer from the bidder features a premium over the current market price and moves options deeper in the money. More importantly, because option is a levered claim, its value grows much faster in the premium than does the value of the underlying stock. For example, an option with a strike price of \$100 and the current market price of \$110 yields the intrinsic value of \$10 upon the exercise. With a 40% premium put forth by the acquirer, the intrinsic value of the option jumps to \$54, which is a 440% increase in value. Therefore, if not modified or canceled, employee stock options could become a large financial burden to the acquirer.[3]

Another potential explanation is that employees of target firms are entrenched and overpaid and that the new owners use an M&A event as an opportunity to abrogate old contracts and reset employee compensation back to competitive levels. Several theoretical papers show how employee entrenchment can arise under the optimal contract (see, e.g., Harris and Holmstrom (1982) and Berk, Stanton, and Zechner (2010)), with the intuition being that such contracts insure risk-averse employees from the idiosyncratic risk in their human capital.

Given the prospect of having their ESOs taken away, employees can be expected to actively participate in merger negotiations or even resist the merger. There are several levers available to employees to influence the outcome and the probability of the merger. For example they can refuse to sell their stock, exert pressure on management, lobby against the merger, or threaten to go on a strike (see e.g., Rauh (2006) and Pagano and Volpin (2005)).[4] However,

[3] With a positive takeover premium, the cost of options can be significant to the acquirer even if options are priced in. If there is no premium, the stock option does not present an extra cost because the additional liability of \$10 to the acquirer is exactly offset by the lower market price of the target. With a premium, however, the liability is greater than the price discount. Specifically, after accounting for the cost of option and the 40% premium, the acquisition price for assets with value V is $1.4(V - \$10)$. Therefore, the acquisition price is lower by \$14 because of options, but the additional liability to the bidder is \$54.

[4] Cronqvist et al. (2009) also find empirical evidence consistent with a view that managers value good social relations with their employees and are willing to pay them more to improve such relations. Thus it is possible

the financial incentives of employees to oppose a merger may vary across firms and deals. On one hand, the premium on a stock offered by the bidder benefits all employees to the extent of their stock ownership. The positive run-up in the stock price driven by the news of the merger increases the value of all components of employee compensation (net of the compensation cancelled); these include stock holdings, options, and stock held through ESPPs, 401(k) plans, and ESOPs. Our estimate shows that the net monetary effect of the acquisition on the employee stock options is positive and increases their value by approximately 4.0%. However, it is strongly dependent on the treatment of ESOs by the acquirer and the offer premium. In fact, in deals in which at least some stock options are cancelled by the acquirer, the value of employee stock options is lower even if we take into account the price increase associated with merger news and completion; ESOs decline in value by approximately 11.6% on average in these cases. Further, many employees may attribute the pre-merger price run-up to their hard work and the success of the firm rather than to the merger itself. Indeed, Malmendier, Opp, and Saidi (2016) find that targets of cash-financed acquisitions are revalued by the market on average by +15% after the deal failure (relative to their market value before the merger announcement), which could indicate that proposed M&As do not actually cause an increase in value of the targets but instead speed up its realization.

Ultimately, what incentives ESOs create for the bidders is an empirical question. On one hand, an additional cost of assuming employee stock options reduces the attractiveness of a firm to the prospective acquirer, implying a lower offer premium and a smaller probability of a merger. On the other hand, if it is possible to cancel or reduce the value of outstanding stock options and transfer the gains from this transaction to shareholders, both the premium and the probability of being taken over may be positively affected by the presence of ESOs. Finally, if employees tend to lobby against those mergers where more of their compensation is at stake or if managers use ESO treatment as a way to obtain a better deal from the acquirer, we may expect that ESOs shift the bargaining power in merger negotiations to the target. We expect that, all else equal, the offer premium is larger in this case.

We find that after we control for deal and target firm characteristics the takeover premium

that managers will be more reluctant to approve deals that reduce employee pay.

is approximately 4.8% higher for deals in which the acquirer cancels some employee stock options. In raw data, the difference in premium is even greater at 8.6%. Interestingly, in deals with option cancellations the acquirers earn on average a statistically positive announcement return of 0.6%, whereas it is negative -1.6% in deals in which acquirers assume compensation obligations of the target. Correspondingly, the total market value of the acquirer's stock over the three-day announcement window drops by $329 million less in deals with option cancellations than in other deals. These results are consistent with the view that cancelling stock options allows the bidder to reduce compensation liability and realize gains at the expense of employees. We estimate that about a quarter of bidder return differential can be explained by wealth transfers from employees to shareholders. We also document that the takeover premium is larger when the target firm has many outstanding stock options, particularly when these options are out-of-the money and unvested. These results suggest that because employees are concerned about the value of their stock options, the managers may be reluctant to approve the deal unless the acquirer pays a substantially high price or that ESOs help to strengthen the target's bargaining power in negotiations.

However, it is also possible that a positive relation between options and the offer premium arises not because more stock options cause a higher takeover premium, but because they proxy for some valuable but unobservable characteristic of the target firm. For example, employee stock options could be correlated with the quality of the firm's labor force or innovativeness. To address this concern, we rely on the instrumental variables approach and use a geography-based and a tax-based instruments. The first instrument builds on the idea that the compensation of rank-and-file employees has a strong geographical component (see Kedia and Rajgopal (2009)) and is calculated as the number of outstanding options to the firm outstanding shares for neighboring firms that have the headquarters located in the same three-digit zip code as the target firm. The second instrument derives from the different propensity of firms to grant stock options for tax reasons. Specifically, firms that face more convex tax schedules, realize a higher tax benefit from moving their compensation deductions to the states with high taxable income and thus may grant more stock options. Because tax convexity is typically not preserved after the combination of target and acquirer cash flows, it is unlikely to be related to the firm's attractiveness as a target of acquisition. We measure tax convexity by the coefficient of serial auto-correlation of the target firm's taxable earnings, with a higher correlation indicating less convexity in the tax structure.

When we use the instruments, we still see a positive relation between the exogenous variation in outstanding options and the offer premium, suggesting a causal link. Further, using the econometric test developed by Oster (2015), we estimate how large the omitted variable bias has to be in order to explain away our results. On the balance, we find that the positive relation between stock options and the offer premium is unlikely to be driven by omitted variables and does not appear to be fully explained by the preemptive option grants by more valuable targets in the hope to secure better bargaining positions. The results are more likely to be explained by the acquirers transferring wealth from employees to shareholders and employees resisting to such bids.

We next turn attention to the relation between employee stock options and target selection. Simple probit models show that there is a positive relation between option-based compensation used by the firm and the likelihood that it is chosen as a target of an acquisition. However, this relation appears to be driven by the newly granted options, which could be symptomatic of efforts by the target firm to defend against the takeover and/or to establish a better bargaining position. Further analysis that relies on exogenous variation in option use reveals only a weak positive relation between option compensation and the likelihood of being a takeover target, which could indicate that choice of the target firm is dominated by the operational side of the deal, such as finding synergies and cost reductions.

Our paper contributes to the literature on the effects of mergers and acquisitions on employee labor contracts that originates from the idea that takeovers breach implicit contracts between managers and employees (Shleifer and Summers (1988)). For example, Rosett (1990) documents that wealth transfers from employees to bidders as a result of wage cuts of workers account for approximately 10% of the takeover premium in hostile takeovers. Lichtenberg and Siegel (1990) and Davis et al. (2014) show that there are modest cuts in the labor force, and Pontiff, Shleifer, and Weisbach (1990) find that pension funds are reduced by almost 15% following hostile takeovers. Li (2013) finds that wages-per-worker and employment at target firms' plants also experience declines after takeovers, although output remains constant.

Several studies analyze how managerial compensation contracts affect acquisition decisions and outcomes and conclude that compensation of top executives often receives special treatment.[5] For example, Hartzell, Ofek, and Yermack (2004) and Fich, Cai, and Tran (2011) document that target firms' CEOs often negotiate large special bonuses and golden parachutes in M&A deals and find that executives who receive large personal benefits also negotiate lower acquisition premiums for their shareholders. As for CEOs of acquiring firms, Grinstein and Hribar (2004) document that they too receive lucrative compensation packages for completing M&A deals, and such packages appear to be unrelated to deal performance or managerial effort. Similarly, Harford and Li (2007) document that following a merger, a CEO's pay and wealth become insensitive to negative stock performance, but increase with positive stock performance. They argue that bidding firms' CEOs are better off most of the time after an M&A deal.

Also related to our work are several recent studies that analyze how labor protection laws, unionization, and the size and composition of target firm labor force affect takeover activity and gains to targets and bidders. For example, John, Knyazeva, and Knyazeva (2015) show that the bidding firms from states with greater employee protection experience lower announcements returns. Tian and Wang (2015) exploit close-call union elections in a regression discontinuity design setting and show that target firms that narrowly pass unionization ballots have a reduced probability of being taken over, a lower offer premium, and a lower announcement return. Using a cross-country analysis of labor protection laws, Dessaint, Golubov, and Volpin (2016) show that increases in employment protection reduce takeover activity by approximately 15% and also result in substantially smaller combined gains from takeovers. Finally, Ouimet and Zarutskie (2016) argue that some firms pursue M&A activity with the

[5] Shleifer and Vishny (1988) argue that equity-based executive compensation should reduce the non-value-maximizing behavior of acquiring managers. Denis, Denis, and Sarin (1997), Datta, Inskandar-Datta, and Raman (2001), and Bliss and Rosen (2001) provide evidence that higher equity-based compensation of top manager is associated with better long-term post-merger performance.

objective of obtaining a larger employment and that target firms most likely to be acquired for their large labor force are associated with greater increases in mean wages per employee.

The remainder of this paper is organized as follows. Next section develops the empirical hypotheses. Section II discusses our data sources and sample selection. Section III summarizes how acquirers treat stock options in the M&A deals and evaluates the financial implications of mergers for target firm employees. Section IV examines the relation between employee stock options in the target firm and the M&A offer price premium. Section V presents the results on the acquirer CARs. We empirically examine the relation between target selection and ESOs in Section VI. The last section concludes.

I. Effects of ESOs on Merger Terms and Outcomes

There are several channels through which previously granted employee stock options can affect the attractiveness of a firm to potential bidders, the terms of merger negotiations, and the outcomes for the acquirer, target firm, and employees.

First, employee stock options can be associated with a significant cost to the acquirer. Assuming all ESOs of the target is expensive for the bidder because it results in the dilution of shareholder value, increased administration burden, and unfavorable accounting treatment. The dilution is more severe with stock options than with other types of compensation plans (e.g., 401(k) plans, ESOPs, restricted stock) because options represent levered claims on a stock that increase in value exponentially with the premium. The assumption of target compensation plans may also present integration issues if the terms or depth of target employee stock options are inconsistent with the acquirer compensation culture. Further, the acquirers are often reluctant to treat options in this way because of the concern that this will create the incentive for a target firm to make extraordinary large grants of stock options immediately before the merger. Cashing out and/or cancelling the employee stock options also has disadvantages as it may require substantial cash resources, create discord among employees (e.g., low productivity, high employee turnover and absenteeism, negative effects on morale and teamwork), and increase the probability of lawsuits brought by the target employees.[6] If

[6] One such case is AT&T Corp. acquiring MediaOne Group, Inc. in 2000. MediaOne had an option

these costs are indeed significant, we would expect a negative relation between ESOs of the target firm and the takeover premium paid by the bidder, as well as between ESOs and the acquirer announcement return. In addition, choosing a target with a large broad-based stock option plan may be undesirable for the acquirer.

Second, to the extent that the value of stock options is priced in before the deal and the acquirer can cancel or modify their terms in a way that significantly reduces value, ESOs can present an opportunity to transfer wealth from the target firm employees to shareholders, as suggested by Shleifer and Summers (1988).[7] Previous literature finds that wealth transfers from employees can be a source of takeover gains (see e.g., Pontiff, Shleifer, and Weisbach (1990) and Rosett (1990)). For example, in option plans that do not explicitly contain the "anti-destruction" provision, the acquirer can cancel all out-of-the-money options without providing any payment to employees. In some cases, particularly when option plans do not contain the "change-of-control" provisions that accelerate vesting, unvested in-the-money stock options can also be canceled. The acquirer typically cannot completely take away vested in-the-money stock options as employees can choose to exercise them before the merger close. However, even in these cases, the acquirer can significantly shorten the maturity of options or force employees to accept the intrinsic option value instead of Black-Scholes value. This option treatment is particularly attractive to bidders when the majority of options are at-the-money. Overall, we expect that the possibility to cancel some of the outstanding options makes an acquisition more attractive, increases the willingness of the bidder to pay for the target, and may increase the bidder announcement returns.

Third, given that the value of employee compensation contracts is at stake, it is natural for employees to look unfavorably upon the merger and to resist it. For example, by exercising some of their stock options, employees can acquire shares in a target firm and refuse to sell

plan containing an 'anti-destruction' provision which required options to be appropriately adjusted in M&A transactions so as not to decrease option holders' economic positions. At the time of the acquisition, AT&T requested to cancel all underwater options and cash out others, but MediaOne refused and demanded that all options be converted into AT&T options. Even though ultimately the acquisition went through after many rounds of negotiations, the question whether the bidder may legally cash out target stock options with the existence of an 'anti-destruction' provision in the option plan was not answered until the 2007 decision by the Delaware Court of Chancery.

[7] Removing options reduces the effective cost of acquisition only if options are no longer necessary (e.g., for incentives or retention purposes).

them to the bidder. Pagano and Volpin (2005) argue that employees can also lobby against the merger and take political actions to oppose the deal. Finally, employees could try to dissuade the management from accepting the deal, and in cases in which the bidder's main objective is to acquire valuable human capital (acqui-hire merger), employees could also threaten to quit if their financial wealth is not preserved. Importantly, the magnitude of wealth transfers between employees and shareholders is directly related to the offer premium, as options move deeper in-the-money with a higher takeover premium. Thus we expect employee resistance to the deal to decrease with the premium. As a consequence, the deals in which the target firm has many outstanding stock options may require a higher premium to close.

Finally, the relation between options and merger negotiations can be more complicated because options can be issued to employees for strategic reasons in anticipation of a future merger. Theory predicts that in many situations interests of managers and employees are aligned and make them natural allies against takeovers (see e.g., Garvey and Gaston (1997), Chemla (2005), and Pagano and Volpin (2005)). It is therefore conceivable that a manager anticipating a future takeover attempt, may preemptively put the stock in friendly hands by granting more stock options to firm employees. Previous literature suggests that firms may adopt ESOPs and increase employee ownership in 401(k) plans as a way of takeover defenses (see, e.g., Gordon and Pound (1990), Beatty (1995), Brown, Liang, Weisbenner (2006), and Rauh (2006)). However, it is not ex ante clear whether options are as effective at deterring takeovers as are ESOPs and 401(k) plans. On one hand, option value may grow more quickly with the premium than the value of stock, making it more effective as a poison pill. On the other hand, the acquirer may significantly curb this cost by cancelling the stock option plans and expropriating employees. Furthermore, if the option holders do not exercise their options, they have no voting power on a stock and cannot directly influence the outcome of the takeover attempt. Ultimately, it is empirical question whether options are used as a takeover defense and whether they are effective.

Next, we describe the data sources used in our study and document how employee stock options are treated by acquirers in M&A deals. We then analyze how ESOs affect the premium paid by the acquirer, the likelihood of the acquisition, and the acquirer announcement returns.

II. Data Description and Summary Statistics

A. Acquisition Sample

The initial sample of mergers and acquisitions comes from the Thomson Financial SDC Platinum database and includes all 1,863 completed and withdrawn M&A deals announced between January 1, 2006 and December 31, 2014. We require that the target is a publicly listed company in U.S. and exclude spin-offs, self-tenders, exchange offers, repurchases, recapitalizations, acquisitions of assets, remaining interest or partial interest, and transactions for which deal value is not available. Our choice of the starting date is motivated by the availability of stock option data in Compustat. In December 2004, the FASB issued new rule (SFAS 123R) that requires employee stock options to be expensed in accounting statements using the fair value method. This rule became effective for firms' fiscal years beginning after June 15, 2005. As a result of new regulation, firms started to disclose more details on their outstanding options and new grants in financial statements, and these data became recorded in Compustat database.[8] For the analysis of the offer premium, we further restrict attention to completed deals with non-missing information on the number of stock options and the offer premium (1,277 deals). We obtain data on the offer price premium and other deal characteristics from the SDC Platinum database. The reported offer premium is calculated as the ratio of the initial offer price to the target's stock price four weeks before the merger announcement date minus one.[9]

To obtain the detailed information on the treatment of employee stock options in each deal, we perform the manual search of SEC filings for a sample of 1,277 deals. The data on option treatment are typically contained in merger agreements, tender offer statements,

[8]If we choose June 15, 2005 as the starting date, our sample increases by 12 observations and all results are very similar.

[9]Following Officer (2003), we use three different methods to compute the value of the bidder's offer. The first measure uses the initial offer price per target share reported by SDC and the second method use the final offer price. We also estimate the offer price using the component data, where SDC reports individually the aggregate value of cash, stock, and other securities paid by the bidder to target shareholders. All offer values are then scaled by the target firm's market capitalization four weeks prior to bid announcement date. We restrict the premium measures between 0 and 2 to exclude the extreme outliers and the premium is left as a missing observation is the condition is not met.

and asset purchase agreements filed with the SEC as a part of 8-K, 425, DEFA, or DEFM forms. We are unable to find the details on option treatment for 32 deals, which decreases our sample to 1,245 deals. Appendix A provides several examples of text in merger agreements that describes how employee stock options are to be treated.

The data on employee stock options are from Compustat. We calculate the value of outstanding, granted, vested, and unvested stock options using the Black-Scholes formula. After 2005, firms have to disclose their assumptions used for the calculation of fair option values, including the assumed dividend yield, risk-free rate, and stock return volatility. Johnston (2006) and Aboody, Barth, and Kasznik (2006) argue that firms have some latitude in determining the inputs for option expense calculation and find that firms tend to manipulate the estimate of the volatility downward, which may reduce their option expense.[10] In contrast, Johnston (2006) finds no manipulation of the risk free rate or the dividend yield estimates. We therefore do not rely on the firms' disclosed information for the estimates of volatility, and for all firms calculate the annual volatility from the daily data on stock returns over the previous fiscal year. We assume the life of outstanding options to be the same as the term of granted options and the life of vested options to be one half of the term of granted options. All stock option values are normalized by the market value of their firm's equity at the most recent fiscal year-end before the acquisition. The value of unvested options is defined as the difference between the value of outstanding stock options and the value of vested options.

Panel A of Table 1 reports the summary statistics on deal characteristics, target firm characteristics, and option variables. The average (median) offer premium is 41.6% (33.3%) over the target's stock price four weeks prior to the deal announcement. The presence of a significant positive premium for the average deal implies that if the acquirer were to fully assume all of the target's equity compensation, the target employees would realize significant financial gains. As we will see later, however, the acquirers are reluctant to assume the target firm compensation obligations. Most of the acquisitions (87.7%) are at least partially financed with cash, and we classify 67.2% of the deals as diversifying, i.e., such deals in which the

[10] Carpenter, Stanton, and Wallace (2010) examine how option cost to shareholders depends on the volatility and conclude that in general the relation is ambiguous.

acquirer and the target belong to different industries as defined by their four-digit Standard Industrial Classification (SIC) codes. The frequencies of cash-financed and diversifying deals are similar to those reported by Fich, Cai and Tran (2011). In our sample, 58.1% of all deals are done by a tender offer, and in 60.0% the acquirer is a public firm.

The average target firm employs more than 4,000 people and has assets of $1.2 billion. The size of the average target in our sample is comparable to that reported by Bates and Lemmon (2003), who study merger bids during 1989-1998 and report average assets of the target firms of $1.7 billion. Consistent with Bena and Li (2014), we also find that the average target firm has relatively high R&D expenses compared to the average firm in Compustat. Bena and Li (2014) argue that one of the important drivers behind acquisitions is synergies obtained from combining innovation capabilities of two firms. In general, our sample is fairly representative of merger bids for similar studies.

As is evident from the table, target firms also tend to have many employee stock options, with the average ratio of the number of outstanding options to the firm's outstanding shares equal to 9.6%. These options have substantial Black-Scholes value. Specifically, target firms have outstanding options valued at 4.9% of the firm's market capitalization on average, with 2.3% being the value of unvested options and 2.6% of vested. The outstanding options are on average 39.8% in-the-money four weeks prior to the M&A announcement, but the moneyness is highly skewed. For example, in 41.8% of the target firms the outstanding options are out-of-the-money. Naturally, the moneyness of vested options is greater than the moneyness of the unvested options (58.1% vs. 31.0%).

B. Target Selection Sample

In Panel B of Table 1, we also compare the average characteristics of target firms and control firms. Following Bena and Li (2014), we create a control sample as a pool of potential targets. For each target firm in a given year, we find matching firms in the Compustat/CRSP universe that were neither acquirers nor targets in the three-year period prior to the deal, are from the same industry (Fama-French 17-Industries (FF17) classification), and have similar firm size in the prior year (measured by sales).[11] The matching procedure creates a pool of potential targets and captures clustering of M&As in time and by industry.

Consistent with empirical evidence in Graham, Lemmon, and Wolf (2002) and Edmans, Goldstein, and Jiang (2012), we report in Panel B that target firms tend to be discounted prior to the acquisition. In particular, they have significantly lower market-to-book ratios than control firms, as well as lower ROA and stock returns during the prior year. In line with the argument by Bena and Li (2014), target firms also do more R&D than control firms. Finally, we report that target firms have substantially more employee stock options relative to control firms, both in terms of the number of securities and in terms of their value.

III. Treatment of Employee Stock Options by Acquirers

In Table 2, we summarize the key statistics on treatment of target employee stock options by acquirers. Because the actual treatment often depends on whether options are exercisable and whether they are out-of-the-money or in-the-money, we present statistics for four separate categories. As can be seen from the table, most often acquirers choose to cash out vested in-the-money options (76.2%), which means that employees are forced to accept the intrinsic value of the options in lieu of their Black-Scholes value. In only one case, vested in-the-money options are cancelled, which is not surprising given the fact that employees can always choose to exercise them after the merger announcement but before the effective date. We do see that in 3.0% of deals, the vested in-the-money options are made to expire upon the merger close, which significantly shortens their maturity and reduces value. Finally, in 17.9% the acquirer chooses to assume or convert the targets vested in-the-money stock options on essentially the same terms as they had before.[12]

The treatment of unvested in-the-money options is somewhat similar, as they are cashed out in 70.1% of the deals and assumed or converted in 22.1% of the cases. Yet, it is possible for the unvested in-the-money stock options to be cancelled by the acquirer without any payment

[11] Specifically, the control firms must have sales within 95% to 105% range of the sales of the target firm.

[12] In some of these cases, option vesting is accelerated. We do not focus on the acquiror's choice whether to accelerate vesting because, in many cases, option plans already have a built-in change-of-control provision that automatically accelerates vesting upon the change of control event.

to employees; this happens in 3.6% of all deals. Further, in some deals unvested in-the-money stock options expire on merger close, which in most cases precludes employees from obtaining any value.

In contrast to in-the-money options, the out-of-the-money options are very frequently cancelled by acquirers. The cancellation takes place in 79.0% of all deals for vested out-of-the-money options and in 75.9% for unvested options. Yet, some acquirers do assume or convert even out-of-the-money options (18.2% for vested and 21.1% for unvested). Overall, it is clear that in many M&A deals there are cancellations of at least some of the outstanding options, payout of intrinsic value instead of Black-Scholes value, and/or shortening of option maturity. At the same time, the average acquirer pays a substantial premium over the target's market price, which increases the value of all equity-based compensation.

Given that it is typical for acquirers to cancel all out-of-the-money stock options held by employees, we also investigate whether, at the margin, the acquirers are more likely to choose a premium on a target's stock that pushes options just out-the-money or just in-of-the-money. If it is the former, it could indicate that acquirers attempt to cancel all options even though the cost of slightly increasing premium and making these options in-the-money is small. If it is the latter, it may imply that employees have some bargaining power in merger negotiations or that acquirers prefer to pay employees some small amount in lieu of their options in order to keep them happy or to prevent future lawsuits. At the margin, we see that more acquisitions are structured in such a way so that employees gain rather than lose a small amount on their options (results are available upon request).

A. Financial Implications of M&A for Target Firm Employees

Here we evaluate how the value of employee option-based compensation is affected by the merger.[13] There are several effects at play. First, employees may gain financially because

[13] Some of the M&As may result in production redundancies and overcapacity and may call for significant employee layoffs (see, e.g., Lichtenberg and Siegel (1990) and Davis et al. (2014)). If laid off employees are less productive and/or have outdated skill sets that prevent them from quickly reentering the labor force, their financial welfare will be negatively affected by the merger. Since we do not observe what kind of jobs laid off workers secure after the merger, we do not address a more general question of how employee overall welfare is affected by the merger.

of the premium paid by the acquirer. Note, however, that targets may be significantly undervalued prior to the acquisition, suggesting that even if the acquirer did not approach the target the stock price would eventually increase when misvaluation is corrected. For example, Malmendier, Opp, and Saidi (2016) find that firms that are targets of cash-financed acquisitions are revalued on average by +15% after the deal failure. Second, the value of employee compensation may be adversely affected by the merger because the acquirers tend to cancel some of the outstanding employee stock options, shorten their maturity, force employees to accept the intrinsic value instead of Black-Scholes value, and also cancel valuable ESPP plans. Third, in cases where the acquirers do assume the target's stock options by converting them to options written on the acquirer's stock, the value of stock options may be affected because of the differences in volatility of stock returns and the company dividend yield. Finally, if the offer bid is stock-financed, there is a potential concern that the acquirer's stock is overvalued (Shleifer and Vishny (2003)). For example, Ahern and Sosyura (2014) find that bidders in stock mergers try to manipulate media coverage during the period when the stock exchange ratio is determined, and that this strategy generates a short-lived runup in bidders' stock prices. Thus it is possible that when the target options are assumed by the acquirer using the stock exchange ratio, the value of options is not preserved. In our evaluation of financial implications of M&A for the value of target stock options, we do not, however, take into account the possibility that the acquirer's stock is overvalued because it is difficult empirically to estimate the degree of such overvaluation.

In Panel A of Table 3, we present various summary statistics on implications of M&As for value of compensation. In 79.9% of all deals, the acquirer cancels at least some of the target's outstanding stock options. We next calculate how much value is lost by employees on their options given the treatment of options by the acquirer. Indeed, we find that because of option cancellations, employees lose on average a value equal to 2.4% of the target's market capitalization, or 48.8% of the value of their outstanding stock options. Although this number does not take into account that the merger is associated with a significant premium paid by the acquirer, it is still useful as a metric of how much money the acquirer saves by cancelling stock options. In addition, target employees may feel that they have earned the premium by their hard work or that their firm was worth more than the market value before the merger announcement. In this way, they may feel that at the commencement of the merger they suddenly lose 48.8% of their options' value.

If, however, we compare the value of the target's stock options four weeks before the merger announcement to the value of their remaining options right after the merger announcement, we observe that employees gain on average 4.0% in terms of value, whereas the median value gain is even higher at 10.8%. This is not surprising given that acquirers in our sample pay a significant premium, which increases the value of all equity-based compensation. Interestingly, even after we account for the offer premium, the value of unvested employee stock options still decreases on average by 19.2%. This is mainly explained by the fact that unvested options are more likely to be cancelled (e.g., they are more likely to be out-of-the-money) and have longer time left to maturity.

Panels B and C summarize the gains and losses of employees in subsamples of data sorted by whether the acquirer cancels at least some options. We see that in a sample of firms that assume or convert all of the target's employee stock options, i.e., where there are no outright cancellations, the employees on average gain 48.7% in terms of value.

In contrast, in deals where the acquirer cancels at least some of the target's options (which covers majority of all deals), the value of employee option compensation decreases on average by 7.5% as a result of the merger. In addition, if employees of target firms believe that their employer's stock is undervalued or that they are entitled to the offer premium, then option cancellations amount to 58.1% reduction in the value of their compensation.

In Panels D and E we separately present results for samples of deals with the offer premium below and above the sample median of 33%. In is easy to see that in deals with modest offer premia employees lose on average 11.6% of value of their options even after we account for the offer premium

The next panel reports the average annual volatility and dividend yield of the target and the acquirer. In practice, when the acquirer assumes options "on essentially the same terms as before," it implies that the intrinsic value of the options is preserved, whereas the Black-Scholes value can in general be affected positively or negatively.[14] However, the acquirers tend to be substantially larger, more mature, and have fewer growth options than targets. As a result they typically pay higher dividends and have less volatile stock returns. Specifically, we find that the average annual volatility of target firms' stock returns is 53.8%, whereas for acquirers it is only 34.4%. Similarly, the average dividend yield for acquirers is 1.4%, but for targets it is 0.9%, with the differences in volatilities and dividend yields being statistically different between these two samples. These results suggest that even in cases when acquirers fully convert and assume the employee stock options, their values tend to decrease after the conversion.

Finally, we present evidence that acquirers do not reinstate the option incentives following the acquisition (see Panel E). First, note that approximately 40% of all bidders in the sample are private firms that do not have a well-defined stock price. These firms are unlikely to issue stock options.[15] Second, for the public acquirers that did not assume any of the target firm's stock options, we compare the value of option grants in the year prior to, the year of, and the year after the acquisition. Despite the fact that the number of employees increases, we do not see that the overall value of option grants increases. If anything, we observe the opposite trend.

Overall, the evidence presented in Table 3 suggests that in many deals employees experience losses in value of their option compensation. Of course, this evidence alone is insufficient to determine whether employees are made worse off or better off by an M&A deal. In principle, many components of employee compensation package can be affected, such as fixed wages, non-option equity-based compensation, and pensions. Moreover, employee job security can be at stake as well, as many mergers are followed by significant layoffs. In fact, Dessaint, Golubov, and Volpin (2016) argue that labor restructuring is one of the main drivers of takeover activity and show that increases in employment protection substantially reduce takeover ac-

[14] When options are assumed, the number of target firm stock options is divided by the option coverage ratio, and the strike price is multiplied by the same ratio. If the deal is stock financed, the option coverage ratio is typically the same as the stock exchange ratio.

[15] The data on stock options grants by private firms are not available.

tivity. Further, employee workloads and job functions may also change as a result of the M&A. While we do not have sufficient data to evaluate the overall welfare implications of M&A deals for target firms' employees, prior literature suggests that there are significant negative implications for employment, wages, and value of employee pension assets (Lichtenberg and Siegel (1990), Rosett (1990), Li (2013), and Pontiff, Shleifer, and Weisbach (1990)). Our results thus complement the existing literature by highlighting a new channel through which mergers impact employees' welfare. We next analyze how option compensation affects the terms of the deal and whether expropriation of employees through their stock options can be a source of takeover gains.

IV. M&A Offer Price Premium

A. Univariate Results

Here we present univariate comparisons on the relation between the treatment of option compensation by the acquirer and the target firm's compensation obligations, as well as various deal characteristics. As can be seen from Panel A of Table 4, the offer premium is 8.6% higher for deals in which the acquirer chooses to cancel options. Further, we observe that in these deals the acquirers increase the initial offer price by a larger percentage. Specifically, in the sample where the acquirer cancels options and the initial and final offer prices differ, the offer price is increased on average by 10.7% relative to the initial offer, while it is increased by only 4.6% in deals where the acquirer assumes target compensation obligations. It also follows from the table that the average acquirer stock price reaction to the M&A announcement is significantly negative in deals with assumed and converted options at -1.6%. Correspondingly, the total market value of the acquirer's stock over the three-day announcement window drops by $358 million in such deals. In contrast, the acquirers that are able to cancel option compensation tend to earn positive announcement returns, which average 0.6% over the three-day window. The dollar value losses are also smaller for these acquirers at $29 million.[16] This

[16] It is well known that bidders may on average experience dollar losses on the announcement of M&A deals even if the average CAR to the announcement is positive (see Moeller, Schlingemann, and Stulz (2005)). This is driven by a fact that negative CARs are more likely to be observed for firms with extremely large market capitalizations.

result may suggest that not canceling the option compensation is costly to the acquirer.

For comparison, we also provide the estimated bidder return from canceling or modifying employee stock options of the target firm, which is calculated as the dollar value change in the target employees' option compensation divided by the market capitalization of the bidder prior to the deal. We estimate that, on average, out of 2.2% additional announcement return for bidders that cancel options approximately 0.5% can be directly explained by the cost savings arising from option cancellations and modifications.

In Panel B, we compare deal, acquirer, and target firm characteristics across deals with option cancellations and without. It is interesting to observe that acquirers are more likely to cancel employee stock options for deals financed with cash, as well as when the targets are smaller in size, have more option compensation obligations, and are less similar to acquirer in terms of their industry. The fact that options are less likely to be cancelled in larger target firms could reflect that some firms pursue M&A activity with the objective of obtaining a larger workforce and prefer to minimize post-merger employee turnover. For example, Ouimet and Zarutskie (2016) find that in M&A deals involving higher employment target firms there are greater post-merger wage increases. Naturally, we also see a higher propensity to cancel ESOs by private acquirers. In addition, we find that in deals with option cancellations employee layoffs during the first year after the merger seem to be greater in magnitude. These results could indicate greater reluctance by bidders to cancel options in situations where they acquire valuable and talented employees who they prefer to keep. The final observation from Panel B is that acquirers that cancel option obligations of the target are not more likely to reinstate incentives through new option grants after the merger. If anything, we observe the opposite.

B. OLS Results

In this section, we analyze how the takeover premium is affected by the presence and treatment of ESOs. The dependent variable is the offer price premium, defined as the initial offer price divided by the target's stock price four weeks before the merger announcement.[17] In

[17] Following the M&A literature, we analyze the four-week premium to mitigate the concerns that rumors and news leakages can start to affect the target stock price prior to the announcement.

the regressions, we control for various deal characteristics: whether the acquirer is a public firm, whether the deal is cash- or stock-financed, tender offers, a diversifying deal dummy, and toeholds. These control variables are motivated by the prior literature. For example, Offenberg and Pirinsky (2015) find that structuring deals as tender offers allows for faster completion rates but typically requires a higher acquisition premium. Bargeron, Schlingemann, Stulz, and Zutter (2008) document that private acquirers pay significantly less than the public acquirers. We also include firm characteristics that can capture target firm attractiveness, such as the target size, profitability, market-to-book ratio, prior year stock return, and the amount of investment in R&D. Finally, we include industry (Fama-French 17) and year fixed effects to capture the differences in takeover premiums across different industries and business conditions.

Table 5 presents the results of our estimation. Most of the control variables have the expected signs. As in Offenberg and Pirinsky (2015) and Bargeron, Schlingemann, Stulz, and Zutter (2008), we find that offers by public acquirers and deals structured as tender offers are associated with a significantly higher premium. Acquirers that have a toehold prior to the bid pay a higher premium, whereas large targets and firms that are less likely to be undervalued, as indicated by their high market-to-book ratios, collect lower takeover premiums.

We first examine how the offer premium is related to the treatment of employee stock options (column 1). The estimates reveal that deals in which some stock options are cancelled by the acquirer are associated with an approximately 4.8% higher takeover premium, when the median premium is 33.3%. This result is consistent with several (not necessarily mutually exclusive) hypotheses. First, it could reflect a possibility that options represent a significant cost to the acquirer, so that their cancellation reduces this cost. Second, it is consistent with the story that cancelling stock options allows the bidder to transfer wealth from employees to shareholders, so that their willingness to secure the deal increases. Third, it may underscore resistance by discontent employees to the deal. Forth, it could indicate that managers use option treatment as a powerful way to increase bargaining power with the acquirer.

Next, we include the number of outstanding stock options, as well as the indicator for the average outstanding option being out-of-the-money four weeks prior to the deal (columns 2 and 3). The results show that target firms with more stock options are acquired at a significantly higher premium. These results are inconsistent with options creating a significant financial burden for the acquirer, but they do lend support to the hypothesis that options present an opportunity for the acquirer to transfer wealth from employees to shareholders and/or are associated with greater employee resistance to the bid. Likewise, we do observe that firms with out-of-the-money stock options also obtain on average 8.6% higher premium, even controlling for the past stock return performance of the target. Because it is much easier and common for acquirers to cancel out-of-the money stock options, these results provide further support for employee expropriation and resistance hypothesis. We obtain similar results when we look at the value rather than the number of stock options.

In column 5, we analyze whether the premium is more strongly related to the value of vested or unvested employee stock options prior to the deal. As we have seen in Table 2, acquirers never cancel in-the-money vested stock options, as employees can always exercise them prior to the merger close, but they occasionally cancel in-the-money unvested stock options, which could be a cause of concern for employees. Further, in cases where all options are cashed out, the employees tend to lose substantially more money on their unvested options because these options are more likely to be out-of-the-money and they also have a longer time left to maturity. Hence, employees may look more unfavorably upon the merger and resist more to the deal if they hold more unvested options. Indeed, we find that the offer price premium is higher when more stock options in the target firm are unvested. This result suggests that because employees are concerned about preserving the value of their stock options, the managers are reluctant to approve the deal unless the acquirer pays a substantially high price.

In columns 6 and 7, we regress the offer premium directly on the predicted gain by employees made on their options. This variable is calculated four weeks before the deal announcement and captures how the value of ESOs would be affected if the bidder implemented the treatment of stock options laid out in the merger agreement and offered no premium on the stock.

Indeed, we see that the more employees stand to lose, the greater the premium that the acquirer chooses to pay on the stock.

Note that employees stand to lose the most from option cancellations and cashouts by the acquirer in case when their options are close to being at-the-money. However, moneyness of stock options may be correlated with prior stock returns and therefore the overall attractiveness of the target to the acquirer. We therefore also show that our results survive if we narrow the sample to only those firms that have moneyness of stock options close to one or we control for the polynomial functions of the moneyness of stock options (column 7 through 10).

Overall, Table 5 provides evidence consistent with expropriation by acquirers and employee resistance. Nevertheless, the results of OLS estimation cannot be interpreted in a causal way as it is possible that employee stock options proxy for some omitted target firm characteristics, which may confound our inferences.

To assess the potential omitted variable bias in our sample, we also conduct the test developed by Oster (2015). She shows that under reasonable assumptions, it is possible by looking at movements in coefficients and R-squared with inclusion of control variables to assess how large the selection on unobservables must be in order to explain away the coefficient of interest. We use her suggested input of $\mathrm{R}_{\mathrm{max}} = 1.3\widetilde{R}$, where $\widetilde{R}$ is the largest empirically observed R-squared (20.29% in our case). The results are reported in Panel B of Table 5 and correspond to models estimated in Panel A. We find that in all our specifications in Table 5, the selection on unobservables must be greater than selection on observables in order to explain away our results, which satisfies the robustness reporting standard suggested by Oster (2015). For example, in order for the higher premium with option cancellations to be explained away by selection on unobservables, it must be that selection on unobservables is approximately 2.35 times greater than selection on observables, which seems unlikely given that we control for the known determinants of the offer premium. In the next section, we further examine the possibility of omitted variable bias using the instrumental variables approach.

C. Endogeneity of ESOs and Instrumental Variables Estimation

We next explore the alternative hypothesis that more employee stock options do not cause the higher takeover premium. Instead, a positive relation between options and the offer premium can arise because ESOs proxy for some valuable but unobservable target firm characteristics. For example, Hoberg and Phillips (2010) argue that takeover gains are greater when targets have more unique products, and it could be the case that stock options are correlated with product uniqueness. Similarly, employee stock options could be correlated with such firm characteristics, as the quality of the labor force, employee entrepreneurship, productivity, and firm innovativeness. In support of the latter argument, Chang, Fu, Low, and Zhang (2015) find that employee stock options tend to foster innovation, whereas Bena and Li (2014) and Phillips and Zhdanov (2013) present arguments why acquirers may choose targets that innovate successfully. If indeed stock options proxy for some unobservable target firm characteristics which acquirers find valuable, the OLS estimates will be inconsistent and we will overestimate the effect of stock options on the takeover premiums.

Another potential reason why stock options are correlated with the offer premium has to do with the *strategic considerations* on the part of the target firm. First, it is possible that a manager anticipating a future takeover attempt, will decide to preemptively grant more stock options to firm employees. As shown theoretically by Pagano and Volpin (2005), granting more ESOs may help to fend off the unwanted takeover, and it is optimal for the target firm's manager if he is entrenched and has private benefits of control. Second, a manager who is not self-serving but acting in the interest of shareholders may believe that option grants will help the target firm to secure a better bargaining position and to obtain a higher premium. This explanation for higher option grants will only apply if the likelihood of a takeover is not significantly decreased by the presence of ESOs. Finally, small cash-constrained firms that have a high chance to be acquired in the future may give employees more option-based compensation in the hope that it is the acquirer who will pay for it (by buying the firm's stock and options at the premium). Naturally, the last argument depends on whether the acquirer can cancel some of the options.

To understand whether an omitted variable that is correlated with the option use drives our results, we examine whether target firms with more stock options are able to negotiate better terms of the deal by using an instrumental variables approach. Ideally, we need to find such economic variables that are strongly correlated with the option use, but are unrelated to the possibility of the future takeover or firm attractiveness as a target. We rely on two such instruments. First, we use the fact that the compensation of non-executive employees has a strong geographical component. In particular, Kedia and Rajgopal (2009) argue that location of the firm's headquarters matters for option grants because of local labor market conditions, the local industrial and legal environment, and social interaction among employees of neighboring firms.[18] Kedia and Rajgopal (2009) find evidence that the location of firms' headquarters explain a significant part of variation in broad-based option grants, which implies that the relevance criteria is likely to be satisfied in our case. Specifically, our first instrument is the *neighbor firms option use*, calculated as the ratio of the number of outstanding options to the firm outstanding shares, averaged over all Compustat firms in the year of M&A announcement that have the headquarters located in the same three-digit zip code as the actual target firm (but excluding the target itself). It is unlikely that all firms in a given region (e.g., in Silicon Valley) are attractive targets and/or face higher takeover probabilities.

Our second instrument relies on the variation in stock option grants that is driven by the tax structure of a firm. Specifically, firms that face more convex tax schedules, benefit more from moving the tax deductions to the states with a higher taxable income and thus may find it optimal to substitute stock options for fixed wages. To capture the tax convexity, for each target firm in our sample, we estimate the coefficient of serial autocorrelation of EBIT over the past 20 years of data. Babenko and Tserlukevich (2009) show that firms with a low coefficient of serial auto correlation in their earnings realize significantly higher tax savings from using stock options, and show that such firms tend to grant more options. Because on average target firms are considerably smaller than acquirers and because after the combination of their cash flows the tax convexity features of the target are typically not preserved, we believe that a

[18] For example, the location of a firm may affect the need for employee retention mechanisms and their efficacy.

higher or lower tax convexity is unrelated to the attractiveness of the firm as a target.

Our model is identified by exclusion restrictions and estimated by the limited information maximum likelihood as it may have better properties in finite samples. The results are presented in Table 6. Columns 1, 3, and 5 in Panel A present the estimates of the first stage, where the dependent variable is the number of outstanding options divided by the number of shares outstanding. We first use the geography-based instrument (columns 1 and 2), then the tax-based instrument (columns 3 and 4), and finally the two instruments together (columns 5 and 6). When the neighbor firms option use is employed as the instrument, we see that it positively predicts the target firms number of outstanding options (t-stat = 6.64). The instrument appears to be quite strong as the first-stage R-squared is 26.6% and the F-test of excluded instruments rejects the null hypothesis of weak identification (p-value< 0.001), which is important for establishing the relevance condition. In the second stage, however, we still see a positive relation between the exogenous variation in outstanding options and the offer premium. We obtain similar results using the tax convexity instrument. Finally, we note that when both instruments are used together and the model over-identified, it is not rejected by the test of overidentifying restrictions (p-value $= 0.309$). This lends further support to the validity of our instruments. The results in Panel B, where we use the value rather then the number of outstanding options, are fairly similar.

Overall, our results do not fit the story that stock options proxy for some unobservable target firm characteristics. Instead, the positive relation between stock options and the offer premium is more likely to be explained by the acquirers transferring wealth from employees to shareholders through stock option cancellations and/or by resistance of firm employees to such bids.

V. Acquirers' CARs

Given that acquirers pay a higher offer premium for the targets with more outstanding stock options, an important question is whether such deals are value-creating for the acquirers. On one hand, overpayment should lower the announcement returns. On the other hand, however, the acquirer may be able to cancel some of the outstanding options and transfer value from employees to shareholders. Still, even in this case, it is unclear whether the acquirer will benefit as options may be necessary to motivate or retain the target firm's employees.

We hence investigate how the market reacts to the announcements of deals in which the target firm has many options and also to the selected treatment of these options by the acquirer. The results of the estimation are presented in Table 7. The dependent variable is the cumulative abnormal return (CAR), calculated over the window (-1,+1) around the deal announcement using the market model.[19] Columns 1 and 2 show the results of the regression of the acquirer CAR on several control variables and the dummy for whether the acquirer cancels stock options of the target firm's employees. Consistent with the univariate results, it follows from the table that the market reacts more favorably to the deals in which stock options are cancelled. Such deals have on average from 1.4% to 1.6% higher announcement returns. In contrast, we find that the greater number of stock options is associated with a lower announcement return, perhaps because of the effect of options on the offer premium and/or the costs association with their assumption.

Perhaps an interesting unanswered question is then why all acquirers do not choose to cancel employee stock options if this action tends to be value-creating. We believe that in some cases preserving the target firm employee stock options is necessary to retain and motivate target firm employees. Moreover, some stock option plans are designed in such way that it is impossible for the acquirer to cancel them in a legal way without triggering an avalanche of lawsuits (e.g., when the plan has explicit 'anti-destruction' provision).

VI. M&A Target Selection

Because cancellation of options presents an opportunity to create gains for the shareholders of the acquiring firm, we next examine whether companies with more stock options are more likely to be selected as targets. Alternatively, it is possible that the resistance by target firm's employees and the resulting higher offer premium paid by the acquirer make firms with many

[19] Some acquirers in our sample are private firms, and we cannot calculate the CARs for them.

stock options unattractive targets. Finally, it is also possible that the two effects offset each other. To answer these questions, we analyze whether heavy option users are more likely to be chosen as targets. Specifically, we estimate probit regressions using the cross-sectional data as of the fiscal year-end before the bid announcement to identify firm characteristics that drive the choice of targets.

Following Bena and Li (2014), we create a control sample by finding matching firms in the Compustat/CRSP universe that have the same industry and similar size as actual targets, but were neither acquirers nor targets in the three-year period prior. The dependent variable in the probit specifications takes the value of one if a firm is chosen as the actual target, and zero for control firms. Explanatory variables include the log of assets, sales growth, cash flow, R&D expense, book-to-market ratio, leverage, cash holdings, and one-year buy-and-hold abnormal returns.

Table 8 provides the results of the probit regressions. Looking at the control variables, we observe that firms that invest more into R&D are more likely to be chosen as a target in an M&A, whereas overvalued firms (as proxied by a high market-to-book ratio) are less likely to become the targets of an acquisition.

Interestingly, options do not seem to present a large impediment to the acquirer. Firms with a greater number and value of outstanding employee stock options are significantly more likely to be chosen as targets of acquisition. One interpretation of these results is that greater employee resistance does not deter takeovers and that acquirers are looking for opportunities to transfer wealth through option cancellations. However, these results are also consistent with the interpretation that firms that have a higher chance of being taken start to grant more options preemptively. Consistent with the latter interpretation, we see that although the takeover likelihood increases with both the value of vested and unvested options (column 3), the economic effect of unvested options is larger.

While these results are interesting, they cannot be taken as causal evidence that targets with more stock options create more opportunities for acquirers to benefit their shareholders at the expense of employees, and therefore they garner more interest from acquirers. One alternative interpretation, for example, is that firms that have a higher likelihood of being taken over may prefer to grant stock options as a way of takeover defense or to obtain a better bargaining position in future merger negotiations. It is then possible to see a relation between options and the acquisition likelihood.

We explore this possibility in Table 9, where we use the instrumental variables for option use based on geographical clustering of option-granting practices and tax convexity. Interestingly, we find that firms that have more employee stock options for exogenous reasons are not more or less likely to be chosen as actual targets. Our interpretation of these results is that the target selection is a long-term process and it is impossible for acquirers to predict much ahead of time how many options the target firm will grant in the near future. Alternatively, it is possible that while the acquirers do take into account stock options in the process of target selection, whether options are going to be beneficial or not depends on many things (e.g., whether cancellations are possible, and how much the premium will be affected). The positive relation observed in Table 8 must be then driven by some form of preemptive option grants in the hope that they will defend takeover or to obtain better terms of the deal.

VII. Conclusion

Using unique data from merger agreements, we analyze how acquirers treat employee compensation obligations of the target firm and what implications it has for the negotiation of merger terms and merger outcomes. In 80% of all deals, the acquirers choose to cancel some employee stock options, with a high propensity to cancel all out-of-the-money stock options of the target firm. In cases when options are not explicitly cancelled, their value is often significantly reduced because option maturity is shortened, the acquirer stock is less volatile and has a higher dividend yield than the target stock, and employees are often forced to accept the intrinsic value instead of the Black-Scholes value. We find that in deals with options cancellations, employees become worse off after the deal even after we account for the significant offer premium paid by the bidder.

Given the importance of employee compensation treatment for the wealth transfers that take place between target employees, and shareholders of the bidder and target firms, we analyze how the offer premium and the acquirer CARs are affected by compensation of the target. Using the sample of 1,277 M&A deals announced by U.S. firms during the period of 2006 to 2014, we find that the offer price premium is larger when the target firm has more stock options, particularly when options are out-of-the-money and unvested, and when the acquirer cancels options. We employ geography-based and tax-based instruments for option use and conclude that options do not proxy for an omitted target firm characteristic and that they have a causal effect on the offer premium. Our results can be taken to imply that the acquirers pay a high price to obtain their preferential treatment of option compensation and/or to mitigate employee resistance to the deal. In addition, we find that deals with option cancellations are greeted by positive market reaction (+0.6%), whereas deal with option assumptions by the acquirer tend to destroy value as judged by CARs (-1.6%).

Finally, while we find that firms with more employee stock options are more frequently chosen as a target of acquisition, but this link is partially driven by a higher propensity of potentially attractive targets to grant more stock options in the hope to secure a better bargaining position. Overall, our empirical results show that the equity-based compensation of employees plays an important part in negotiation and outcomes of mergers and acquisitions.

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VIII. Appendices

A. Examples of Option Treatment From Merger Agreements

1. Cash-out of in-the-money options and cancellation of out-of-the-money options (Global Cash Access Holdings and Multimedia Games Holdings, Sep 8, 2014)

Company Options. As of the Effective Time, each Company Option granted prior to the date hereof and that is outstanding and unexercised immediately prior to the Effective Time (whether vested or unvested) shall automatically terminate and be canceled without any action on the part of any holder of such Company Option in consideration for the right at the Effective Time to receive in full satisfaction of the rights of such holder with respect thereto, as promptly as reasonably practicable following the Effective Time, the Option Cash Payment. "Option Cash Payment" means, with respect to any Company Option, a cash payment equal to the product of (A) the number of shares of Company Common Stock subject to such Company Option as of immediately prior to the cancellation of such Company Option and (B) the excess, if any, of the Merger Consideration over the exercise price payable per share of Company Common Stock issuable under such Company Option, without interest and less any required withholding Taxes. For the avoidance of doubt, if the exercise price per share of any Company Option, whether vested or unvested as of the Effective Time, is equal to or greater than the Merger Consideration, then by virtue of the occurrence of the Effective Time and without any action on the part of Parent, the Company or the holder thereof, the Company Option will automatically terminate and be canceled without payment of any consideration to the holder.

2. Cancellation of all unexercised options (Nightingale Informatix and Vantagemed, Feb 16, 2007)

Equity Awards and Employee Benefits. Non-Assumption of Stock Options. Within two business days following the date hereof, the Company shall deliver notice to the holders of Company Options, which such notice shall be in compliance with the terms of the Plan and such Company Options, that the Plan and Company Options will not be assumed by Parent and will be cancelled or terminated immediately prior to the Effective Time.

3. Deal with assumption of all options (Black & Decker, Stanley Works, and Blue Jay Acquisition, Nov 2, 2009)

Stock Awards. The Black & Decker Board shall (except, with regard to Nolan D. Archibald) adjust the terms of each outstanding Black & Decker Stock Option to provide that, at the Effective Time, each such option, whether vested or unvested, outstanding immediately prior to the Effective Time shall be converted into, and shall constitute, an option to acquire, on the same terms and conditions as were applicable to such Black & Decker Stock Option immediately prior to the Effective Time, the number of shares of Stanley Common Stock (rounded down to the nearest whole share) determined by multiplying the number of shares of Black & Decker Common Stock subject to such Black & Decker Stock Option by the Exchange Ratio, at an exercise price per share of Stanley Common Stock, rounded up to the nearest whole cent, equal to (A) the per share exercise price for the shares of Black & Decker Common Stock otherwise purchasable pursuant to such Black & Decker Stock Option divided by (B) the Exchange Ratio (each, as so adjusted, an "Adjusted Option").

4. Deal with cash-out of in-the-money and payout for out-of-the money options (Meteor Holdings, Meteor Merger, and Metrologic Instruments, Sep 12, 2006)

Company Stock Options. At or prior to the Effective Time, the Company shall take the following actions with respect to all options to purchase Company Common Stock ("Company Stock Options") granted under any stock option plans outstanding immediately prior to the Effective Time (without regard to the vesting or exercise price):

With respect to Company Stock Options granted under the Company's 2004 Equity Incentive Plan (the "2004 Plan Options"), the Company shall, pursuant to the terms of such plan, automatically cancel all options outstanding under such plan immediately prior to the Effective Time, without regard to the exercise price of such options. For each cancelled 2004 Plan Option with an exercise price that is less than the Merger Consideration, the Company will cause the holders of such cancelled option to receive an amount (net of applicable taxes) equal to the product of (i) the excess of (A) the Merger Consideration per share over (B) the exercise price per share subject to such Company Stock Option, multiplied by (ii) the total number of shares of Company Common Stock subject to such Company Stock Option, without any interest thereon (the "Option Consideration"). For each cancelled 2004 Plan Option with an exercise price that is equal to or higher than the per share Merger Consideration, the Company shall pay to the holder thereof as consideration for each such 2004 Plan Option award $1.00 per award to effectuate the cancellation of such 2004 Plan Options.

5. Deal with assumption of unvested options and cash-out and cancellation of vested options (Micros Systems, OC Acquisition LLC, Rocket Acquisition, and Oracle, Jun 22, 2014)

Company Stock Options. At the Effective Time, by virtue of the Merger and without any action on the part of the holders thereof, the unvested portion of each Company Stock Option (a "Company Compensatory Award") that is outstanding immediately prior to the Effective Time and that is held by a Person who is an employee of, or a consultant to, the Company or any of its Subsidiaries immediately prior to the Effective Time, shall be assumed by the Ultimate Parent and converted automatically at the Effective Time into an option denominated in shares of Ultimate Parent Stock and subject to terms and conditions substantially identical to those in effect at the Effective Time (an "Assumed Company Award"), except that (i) the number of shares of Ultimate Parent Stock that will be subject to each such Assumed Company Award shall be determined by multiplying the number of shares of Company Common Stock subject to such Assumed Company Award by a fraction (the "Award Exchange Ratio"), the numerator of which is the per share Merger Consideration and the denominator of which is the average closing price of Ultimate Parent Stock on NYSE over the five (5) trading days immediately preceding (but not including) the date on which the Effective Time occurs (rounded down to the nearest whole share) and (ii) the exercise or purchase price per share of each such Assumed Company

Award shall equal (x) the per share exercise or purchase price of each such Assumed Company Award divided by (y) the Award Exchange Ratio.

Notwithstanding the foregoing, (i) the vested portion of each outstanding Company Compensatory Award as of immediately prior to the Effective Time and (ii) the vested and unvested portion of each outstanding Company Compensatory Award that is held by a Person who is not an employee of, or a consultant to, the Company or any of its Subsidiaries immediately prior to the Effective Time (each such award, or vested portion thereof, as the case may be, a "Cashed Out Compensatory Award") shall not be assumed by the Ultimate Parent and shall, immediately prior to the Effective Time, be cancelled and extinguished and, in exchange therefor, each former holder of any such award shall have the right to receive an amount in cash equal to the product of (x) the aggregate number of shares of Company Common Stock subject to such Cashed Out Compensatory Award immediately prior to the Effective Time and (y) the Merger Consideration less any per share exercise or purchase price of such Cashed Out Compensatory Award.

B. Variable Definitions

All continuous variables are winsorized at the 1% tails.

Panel A: Deal characteristics	
Variable	Description
Offer premium	The ratio of the initial price offered by the acquirer to the target's stock price four weeks before the announcement minus 1, all multiplied by 100.
Tender offer	A dummy equal to one if the deal is structured as a tender offer.
Cash payment	A dummy equal to one if any part of the deal is paid with cash.
Diversifying deal	A dummy equal to one if the acquirer and target are from different industries (four-digit SIC code).
Public acquirer	A dummy equal to one if the acquirer is a public company.
Toehold	A dummy equal to one if the acquirer has a toehold in the target before the bid.
Initial to final offer price increase	The ratio of the final to initial offer price minus one in %. The variable is defined only for those deals in which the initial and final offer prices are not the same.
Bidder CAR (-1,+1)	CAR for the acquirer over the three-day window centered on the M&A announcement date; the market model is estimated over one year of daily returns ending four weeks before the M&A announcement.
Estimated bidder CAR attributed to modified and cancelled options	Gain on outstand. options by employees, multiplied by -1, and divided by the market capitalization of the acquirer before the M&A deal.
Bidder value increase $M (-1,+1)	Bidder CAR, multiplied by the market capitalization of the acquirer four weeks before the M&A deal.

Panel B: Firm characteristics	
Variable	Description
Target size	Logarithm of the book value of the target firm's assets.
M/B	Market value of target firm's assets divided by the book value of assets.
ROA	The target firm's EBIT plus depreciation divided by the book value of assets.
R&D	The target firm's R&D expenses divided by the book value of assets.
BHAR	The difference between the buy-and-hold stock return from month -14 to month -3 relative to the month of the bid announcement and the analogously defined buy-and-hold stock return on the value-weighted CRSP index.
Capex	The target firm's capital expenditures divided by the book value of assets.
Leverage	The target firm's sales at the fiscal year-end before the merger minus the sales in the prior year, divided by the sales in the prior year.
Sales growth	The sum of long-term debt and debt in current liabilities, divided by the book value of assets.

Panel C: Employee stock option variables	
Outstand. options/ shares	The number of the target firm's outstanding stock options divided by the number of outstanding shares at the end of the most recent fiscal year prior to the M&A announcement.
Moneyness of outstand. options	The stock price four weeks prior to the M&A announcement minus the weighted average strike price of outstanding stock options at the fiscal year-end divided by the weighted average strike price.
Out-of-the money	A dummy equal to one if the moneyness of outstanding options is negative.
Value of outstand. options/mktcap	The Black-Scholes value of outstanding options four weeks before the M&A announcement divided by the target firm market capitalization.
Value of vested options/mktcap	The Black-Scholes value of vested options four weeks before the M&A announcement divided by the target firm market capitalization.
Value of unvested options/mktcap	The Black-Scholes value of unvested options four weeks before the M&A announcement divided by the target firm market capitalization, calculated as the difference between *value of outstanding options/mktcap* and *value of vested options/mktcap*.
Moneyness of vested options	The stock price four weeks prior to the M&A announcement minus the weighted average strike price of exercisable options at the fiscal year end divided by the weighted average strike price.
Moneyness of unvested options	The stock price four weeks prior to the M&A announcement minus the weighted average strike price of unexercisable options at the fiscal year end divided by the weighted average strike price.
Cancel options	Dummy equal to one if any of the employee stock options are canceled by the acquirer without any payment to employees.
Gain on outstand. options/mktcap	The difference between the value of outstanding options given the acquirer treatment evaluated at the price four weeks before the M&A announcement and the Black-Scholes value four weeks before the M&A announcement without the merger, all divided by the target firm market capitalization.
Gain on outstand. options as % of value of outstand. options	The difference between the value of outstanding options given the acquirer treatment and evaluated at the price four weeks before the M&A announcement and the Black-Scholes value four weeks before the M&A announcement without the merger, all divided by the Black-Scholes value four weeks before the M&A announcement without the merger.
Gain on outstand. options/mktcap (with premium)	The difference between the value of outstanding options given the acquirer treatment evaluated at the offer price and the Black-Scholes value four weeks before the M&A announcement without the merger, all divided by the target firm market capitalization.

Table 1. Summary Statistics.

Panel A presents the summary statistics for firm characteristics, deal characteristics, and stock option variables for the sample of completed M&A deals announced between January 2006 and December 2014 in which target firms are public firms in the United States with non-missing data on the number and value of outstanding stock options and the offer premium. Panel B presents the means of main variables for the sample of actual targets and a control sample of potential targets. All variable definitions are provided in Appendix B.

Panel A: Completed M&A Deals (1,277 deals)						
Variable	Obs.	Mean	SD	25th	Median	75th
Deal characteristics:						
Offer premium	1,277	41.59%	31.72%	20.83%	33.28%	52.10%
Tender offer	1,277	0.581	0.494	0	1	1
Cash payment	1,277	0.877	0.328	1	1	1
Diversifiying deal	1,277	0.672	0.470	0	1	1
Public acquirer	1,277	0.600	0.490	0	1	1
Toehold	1,277	0.044	0.205	0	0	0
Target firm characteristics:						
Assets ($M)	1,277	1,225	3,460	94	297	978
Employees	1,258	4,203	11,274	277	802	3,100
M/B	1,277	1.527	1.193	0.801	1.204	1.866
ROA	1,277	0.059	0.204	0.024	0.101	0.154
R&D	1,277	0.071	0.128	0	0.012	0.098
Option variables:						
Outstand. options/shares	1,277	0.096	0.070	0.044	0.085	0.134
Moneyness of outstand. options	1,265	0.398	1.219	-0.282	0.155	0.675
Out-of-the money	1,265	0.418	0.493	0	0	1
Value of outstand. options/mktcap	1,277	0.049	0.043	0.019	0.039	0.068
Value of vested options/mktcap	1,248	0.026	0.026	0.008	0.018	0.035
Moneyness of vested options	1,233	0.581	1.603	-0.329	0.179	0.868
Value of unvested options/mktcap	1,248	0.023	0.022	0.008	0.018	0.032
Moneyness of unvested options	1,115	0.310	1.036	-0.218	0.131	0.504

Panel B: Target Selection					
	Actual targets		*Control sample*		*Diff. in means*
Variable	Obs.	Mean	Obs.	Mean	t-test
M/B	1,304	1.487	57,053	1.650	-5.77***
ROA	1,304	0.083	57,053	0.099	-4.43***
R&D	1,304	0.062	57,053	0.044	7.64***
Leverage	1,304	0.189	57,053	0.191	-0.28
Sales growth	1,304	0.121	57,053	0.167	-4.84***
Capex	1,304	0.047	57,026	0.053	-4.02***
BHAR	1,304	-0.006	57,053	0.029	-2.79***
Outstand. options/shares	1,304	0.096	57,053	0.083	8.03***
Out-of-the money	1,292	0.444	55,214	0.409	2.66***
Value of outstand. options/mktcap	1,303	0.047	56,373	0.041	6.39***
Value of vested options/mktcap	1,283	0.023	54,824	0.021	3.59***
Value of unvested options/mktcap	1,283	0.023	54,697	0.020	7.23***

Table 2. Treatment of Target Employee Stock Options by Acquirers.

The sample is hand collected from merger agreements, tender offers, and asset purchase agreements filed with the SEC as a part of 8-K, 425, DEFA, or DEFM forms for completed M&A deals announced between January 2006 and December 2014 that have non-missing offer premium, number and value of outstanding options, and are public firms in the United States. *Cashout (intrinsic value)* is equal to one if for each option an employee receives the merger consideration price, offer price, or the stock price prior to the merger minus the exercise price. *Payout (some amount)* is equal to one if for each option an employee receives a fixed amount specified by the company that is different from the option intrinsic value. *Assume or convert* is equal to one if each option is either assumed by the acquirer on essentially the same terms or converted into a similar financial instrument, with the original vesting schedule either being kept or being accelerated. *Expire on close* is equal to one if an option expires upon the merger close and is worthless if left unexercised. *Cancel without any payment* is equal to one if each option is canceled by the acquirer without any payment to employees, other than to directors. *Other treatment* is equal to one if any combination of the above treatments is used.

	Vested stock options				Unvested stock options			
Treatement	In-the-money		Out-of-the-money		In-the-money		Out-of-the-money	
	Number	%	Number	%	Number	%	Number	%
Cashout (intrinsic value)	949	76.2%			872	70.0%		
Cancel without any payment	1	0.1%	983	79.0%	45	3.6%	945	75.9%
Assume or convert	224	17.9%	226	18.2%	276	22.1%	264	21.1%
Expire on close	37	3.0%	0	0.0%	15	1.2%	0	0.0%
Payout (some amount)	4	0.3%	9	0.7%	5	0.4%	9	0.7%
Other treatement	16	1.3%	13	1.0%	18	1.4%	13	1.0%
Target has no options	14	1.1%	14	1.1%	14	1.1%	14	1.1%
Total deals with data	1,245	100%	1,245	100%	1,245	100%	1,245	100%
Data not available	32		32		32		32	
Total deals searched	1,277		1,277		1,277		1,277	

Table 3. Effect of Mergers and Acquisitions on Employee Compensation.

The sample consists of completed M&A deals announced between January 2006 and December 2014, in which target firms are public firms in the United States with non-missing data on the number and value of outstanding stock options and the offer premium. The stock option treatment data are hand collected from merger agreements, tender offers, and asset purchase agreements filed with the SEC as a part of 8-K, 425, DEFA, or DEFM forms. *Dividend yield* is the value of common dividends per share of stock divided by the market price at the end of the fiscal year prior to the M&A announcement. *Stock return volatility* is the annualized standard deviation of log-returns, estimated using daily data over one year prior to the M&A announcement. All other variables are described in Appendix B.

Panel A: Full Sample

Variable	Obs.	Mean	Std. dev.	25th	Median	75th
Cancel options	1,245	0.799	0.401	1	1	1
Gain on outstand. options/mktcap	1,186	-0.024	0.032	-0.034	-0.013	-0.003
Gain on outstand. options as % of value of outstanding options	1,173	-48.84	38.60	-94.11	-43.02	-13.03
Gain on outstand. options as % of value of outstand. options (with premium)	1,081	3.97	67.94	-43.56	10.82	43.29
Gain on vested options as % of value of vested options (with premium)	1,196	19.36	93.58	-51.24	26.75	60.63
Gain on unvested options as % of value of unvested options (with premium)	1,080	-19.15	63.26	-80.07	-18.04	24.82

Panel B: Cancel options = 1

Variable	Obs.	Mean	Std. dev.	25th	Median	75th
Gain on outstand. options as % of value of outstanding options	952	-58.05	35.63	-100.00	-55.45	-24.40
Gain on outstand. options as % of value of outstand. options (with premium)	861	-7.47	66.14	-66.29	0.007	34.76

Panel C: Cancel options = 0

Variable	Obs.	Mean	Std. dev.	25th	Median	75th
Gain on outstand. options as % of value of outstanding options	221	-9.19	22.42	-13.98	-0.004	0.00
Gain on outstand. options as % of value of outstand. options (with premium)	220	48.72	55.32	17.98	40.60	68.37

Panel D: Premium paid < Sample Median						
Variable	Obs.	Mean	Std. dev.	25th	Median	75th
Gain on outstand. options as % of value of outstanding options	582	-41.80	36.13	-75.29	-32.81	-10.37
Gain on outstand. options as % of value of outstand. options (with premium)	540	-11.61	50.35	-46.99	0.00	24.11

Panel E: Premium paid > Sample Median						
Variable	Obs.	Mean	Std. dev.	25th	Median	75th
Gain on outstand. options as % of value of outstanding options	591	-55.78	39.71	-100.00	-55.51	-18.24
Gain on outstand. options as % of value of outstand. options (with premium)	541	19.51	78.85	-39.85	34.33	68.00

Panel F: Differences Between Target and Acquirer				
Variable	Target (Mean)	Acquirer (Mean)	Difference	t-test
Stock return volatility	53.75%	34.42%	19.33%	11.89***
Dividend yield	0.85%	1.39%	-0.55%	-2.93***

Panel G: Option Grants by Bidders That Cancel Options Before and After Acquisition					
Variable	Mean	Median	Variable	Mean	Median
Value of options granted t-1 ($M)	75.83	18.30	Value of options granted t-1/mktcap	1.14%	0.38%
Value of options granted t ($M)	64.47	18.13	Value of options granted t/mktcap	1.13%	0.34%
Value of options granted t+1 ($M)	60.48	18.70	Value of options granted t+1/mktcap	0.47%	0.268%

Table 4. Univariate Relations.

The table shows means for some variables of interest for deals where at least some of the outstanding employee options are canceled by the acquirer and for deals where none of the options are cancelled and are instead assumed or converted by the acquirer. *Layoffs after M&A* is equal to $100\times \max\{0, \frac{T+A-C}{T+A}\}$, where C is the number of employees in the combined firm the first year after the merger, T and A are, correspondingly the number of employees in the target and acquiring firms before the merger. *New option grants/mktcap by acquirer after M&A* is the Black-Scholes value of new stock option grants by the combined firm during the first year after the merger divided by the market value of the combined firm at the end of first fiscal year after the merger. All other variables are described in Appendix B.

Panel A	Cancel	Assume	Diff. in means	t-stat
Offer premium	42.98%	34.39%	8.58%	4.52***
Initial to final offer price increase	10.66%	4.62%	6.03%	2.53**
Bidder CAR (-1,+1)	0.61%	-1.60%	2.21%	3.12***
Estimated bidder CAR attributed to modified and cancelled options	0.60%	0.07%	0.53%	1.41
Bidder value increase $M (-1,+1)	-29.38	-358.60	329.20	1.77*
Panel B	Cancel	Assume	Diff. in means	t-stat
Tender offer	0.595	0.552	0.043	1.18
Cash payment	0.945	0.636	0.309	9.06***
Diversifying deal	0.704	0.552	0.152	4.17***
Public acquirer	0.538	0.856	-0.318	-11.54***
Target size	5.541	6.499	-0.958	-7.38***
R&D	0.072	0.070	-0.002	0.25
Outstand. options/shares	0.100	0.086	0.014	2.60***
Outstand. options value/mktcap	0.051	0.044	0.007	2.34**
Layoffs after M&A	12.86%	6.03%	6.83%	3.93***
New option grants/mktcap by acquirer after M&A	0.004	0.009	-0.005	-4.55***

Table 5. Offer Premium and Employee Compensation (OLS).

Panel A of the table reports estimates of the OLS regressions of the offer premium on firm characteristics, deal characteristics, and employee stock option variables. The dependent variable is the acquisition premium provided by the SDC, calculated as the ratio of the initial offer price divided by the target's stock price four weeks before the deal announcement, minus one, and all multiplied by 100. The sample consists of completed M&A deals announced between January 2006 and December 2014, in which target firms are public firms in the United States with non-missing data on the number and value of outstanding stock options and the offer premium. All specifications include industry fixed effects (Fama-French 17) and year fixed effects. T-statistics based on heteroskedasticity-consistent standard errors clustered by the acquirer are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Panel A of the table reports δ using the test developed by Oster (2015) and corresponds to specifications estimated in Panel A. We use the input of $\mathrm{R}_{\max} = 1.3\widetilde{R}$, where $\widetilde{R}$ is the largest empirically observed R-squared (20.29%). The value of δ means that in order for the coefficient of interest to be explained away to zero by selection on unobservables, it must be that selection on unobservables is approximately δ times greater than selection on observables. All other variables are described in Appendix B.

	(1)	(2)	(3)	(4)	(5)	(6)
Cancel options	4.833**				-0.150	-1.732
	(2.35)				(-0.05)	(-0.56)
Outstand. options/shares	41.149**				-5.151	
	(2.55)				(-0.18)	
Value of outstand.		67.315**				-29.833
options/mktcap		(2.51)				(-0.61)
Out-of-the-money		11.939***	9.894***			11.394***
		(6.47)	(5.27)			(6.14)
Value of vested options/mktcap			8.442			
			(0.20)			
Value of unvested options/mktcap			129.922**			
			(2.55)			
Gain on outstand.				-131.88***		
options/mktcap				(3.24)		
Cancel options × outstand.					55.390*	
options/shares					(1.73)	
Cancel options × value of						121.01**
outstand. options/mktcap						(2.31)
Tender offer	7.138**	7.625**	5.692*	4.896	6.849**	7.696**
	(2.25)	(2.37)	(1.84)	(1.60)	(2.16)	(2.39)
Cash payment	6.744**	9.702***	9.604***	8.154***	7.137**	8.227***
	(2.14)	(3.33)	(3.38)	(2.77)	(2.26)	(2.65)
Toehold	12.623**	10.841*	8.714	10.020*	12.288**	12.108**
	(2.22)	(1.88)	(1.59)	(1.85)	(2.19)	(2.08)
Public acquirer	4.032*	2.879	2.506	2.563	4.023*	3.411*
	(1.91)	(1.37)	(1.20)	(1.27)	(1.92)	(1.64)
Diversifiying deal	3.745**	3.043*	2.621	2.568	3.858**	3.702**
	(2.01)	(1.66)	(1.42)	(1.35)	(2.07)	(2.01)
Target size	-2.382***	-2.321***	-2.387***	-2.271***	-2.416***	-1.896***
	(-3.79)	(-3.60)	(-3.74)	(-3.64)	(-3.87)	(-2.89)
M/B	-3.274***	-1.882**	-1.774*	-2.704***	-3.146***	-1.786*
	(-3.42)	(-2.04)	(-1.95)	(-3.07)	(-3.29)	(-1.84)
ROA	-15.500*	-12.331	-11.244	-13.247	-	-12.341
	(-1.92)	(-1.55)	(-1.42)	(-1.60)	16.164**	(-1.46)
					(-2.02)	
R&D	9.865	2.839	2.725	8.930	9.511	5.597
	(0.69)	(0.20)	(0.20)	(0.67)	(0.68)	(0.40)
Observations	1,245	1,265	1,237	1,186	1,245	1,233
R-squared	18.28%	19.81%	19.39%	19.17%	18.54%	20.29%

Panel B: Oster's δ with $R_{\max} = 1.3\widetilde{R}$						
	(1)	(2)	(3)	(4)	(5)	(6)
Cancel options	2.351					
Outstand. options/shares	1.333					
Value of outstand. options/mktcap		1.452				
Out-of-the-money		2.170	1.666			2.136
Value of unvested options/mktcap			1.260			
Gain on outstand. options/mktcap				1.258		
Cancel × outstand. options/shares					1.349	
Cancel × value of outstand. options/mktcap						1.463

Table 6. Causal Effect of Employee Compensation on Offer Price Premium (Instrumental Variables).

The table presents the results of LIML estimation of the deal offer price premium and employee stock options use. Columns 1, 3 and 5 present the results of the first equation, where dependent variables are the number of outstanding options divided by the number of shares outstanding and the value of outstanding options divided by the firm market capitalization. Columns 2, 4 and 6 present the estimates of the model with the number and value of outstanding options endogenized. The excluded instruments are *neighbor firms option use* and *tax convexity*. Neighbor firms option use is the average ratio of the number of options outstanding to the firm shares outstanding, calculated for all Compustat firms excluding the firm itself, for a given three-digit zip code and a year. Tax convexity is the coefficient of serial auto-correlation in EBIT, estimated over 20 years of data. The estimation in the table below includes intercept, year fixed-effects, and industry fixed-effects (Fama-French 17), and all control variables used in Table 5. T-statistics based on heteroskedasticity-consistent standard errors clustered by the acquirer are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. All other variables are described in Appendix B.

	Outstand. options/shares (1st stage)	Offer premium (2nd stage)	Outstand. options/shares (1st stage)	Offer premium (2nd stage)	Outstand. options/shares (1st stage)	Offer premium (2nd stage)
Outstand. options/shares		157.65**		269.97*		175.96**
		(2.09)		(1.66)		(2.47)
Neighbor firms option use	0.285***				0.278***	
	(6.64)				(6.52)	
Tax convexity			-0.020***		-0.015**	
			(-3.22)		(-2.46)	
Observations	1,255	1,255	1,274	1,274	1,252	1,252
First-stage R^2	26.61%		23.83%		26.96%	
(first-stage joint F-test)	(17.56 p-val<0.001)		(15.16 p-val<0.001)		(17.30 p-val<0.001)	
Weak identification test (Craigg-Donald F-stat)	44.04 (p-val<0.001)		10.36 (p-val=0.002)		24.07 (p-val<0.001)	
Test of overidentifying restrictions	N/A		N/A		0.633 (p-val=0.426)	

	Value outstand. options/mktcap (1st stage)	Offer premium (2nd stage)	Value outstand. options/mktcap (1st stage)	Offer premium (2nd stage)	Value outstand. options/mktcap (1st stage)	Offer premium (2nd stage)
Value of outstand. options/ mktcap		342.03**		357.26*		354.22**
		(2.01)		(1.66)		(2.47)
Neighbor firms option use	0.131***				0.124***	
	(4.86)				(4.64)	
Tax convexity			-0.015***		-0.013***	
			(-3.65)		(-3.10)	
Observations	1,255	1,255	1,274	1,274	1,252	1,252
First-stage R^2	25.61%		24.11%		26.23%	
(first-stage joint F-test)	(13.95 p-val<0.001)		(12.60 p-val<0.001)		(13.46 p-val<0.001)	
Weak identification test (Craigg-Donald F-stat)	23.64 (p-val<0.001)		13.34 (p-val<0.001)		15.82 (p-val<0.001)	
Test of overidentifying restrictions	N/A		N/A		0.020 (p-val=0.887)	

Table 7. The Acquirer Market Price Reaction to the M&A Announcement.

This table reports estimates of the OLS regressions of the acquirer market price reaction to the M&A announcement on firm characteristics, deal characteristics, and employee stock option variables. The sample consists of completed M&A deals announced between January 2006 and December 2014, in which target firms are public firms in the United States with non-missing data on the number and value of outstanding stock options and the offer premium. All variables are described in Appendix B. All specifications include industry fixed effects (Fama-French 17) and year fixed effects. T-statistics based on heteroskedasticity-consistent standard errors clustered by the acquirer are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Cancel options	1.440**	1.623**		
	(2.01)	(2.26)		
Outstand. options/shares			-10.083**	-9.865**
			(-2.11)	(-2.07)
Offer premium		-0.023***		-0.019**
		(-2.72)		(-2.27)
Tender offer	-1.028	-0.890	-0.716	-0.592
	(-1.10)	(-0.97)	(-0.77)	(-0.65)
Cash payment	1.023	1.083	1.464*	1.554*
	(1.16)	(1.25)	(1.74)	(1.87)
Toehold	0.238	0.400	0.714	0.970
	(0.20)	(0.31)	(0.57)	(0.72)
Diversifiying deal	-1.211**	-1.083*	-1.298**	-1.185**
	(-2.12)	(-1.91)	(-2.27)	(-2.08)
Target size	-0.156	-0.215	-0.362*	-0.424**
	(-0.84)	(-1.16)	(-1.87)	(-2.18)
M/B	-0.837***	-0.890***	-0.960***	-1.005***
	(-3.92)	(-4.14)	(-4.42)	(-4.61)
ROA	-3.384**	-3.602**	-2.809*	-2.991*
	(-2.03)	(-2.20)	(-1.70)	(-1.83)
R&D	-9.109***	-8.566***	-8.218***	-7.888***
	(-3.27)	(-2.97)	(-2.91)	(-2.73)
Observations	518	518	524	524
R-squared	15.82%	16.69%	16.02%	16.62%

Table 8. Target Selection and Employee Compensation.

This table reports the results of probit regressions. The dependent variable is equal to one if a potential target firm is chosen as actual target and is zero otherwise. For each target firm of a deal announced in year t, we find matching target firms in the Compustat/CRSP database that were neither acquirers nor targets in the three-year period prior to the deal, are from the same industry, and have similar size in year $t-1$. Fama-French 17 industry fixed effects and year fixed effects are included in all specifications. All other variables are described in Appendix B. Marginal effects (multiplied by 100) are reported and t-statistics based on heteroskedasticity-consistent standard errors clustered by the deal are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	(1)	(2)	(3)
Outstand. options/shares	4.750***		
	(4.88)		
Value of outstand. options/mktcap		9.777***	
		(6.19)	
Value of vested options/mktcap			6.198**
			(1.98)
Value of unvested options/mktcap			14.715***
			(3.90)
Target size	0.029	0.043	0.040
	(0.76)	(1.08)	(0.97)
M/B	-0.414***	-0.480***	-0.491***
	(-6.73)	(-7.48)	(-7.44)
ROA	1.062*	1.021*	1.087*
	(1.74)	(1.64)	(1.71)
R&D	6.386***	6.825***	6.682***
	(7.10)	(7.62)	(7.29)
Sales growth	-0.566***	-0.638***	-0.655***
	(-3.02)	(-3.26)	(-3.25)
Leverage	0.151	0.185	0.005
	(0.50)	(0.61)	(0.02)
Capex	-0.858	-0.780	-0.725
	(-0.69)	(-0.63)	(-0.57)
BHAR	-0.194	-0.240*	-0.298**
	(-1.59)	(-1.91)	(-2.32)
Actual targets	1,304	1,303	1,283
Potential targets	57,026	56,346	54,673

Table 9. Causal Effect of Employee Compensation on Target Selection (Instrumental Variables).

This table reports the results of two-stage probit model estimation. Columns 1 and 3 present the results of the first equation, where dependent variables are the number of outstanding options divided by the number of shares outstanding and the value of outstanding options divided by the firm market capitalization. Columns 2 and 4 present the estimates of the model with the number and value of outstanding options endogenized. The excluded instruments are *neighbor firms option use* and *tax convexity.* Neighbor firms option use is the average ratio of the number of options outstanding to the firm shares outstanding, calculated for all Compustat firms excluding the firm itself, for a given three-digit zip code and a year. Tax convexity is the coefficient of serial auto-correlation in EBIT, estimated over 20 years of data. The dependent variable in the second stage is equal to one if a potential target firm is chosen as the actual target and is zero otherwise. For each target firm of a deal announced in year t, we find matching target firms in the Compustat/CRSP database that were neither acquirers nor targets in the three-year period prior to the deal, are from the same industry, and have similar size in year $t-1$. The estimation includes intercept, year fixed-effects, industry fixed-effects (Fama-French 17), and all control variables used in Table 7. T-statistics based on heteroskedasticity-consistent standard errors clustered by the acquirer are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Marginal effects are reported and t-statistics based on heteroskedasticity-consistent standard errors clustered by the deal are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Outstand. options/ shares (1st stage)	Target selection (2nd stage)	Value of outstand. options/mktcap (1st stage)	Target selection (2nd stage)
Outstand. options/ shares		2.939*		
		(1.91)		
Value of outstand. options/mktcap				6.332*
				(1.79)
Neighbor firms option use	0.129***		0.059***	
	(25.63)		(19.96)	
Tax convexity	-0.008***		-0.004***	
	(-8.06)		(-5.28)	
Other covariates	Yes	Yes	Yes	Yes
Observations	49,961	49,961	49,587	49,587
Wald χ^2 test of exogeneity	2.33 (p-val=0.127)		1.91 (p-val=0.167)	