Corporate tax cuts, merger activity, and shareholder wealth*

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Abstract

We evaluate the impact of the Domestic Production Activities Deduction (DPAD) on mergers and acquisitions. DPAD reduces effective corporate income tax rates for firms based on their income from work or goods made in the US. We find that acquisition spending increases substantially for firms in industries with large DPAD-related corporate income tax cuts. Other results indicate that the quality of acquisitions by DPAD-advantaged firms varies as predicted by existing theories of the firm. Specifically, DPAD improves acquisition quality for bidders with financial constraints or for those that depend on major business counterparties, but not for bidders in non-competitive industries.

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1. Introduction

Corporate taxes are likely to influence investment decisions because the size, timing, and uncertainty of tax payments and deductions distort the expected profitability and valuation of a project. Yet, even if taxes affect many real corporate decisions, their order of importance is still an open research question (Hanlon and Heitzman, 2010). This paper investigates the effect of targeted corporate tax reductions on merger and acquisition (M&A) transactions, using Internal Revenue Code Section 199, the Domestic Production Activities Deduction (DPAD), enacted in 2004. This tax deduction, which is based on the income from goods produced in the US, represents a large benefit to firms with intensive local manufacturing activity, totaling in the tens of billions of dollars (Blouin, Krull, and Schwab, 2014).

In the context of the M&A process and viewing DPAD as an industry shock, we address three different research questions relating to neoclassical, free cash flow (agency), and contracting economic theories. Our first question is whether firms in industries that get large Section 199-related tax cuts perform more acquisitions. Next, we study whether DPAD-related tax reductions affect acquisition quality in terms of bidder returns, synergies, and premiums offered to target shareholders. We then ask whether the answers to our previous question on acquisition quality vary according to characteristics or environments predicted by existing theories of the firm.

The key variable in our study is ETRR (or effective tax rate reduction), which measures the DPAD induced *percentage* reduction in the effective tax rate paid by a firm's Internal Revenue Service (IRS) industry in a given year. We use the acquiring firm's industry ETRR as the main independent variable in all the empirical analyses to evaluate the effect of DPAD on M&A activity and quality. Higher ETRR indicates a larger reduction in tax rates from Section 199.

Our baseline empirical analyses show that DPAD has a first-order effect on M&A transactions. We find that firms benefitting from the tax policy are more likely to invest in acquisitions. Moreover, a one standard deviation increase in ETRR is related to a 1.12% increase in the total deal value made by acquirers in the industry. At the deal level, a similar tax reduction is associated with a 0.6% increase in the acquirers' M&A announcement return, a 1.5% decrease in the premium offered to target shareholders, and a 0.5% increase in the M&A synergy (defined as the percentage gain to the value-weighted portfolio of target and acquirer at announcement).

The effect of DPAD on both merger activity and profitability in our baseline tests supports the neoclassical theory of M&A (Manne, 1965; Mitchell and Mulherin, 1996). This theory predicts increases in acquisition activity after an industry shock and firms making acquisitions that increase their shareholders' wealth. The free cash flow agency theory (Jensen, 1986; Stulz, 1990) conjectures that unexpected cash inflows will increase acquisition volume, but that self-serving agents will be less attentive to invest the inflows in positive net present value (NPV) projects. Our findings on M&A activity support both the neoclassical and free cash flow agency theories, but the results on average deal quality are consistent only with neoclassical predictions.

Fazzari, Hubbard, and Petersen (1988a) conclude that factors and other characteristics related to the corporation's contractual environment (such as financial constraints and the level of competition for inputs and outputs) affect investment. Consistent with this, we find that easing financial constraints through a Section 199-related tax cut influences merger outcomes. For acquiring firms with a high pre-merger Kaplan and Zingales (1997) Index, a one standard deviation increase in ETRR is associated with a 0.3% higher M&A cumulative abnormal return (CAR) at announcement. For the same acquirers, a similar tax reduction is related to an increase

of 0.3% in the overall deal synergy, and to 0.7% lower target premiums. These results hold not only for the Kaplan-Zingales Index,[1] but also when we use other proxies of financial constraints.

Next, we study bidders operating in industries with a high Herfindahl-Hirschman index (HHI).[2] We note that these firms are susceptible to quiet life agency problems described by Hicks (1935) and Bertrand and Mullainathan (2003). Those authors argue that managers of firms free from competitive pressure in their industries are more likely to sacrifice shareholder gain for managerial convenience and stability. For bidders in non-competitive industries, a one standard deviation increase in ETRR is linked to 0.6% lower M&A announcement CARs, to a decline in deal synergy of 0.5%, and to 1.2% higher offer premiums. These effects either cancel out or substantially truncate the beneficial average impact of ETRR on M&A deal quality.

We also study "bonding" firms, which Johnson, Karpoff, and Yi (2015) define as those with a major business customer or a key strategic alliance. They conjecture that the need to bond an important business relation with a major counterparty acts as a disciplining device that prompts the managers in these companies to take value-improving decisions. Consistent with this prediction, we find that bonding firms that benefit from DPAD make profitable M&A deals. Together, the evidence from our financial constraint, quiet life, and bonding tests conform to existing theories of the firm predicting that the corporate contractual environment influences the manner in which a financial shock affects investment profitability.

Making causal inferences when assessing and analyzing the economic impact of regulatory changes is often challenging. For instance, because regulatory changes frequently affect most

[1] The Kaplan and Zingales (KZ) Index provides a commonly used ranking of how financially constrained a firm is. As implemented by Lamont, Polk, and Saa-Requejo (2001), which we follow, the index consists of a linear combination of the following five accounting ratios: cash flow to total capital, the market to book ratio, debt to total capital, dividends to total capital, and cash holdings to capital. Additional details appear in Appendix A.

[2] HHI is a commonly used measure of industry competition. For each industry, the index is computed as the sum of the squares of the market shares of all firms belonging to the industry.

firms at the same time, isolating the unique effect of a new policy is difficult as it could be confounded by other contemporaneous changes or events. Moreover, establishing a suitable matching sample of firms not affected by the policy is sometimes impossible since the new regulations often apply to all firms. Our identification strategy uses a difference-in-differences (DiD) method that circumvents these limitations and enables causal inferences regarding the effect of DPAD on M&A activity and profitability.

Our DiD research design exploits the fact that firms in industries that produce a large portion of income from domestic manufacturing earn a significant Section 199 reduction in their corporate income tax rate, while firms in industries with little or no domestic manufacturing are basically unaffected by the policy. This cross-sectional variation allows within-year comparison for firms in different industries. We also note that DPAD was rolled out to allow a deduction of 3% in 2005-2006, of 6% in 2007-2009, and of 9% beginning 2010 and thereafter.[3] We therefore obtain both temporal and cross-sectional industry variation in the size of Section 199's influence on effective tax rates (as measured by ETRR).

Our DiD empirical design is further enhanced by the existence of precise announcement dates for acquisitions. This enables us to more accurately evaluate the effects of ETRR on the profitability and value of the particular investment choices taken after the DPAD cash infusion. This feature gives us the power to discriminate between hypotheses, such as those about acquisition quality and differences in quality across firms with different characteristics, which would be otherwise difficult to disentangle.

[3] As noted by Abadie (2005), when only a fraction of the population is exposed to the treatment, an untreated comparison group can be used to identify temporal variation in the outcome that is not due to treatment exposure. The DiD estimator is based on this simple idea. Abadie shows DiD estimators to be feasible when applied to repeated cross-sections.

We perform two separate procedures to address the concern arising from our use of an industry-based ETRR at the acquirer firm's level. First, in subsamples of firms with and without foreign operations, regression analyses that use both GAAP and cash measures of the firm's effective tax rate show that a one percentage point reduction in ETRR lowers the average acquirer firm's tax rate by one percentage point. Second, in non-parametric permutation robustness tests where we randomize the industry ETRR assignment, we find results that corroborate those from our baseline analyses. The evidence from both tests mitigates concerns related to the use of industry ETRR to assess treatment.

Our paper advances several strands of the finance and accounting literature. First, we contribute to recent work that uses DPAD to obtain quasi-exogenous identification to study the effects of that regulation on various corporate actions. For example, Ohrn (2016) examines the effect of DPAD on corporate investment and financing choices. Blouin, Krull, and Schwab (2014) investigate the effect of DPAD on payout policy. Lester (2016) explores how a Section 199 tax deduction influences domestic investment, payout, and income shifting across borders and across time.[4] None of these papers, however, considers the effect of DPAD on M&A activity. Looking at acquisitions is important because these transactions, which are announced at precise dates, are typically the largest and most dramatic investments that firms undertake. Consequently, acquisitions provide an ideal setting to examine our hypotheses.

Second, this paper adds to the literature on the effect of taxes on corporate decisions in general, and on merger decisions in particular.[5] Notably, the extant evidence about the

[4] In addition, Lester and Rector (2016) use C corporation tax return data to provide empirical evidence on the economic significance of DPAD and the characteristics of the companies that benefit from it.

[5] This literature goes back at least to Auerbach and Reishus (1987), and includes Hayn (1989), Erickson (1998), Scholes and Wolfson (1990), Henning and Shaw (2000), Erickson and Wang (2000; 2007), Ayers, Lefanowicz, and Robinson (2003; 2004), Devos, Kadapakkam, and Krishnamurthy (2009), Huizinga and Voget (2009), Hanlon, Lester, and Verdi (2015), and Ohrn and Seegert (2016).

importance of taxes to acquisition activity and value is mixed.[6] The message to that literature from our findings is that seemingly small changes in corporate tax rates can have major effects in both the amount and quality of acquisition activity.

Third, our study also moves forward an extensive literature on agency problems and excess cash. Papers such as Jensen (1986), Harford (1999), and Moeller, Schlingemann, and Stulz (2004) maintain that firms with excess cash tend to spend more on value decreasing acquisitions. Similarly, Blanchard, Lopez-de-Silanes, and Shleifer (1994) argue that managers of firms that receive cash windfalls tend to waste the money on self-serving investment projects. Our baseline findings suggest that, on average, excess cash generated from Section 199-related tax cuts is deployed in value increasing M&As and not wasted, as predicted by the free cash flow agency hypothesis.

Our fourth contribution is based on several findings showing that the effect of cash shocks on investment quality varies with the corporate contracting environment as predicted by existing theories of the firm. Our evidence that DPAD-related cash infusions soften financial constraints that enable firms to undertake profitable M&A projects conforms to the theory by Fazzari, et al. (1988a) conjecturing that a decrease in the corporate tax would promote investment in financially constrained firms.[7] Our findings of ineffective M&A deals in the subset of DPAD advantaged bidders that do not face intense industry competition support the quiet life hypothesis (Hicks, 1935).[8] At the same time, our results showing that high-DPAD firms that rely on a major

[6] For example, Auerbach and Reishus (1987) find no evidence that potential tax benefits played an important role in the structure and frequency of mergers and acquisitions during the 1970s and early 1980s. In contrast, Scholes and Wolfson (1990) show that tax laws passed in the 1980s had a first-order effect on M&A activity.

[7] Other papers on the association between financial frictions and investment includes Fazzari, et al. (1988b), Kaplan and Zingales (1997), Erickson and Whited (2000), Gomes (2001), Alti (2003), Almeida, Campello, and Weisbach (2004), Almeida and Campello (2007), Denis and Sibilkov (2010), and Faulkender and Petersen (2012).

[8] The quiet life hypothesis is also studied in other papers including Bertrand and Mullainathan (2003 and 2005), Qui and Yu (2009), Giroud and Mueller (2010), Armstrong, Balakrishnan, and Cohen (2012), Chhaochharia, Kumar, and Niessen-Ruenzi (2012), Muscarella and Zhao (2015), and Fich, Harford and Yore (2017).

business relationship perform value increasing M&As provide support for the bonding hypothesis of Johnson, Karpoff, and Yi (2015). Therefore, perhaps our most important contribution is distinguishing the overall positive effect of Section 199 among different firms. We show that the effect is particularly positive in firms that are financially constrained or in those where bonding commercial relations is important; but the effect is less positive and perhaps negative in firms prone to quiet-life agency problems.

The paper continues as follows. Section 2 provides institutional background on the Domestic Production Activities Deduction and develops our hypotheses and empirical predictions. Section 3 describes our research design, our sample selection, and the measurement of key variables. Section 3 also addresses potential econometric issues related to our DiD research design and our ETRR variable. Section 4 contains the main empirical tests. Section 5 discusses additional analyses and Section 6 presents several robustness checks. Section 7 delivers our conclusions. The variables we use in this study are defined in the appendix.

2. Institutional background and theoretical framework

2.1. Institutional background

Internal Revenue Code (IRC) Section 199, the Domestic Production Activities Deduction (DPAD), was enacted as part of the American Jobs Creation Act (AJCA) of 2004. The deduction reduces the tax rate on income derived from domestic manufacturing activity by a fixed percentage. The level of reduction started out at 3%, for 2005 and 2006. The percentage deduction increased to 6% (for 2007-2009), and then to 9% (for 2010 and later). This deduction is applied to manufacturing activity itself rather than to a whole firm. The overall effect on the effective tax rate for a firm can therefore range from zero, if the taxpayer does no domestic

manufacturing, to 3.15% (9% of 35%) for an all-manufacturing, fully taxable firm. The dollar impact of DPAD on taxes over time has been large; it has reduced tax collections by more than $US70 billion in the first ten years of its implementation and such benefits are expected to continue (Blouin, et al. 2014). According to Lester and Rector (2016), from 2015 through 2019, DPAD is estimated to be the second largest corporate tax expenditure.

The AJCA instituted DPAD and simultaneously revoked the extraterritorial income tax incentive (ETI), a provision that reduced taxes on overseas sales. The World Trade Organization had ruled that the ETI constituted an export subsidy that violated trade agreements, and in 2004 established large retaliatory penalties on U.S. exports (see Lester and Rector, 2016, p. 1272). DPAD was thought by many in Congress as a way to boost incentives for U.S. manufacturing activity, which many Congressional representatives wanted to do, while avoiding the penalties imposed by the World Trade Organization.

Exact calculation of DPAD can be extremely complicated. It requires judgments about gray areas, such as whether activities are manufacturing or not, how to allocate firm's expenses not directly allocable to particular items, and what to do about services embedded in manufactured items, to name just a few. In its simplest form, however, a firm claiming the Section 199 deduction must first calculate qualified production activities income (QPAI) by manufactured item. It then would add up this income across all items (netting losses against gains) to get a QPAI overall for the firm. The Section 199 deduction in dollar terms would be the percentage reduction allowed for the particular year in question (3%, 6%, or 9%) multiplied by the minimum of (1) the overall QPAI of the firm, and (2) the firm's overall taxable income. Furthermore, the total Section 199 deduction in dollars is limited to no more than 50% of the W-2 wages paid by the firm.

Notice that this means that firms without taxable income cannot benefit from DPAD, even if the manufacturing part of the firm is highly profitable. Also, firms that rely on contract labor (where worker income is reported through 1099 forms) may not be able to fully use their potential Section 199 deduction given the limitation to 50% of W-2 wages. Moreover, the complexity and flexibility of the QPAI calculation may provide firms that have sophisticated tax departments (or advisors) with an advantage over other firms in the ability to use DPAD most effectively.

A large DPAD for a given firm represents a windfall to cash flow. This is especially true given that the idiosyncratic technicalities of the DPAD calculation would have made it difficult for any particular firm to anticipate how this tax break would affect its taxes precisely. Furthermore, DPAD provides not only a one-time windfall but also a repeated cash windfall until competitive forces fully erode its advantages away.[9] We therefore think it appropriate to view these Section 199 deductions partially as unexpected cash flows (or shocks) in the spirit of events like those in Blanchard et al. (1994) of lawsuit settlements.

2.2. Research questions, hypotheses, and empirical predictions

We note that the structure of DPAD creates some clear incentives for acquisitions that otherwise might not happen. For example, if a firm is not getting its full Section 199 deduction (QPAI multiplied by the DPAD rate in force) because it has tax losses from non-manufacturing activity or because its W-2 wages are too small, there would clearly be an incentive for the firm to combine with another firm that has service sector taxable income or high W-2 wage payments. Less directly, there also would be extra incentives for a firm with a sophisticated tax department

[9] The windfall has continued to be uncertain since the original passage of DPAD. Lester and Rector (2016, p. 1270) reports at least four Congressional attempts to repeal or reduce the deduction since 2006, and that DPAD's existence would be imperiled by any comprehensive tax reform plan that Congress is likely to enact.

to acquire another firm that is not realizing a potentially large Section 199 deduction because of a lack of sophistication. Thus, for reasons involving the structure of DPAD itself, we should expect some increase in merger activity in industries where the DPAD impact on effective tax rates is large.

More important than these structural effects, however, is the cash flow shock that DPAD provides. Therefore, we consider the effect of DPAD, especially because of its idiosyncratic complexities, to be more like a productivity shock to manufacturing industries that changes cash flows, than a change in tax structure alone. Our hypotheses below are based on this presumption about the main effects of the tax change.

2.2.1. Research questions

We formulate three different research questions regarding the effect of DPAD on the acquisition process in which the policy produces a shock (reduction in the effective tax rate) in some (but not all) industries. The questions are:

- Does acquisition activity increase for firms in high DPAD industries?
- Do Section 199 tax deductions affect M&A deal quality?
- Does the effect of DPAD on deal performance depend on attributes of the bidder firm as predicted by existing theories of the firm?

2.2.2. Theories, hypotheses, and empirical predictions

Our empirical predictions about the effect of the DPAD on acquisition activity and merger quality are grounded in both economic theory and recent empirical evidence. Two theories are particularly pertinent in this regard. First, Manne (1965) suggests that firms will execute

acquisitions that enhance the wealth of their shareholders. In the context of Manne's *neoclassical theory* of M&A, Mitchell and Mulherin (1996) and Andrade, Mitchell, and Stafford (2001) argue that major industry shocks affecting technology and government policy improve the investment opportunity set for acquiring firms. As a result, the neoclassical theory conjectures not only that merger activity should increase following industry shocks, but also that this increased activity should be associated with improved acquisition quality.

Next, we consider the *free cash flow agency theory* (Jensen, 1986). It predicts that managers act in their own interests, which may or may not be congruent with what shareholders want. This creates conflicts because self-serving managers have a private incentive to use excess cash to increase their firm's size even if it reduces original shareholder value. In this regard, Jensen (1986, p. 323) notes that "growth increases managers' power by increasing the resources under their control." In the models presented by Hart and Moore (1998) and Stulz (1990), investors limit the funds they make available to managers to mitigate potential investments in negative NPV projects. But, as noted by Blanchard et al. (1994), a cash infusion presents self-serving managers with opportunities not previously available. Thus, under the free cash flow agency hypothesis, a cash infusion via DPAD should increase M&A activity but not necessarily the quality of acquisitions. Managers would be less concerned than usual about the efficiency of any business combination and any overpayment for the target firm with newly found cash.

Based on the preceding discussion we formulate the following empirical predictions.

Prediction 1 (neoclassical and agency): The larger the Section 199-related reduction in the effective tax rate for a given industry, the more acquisition activity by firms in the industry.

If taxes are not an important part of merger decisions or DPAD forestalls some acquisitions (perhaps takeovers in foreign countries with cheaper labor than the United States) that the policy renders unprofitable, we might not be able to reject the null hypothesis of an equal or reduced amount of merger activity.[10]

Prediction 2a (neoclassical): The larger the Section 199-related reduction in the effective tax rate for a given industry, the larger the synergy gains from the acquisition and the gains accruing to the bidder.

Prediction 2b (agency): The larger the Section 199-related reduction in the effective tax rate for a given industry, the higher the premiums offered in acquisition bids and the smaller the returns to the bidder.

We also consider a *contractual environment theory*, which is rooted in the model by Fazzari, et al. (1988a) predicting that a reduction in the corporate tax would stimulate investment in firms facing financing constraints. Fazzari et al. (1988b) provides support of this theory by showing that investments by financially constrained firms (such as those that do not pay dividends) are more sensitive to cash flows than those by unconstrained firms.

Beyond financial constraints, we argue that a firm's contractual environment (and its effect on investment) is sensitive to several factors such as its commitments to business counterparties and the level of industry competition. Regarding counterparty commitments maintained by firms, Johnson et al. (2015) describe a situation where there are joint, specific investments taking place in a contracting relation between two parties, and there are quasi-rents created by these investments. It then holds that the threat of reputation loss can prevent opportunistic behavior on each side that could expropriate these quasi-rents. That is, if the behavior of a party in a contract

[10] In fact, Goolsbee (1998) finds that investment tax incentives result in higher prices for capital goods, but not more investment.

is viewed as opportunistic, this will result in the worsening of future contracting terms for that party, as its counterparty would demand better terms. The potential reputation loss will not always be effective at preventing opportunism, but it is more likely to be effective in cases where the amount of quasi-rent to expropriate today is small and the importance of future relationship specific investments is high. As a result, the party with the highest dependence on the relationship (such as a firm selling to a major customer or a company deriving key benefits from a strategic alliance) will take actions that reassure the counterparty that it will honor its implicit commitments. Thus managers of firms with important relationship-specific investments to protect will be less likely to engage in value destroying investments that could tarnish the manager and firm reputation. Johnson et al. (2015) refer to this circumstance as *bonding*.

In terms of competition, existing academic studies consider the *quiet life* hypothesis (Hicks, 1935) conjecturing that managers free from industry competition reduce risky investments and focus instead on activities without costly effort. A similar type of agency problem could also arise as firms age. Recent work by Loderer, Stulz, and Waelchli (2017) shows that aging firms exhibit less growth opportunities and argues that agency problems partially account for this trend. Likewise, Johnson et al. (2016) argue that as a firm matures, its shareholdings become more diffuse, aggravating managerial agency costs.

In sum, under the contracting environment theory, factors such as financial constraints, bonding needs, or industry competition affect investment quality. This leads to the following predictions.

Prediction 3a (contracting- financial constraints): Acquisition quality should be higher for acquirers in high DPAD industries, when the acquirer had previously been financially constrained.

Prediction 3b (contracting- bonding): Acquisition quality should be higher for acquirers in high DPAD industries, when the acquirer has strong incentives to bond a commercial relation with a major business counterparty.

Prediction 3c (contracting- quiet life): In higher DPAD industries, acquiring firms that operate in less competitive environments should perform lower quality acquisitions.

3. Data, variable measurement, empirical design, and econometric issues

3.1. Sample of transactions

Our sample consists of 5,072 US merger and acquisition (M&A) bids by public acquirers announced during 1997-2013 and tracked in the Securities Data Company's (SDC) M&A database. We screen deals from SDC following the criteria used in Moeller, et al. (2004). Specifically, we exclude observations involving spinoffs, recapitalizations, exchange offers, repurchases, self-tenders, privatizations, acquisitions of remaining interest, and partial interests of assets, and those with deal value less than US$1 million or with relative size (deal value / acquirer's market value of equity two days before deal announcement) less than 1%. In addition, we require that all acquirers have stock market and accounting data available from the Center for Research in Security Prices and Compustat, respectively.

Panel A of Table 1 provides summary statistics for key characteristics, such as deal status, mode of acquisition, method of payment, deal attitude, deal value, and financial characteristics for the acquirers and the public targets in our sample. We note that in a number of important dimensions, our sample resembles those used elsewhere in the M&A literature.[11]

[11] For example, the fraction of public targets, the mean acquirer's market value of equity, and the mean acquirer's leverage in our sample are 0.35, $5.4 billion, and 0.14, respectively, while those in Masulis, Wang, and Xie (2007) are 0.33, $5.6 billion, and 0.15, respectively.

3.2. Variable measurement

Our variable of interest, ETRR, is the percentage point reduction in a firm's effective income tax rate generated by DPAD. To estimate it, we obtain data from the IRS Statistics of Income (SOI) reported in their Table 7 which is labeled *Corporate Returns with Net Income* in the *Tax Stats Corporation Complete Reports*. The data in these reports are aggregated at the industry level from all firms that file a tax return each year, which allows us to calculate the proportion of taxable income derived from qualified production activities (QPAI proportion) for each industry. We apply this QPAI proportion for all Compustat firms at the industry level each year by matching the 79 IRS industries with the Compustat NAICS 4-digit industries.[12] To calculate ETRR, we multiply the QPAI proportion by the deduction percentage (3% in 2005-2006, 6% in 2007-2009, and 9% in 2010-onwards) and then by the statutory corporate income tax rate of 35%. For example, a firm operating in an industry that claims 40% of its taxable income as income from qualified production activities in 2011 could see its effective tax rate drop by 1.26% (which equals 40% x 9% x 35%).

Table 1 Panel B reports the temporal distribution of ETRR for our sample acquirers. ETRR is zero before 2005 and starts increasing from 2005 when the DPAD was phased in. The mean acquirer's ETRR for the full sample period 1997-2013 is 0.25% while the maximum is 3%. Table 1 Panel C shows the distribution of acquirer's ETRR across different IRS industries during 2005-2013.[13] As expected, acquirers in manufacturing industries (e.g., furniture, transportation equipment, food, paper) exhibit a larger effective tax rate reduction as a result of DPAD.

[12] NAICS codes were introduced in 1997 and modified in 2002, 2007, and 2012. IRS Corporate Returns data are available for the period 1994-2012. As a result, we start our sample in 1997.
[13] Some IRS industries have no acquirers in our M&A sample during 2005-2013.

3.3. Research design

To study the effect of corporate income tax cuts on mergers and acquisitions, we use the passage of IRC Section 199, the Domestic Production Activities Deduction, as a quasi-natural experiment. This deduction is substantial for firms operating in industries that derive a larger percentage of their income from goods or work made in the US. However, companies in industries with little or no local production are largely unaffected by Section 199 tax deductions. At the same time, the deduction increased from 3% in 2005-2006, to 6% in 2007-2009, and to 9% in 2010-onwards.

The differential impact of the policy across industries with different levels of domestic production and the way in which the policy was phased-in suggest a difference-in differences (DiD) econometric strategy. Therefore, using regression analyses, we estimate the following baseline model,

$$y_{i,t} = \beta_0 + \beta_1 \mathbf{ETRR}_{j,t} + \gamma X_{i,t} + \eta_{k,t} + \varepsilon_{i,t} \quad (1)$$

where i indexes firms, j indexes IRS industries, k indexes 1-digit SIC industries, and t indexes time. In equation (1), $y_{i,t}$ is the outcome of interest for firm i in year t. Following Gormley and Matsa (2014), the model includes industry-year fixed effects (η_{jt}) to control for time varying heterogeneity at the 1-digit SIC level (such as business cycle factors that may have overlapped with or led to the policy's passage). In equation (1), $X_{i,t}$ represents a set of control variables if they are present. As discussed by Gormley and Matsa (2014), in the presence of fixed-effects the inclusion of firm- or deal-level control variables is not advisable because they might be affected by the policy under study. Nevertheless, in some specifications we expand the baseline model to show that the results are robust to controls for deal and (acquirer or target) firm characteristics, as well as to the inclusion of state of incorporation and firm (acquirer and target) fixed effects.

The state (firm) fixed effects control for unobserved, time-invariant differences across states (firms).

In our baseline specification, β_1 is the treatment effect and describes the increase in a given outcome variable that results from a one percentage point reduction in a firm's effective income tax rate generated by DPAD. The standard errors are adjusted for heteroskedasticity and double-clustered by industry and year following Petersen (2009) and Thompson (2011). This process helps mitigate concerns regarding bias in the estimation of standard errors noted by Bertrand Duflo, and Mullainathan (2004).

We also perform triple difference (DiDiD) analyses to capture heterogeneity in the effect of the tax cut on mergers across acquirer firms with varying characteristics. In those regressions, the specification becomes:

$$y_{i,t} = \beta_0 + \beta_1 \mathbf{ETRR}_{j,t} + \beta_2 \mathbf{ETRR}_{j,t}\, \mathrm{CI}_{i,t-1} + \beta_3 \mathrm{CI}_{i,t-1} + \gamma X_{i,t} + \eta_{k,t} + \varepsilon_{i,t} \quad (2)$$

where $\mathrm{CI}_{i,t-1}$ is a characteristic indicator variable. In the empirical tests that estimate equation (2), we will focus on β_2 to test whether the effect of DPAD varies with the acquirer firm's contracting environment.

3.4. Econometric issues: Parallel trends assumption

Fulfillment of the parallel trends assumption is critical to ensure internal validity of DiD models. It requires that the trend in the outcome variable for both treatment and control groups during the pretreatment era are similar. We therefore estimate trends in our outcome variables of interest (acquirer returns, synergies, and target premiums) during the five years before a treatment firm first claims the deduction. The choice of five years mitigates concerns that other policies (such as bonus depreciation, which was part of the Economic Growth and Tax Relief

Reconciliation Act of 2001),[14] affect pretreatment trends across the two groups. The control firms are those operating in industries that get little or no benefit from Section 199 deductions. More precisely, for each IRS industry we add QPAI from 2005 until the end of our sample and divide it by the addition of that industry's taxable income during the same period. A firm in one of the 21 industries for which this ratio is less than 3% (corresponding to the first quartile) is placed in the control group.[15] Otherwise, the firm is placed in the treatment (DPAD) group.

Table 2 Panel A shows that the pretreatment trends in the outcome variables are not statistically different when comparing firms in industries that benefit from DPAD with those that do not.[16] This evidence suggests that differential trends across groups in the pretreatment era are unlikely to account for the estimated effects of the policy. Panel B of Table 2 reports mean and median levels for the outcome variables once DPAD is in effect. Foreshadowing future results with more rigorous econometric methods, the univariate estimates suggest better quality M&A deals for the acquirers impacted by the policy. At the mean (and median), deals by these firms exhibit higher M&A bidder announcement returns, higher synergies, and lower target premiums. Combined, the evidence in Panels A and B shows that the trend in every outcome variable changes once the tax policy is in effect, but not before.

3.4. Econometric issues: Using industry-ETRR at the firm level

Throughout the paper we use the acquirer firm's industry ETRR as the key variable to examine the effect of the DPAD on acquisitions. The use of ETRR at the firm level is subject to

[14] Bonus depreciation was also increased by President Bush in 2003.
[15] The mean is 26% and the third quartile is 55%.
[16] Consistent with our results, Ohrn (2016) presents a graph showing that there is no divergence in corporate investment between DPAD firms and other firms during the 5 years prior to the policy's enactment. Likewise, Lester (2016) shows that, prior to the implementation of DPAD, her treatment and control firms exhibit similar trends in the outcome variables she considers (income-shifting, cross-border shifting, investment, and employment).

at least three concerns. First, not all firms in the industry are able to claim a tax deduction under Section 199. Second, ETRR ignores potential correlations between DPAD and other tax strategies firms employ (such as the lost ETI for some firms). Third, ETRR is a generally noisy measure of corporate tax benefits. Because of these issues, we are worried that imprecision in our ETRR measure will bias its coefficients.

To address the issues noted in the previous paragraph, we examine the effect of DPAD on the acquirer firm's effective tax rates to ascertain whether DPAD is properly assigned. For this purpose, we follow the method in Ohrn (2016). He argues that if the DPAD treatment is correctly assigned, then a one percentage point decrease in the treatment should cause a firm's effective tax rate to decrease by one percentage point.

In Panel C of Table 2, we examine the effect of the domestic production activity deduction on the GAAP effective tax rate and the cash effective tax rate. We estimate four ordinary least squares (OLS) regressions in which the key independent variable is ETRR. The dependent variable in models (1) and (2) is the financial statement effective tax rate (GAAP ETR). Regressions (3) and (4) use the cash effective tax rate (Cash ETR) as the dependent variable. In models (2) and (4) we limit the analyses to firms without substantial foreign operations because the effective tax rates of multinational companies rely on overseas income and foreign taxes. We follow Lev and Nissim (2004) to estimate GAAP ETR, Cash ETR and also to construct a sample of firms without substantial foreign operations. We define income from foreign operations (from Compustat variables) to be substantial if the ratio of the absolute value of "pretax income-foreign" to the sum of that amount and the absolute value of "pretax income-domestic" exceeds 20%. This procedure limits the sample size to 1,392 observations.

In model (1), a one percentage point reduction in ETRR is associated with a reduction of 1.6 percentage points in GAAP ETR, whereas in model (3) a similar drop in ETRR leads to a 1.3 percentage point reduction in Cash ETR. Neither estimate is statistically different from the predicted one percentage point decrease.

While this evidence from models (1) and (3) is reassuring, the tests that use the sample of acquirers with no substantial foreign operations yield estimates even closer to the predicted amount. A one percentage point reduction in ETRR is associated with a 0.95 percentage point reduction in GAAP ETR in model (2) and with a Cash ETR drop of 1.02 percentage point in model (4). Furthermore, especially in the cash measure in model (4), the standard error of the predicted tax rate is quite small at 0.21%. These results are particularly important because these firms are not likely to have had much of an ETI deduction before 2005; they should therefore give us a cleaner reflection of new tax benefits from DPAD (although on a substantially smaller sample).

Given these results, our ETRR industry variable appears well suited to measure DPAD treatment at the acquirer firm level. Nevertheless, in Section 6 herein, we further evaluate whether the ETRR is properly assigned with a non-parametric robustness test and an analysis of firms with no foreign operations.

4. Results

4.1. Acquisition activity

We estimate three regressions in Table 3 to study the association of DPAD and M&A activity using 106,506 firm-years with data available from CRSP and Compustat during fiscal years 1997-2012. Model (1) uses a logit specification in which the dependent variable is set to 1

if the firm makes an M&A bid during the year and set to zero otherwise. All the other models consist of OLS regressions. The dependent variable in model (2) is the natural log of (1 + the number of M&A bids) whereas in model (3) it is the natural log of (1 + total deal value). In all models, the key independent variable, ETRR, is the percentage point reduction in the acquiring industry's effective income tax rate generated by Section 199.

The results in Table 3 suggest that Section 199 has a first-order effect on M&A activity in the US. A one standard deviation increase in ETRR leads to a 0.45% increase in the probability of making a bid (model (1)) and to a 1.12% increase in total M&A deal value (model (3)). These estimates are economically important when benchmarked against the unconditional probability of making a bid of 5.24% and an average deal value of US$48.85 million for transactions in our sample. Notably, the effect of Section 199 on deal value is probably understated since the US$48.85 average include firm-years without acquisition activity. Conditioning on firm-years with acquisitions the average is much larger at US$ 932 million.

The evidence in Table 3 is consistent with *prediction 1* of both neoclassical and free cash flow agency theories, stating that the larger the Section 199-related reduction in the effective tax rate for a given industry, the more acquisition activity by firms in that industry.

4.2. Acquisition quality

We evaluate whether DPAD affects the quality of M&A deals. Our first proxy for quality is the three-day cumulative abnormal return for the acquiring firm upon the M&A announcement. Our second proxy is the synergy accruing to the merged firm. The third measure of deal quality is the premium offered to target shareholders. We use these variables in our baseline analyses and then use alternative deal quality proxies in robustness tests reported in later sections.

4.2.1. Acquirer returns

In Panel A of Table 4, we run five DiD regressions of the three-day merger announcement CAR meeting the bidders in our sample. This CAR is centered on the acquisition announcement day and we estimate it using standard event-study methods.[17] The key independent variable in all tests is ETRR. Model (1) reports our baseline specification, which estimates equation (1). The other regressions successively expand the baseline model with the inclusion of deal and acquirer characteristics (model (2) through model (5)), acquirer fixed effects (model (3)), state of incorporation fixed effects (model (4)), and target characteristics (model (5)). Model (5) is limited to the 1,806 observations in which both parties to the deal are public firms. Notably, the controls in model (5) include the target industry's ETRR which could affect the acquirer's bid.

The coefficient of ETRR is positive and significant at the 5% level (or better) in all models. The results are economically meaningful. According to model (1) for example, increasing ETRR by one standard deviation leads to a 0.56% increase in the acquirer CAR. This result does not support *prediction 2b* of the free cash flow agency theory that managers generally use the extra cash flow from DPAD to make self-serving acquisitions. Instead, the evidence from the acquirer return tests is more consistent with *prediction 2a* thereby suggesting that the neoclassical theory is the dominant effect of the tax policy on merger value in the data.

The results in Panel A of Table 4 indicate a beneficial average effect of DPAD on M&A quality. Using equation (2), we perform triple differences analyses in Panel B to examine whether the DPAD effect varies with the theoretically predicted characteristics of the bidder firms. Specifically, we classify financially constrained firms as those with either a Kaplan-Zingales (KZ) index in the top tercile of the distribution during the year before they make a

[17]See the appendix for a more complete description of the calculation.

public merger bid or those without a credit rating from a major rating agency. In addition, we denominate bonding firms as those with a major customer or those with a key strategic alliance (as in Johnson et al., 2015). Our last group tries to capture firms that may fall prey to quiet life agency problems. As in Fich, Harford, and Yore (2017), firms belong to this group if they operate in a non-competitive industry or they are in the top quartile of the age distribution.

All triple difference coefficients are statistically significant in the regressions reported in Panel B of Table 4. Consistent with *prediction 3a*, a single standard deviation increase in ETRR in model (1) is associated with an *additional* increase of 0.26% in the CAR meeting a financially constrained (high KZ) acquirer. An analogous ETRR increase in model (3) is related to an extra 0.12% in the CAR accruing to a bidder with a key strategic alliance, a result that is in line with *prediction 3b*.

The estimates in model (5) are congruent with *prediction 3c*: raising ETRR by a single standard deviation is associated with a decrease of 0.58% in the CAR of an acquirer firm operating in a non-competitive industry. Moreover, the total estimate of ETRR's effect given by $\beta_1 + \beta_2$ in equation (2) for quiet life firms is not statistically significant. This result indicates no difference in acquirer returns between high and low ETRR quiet life firms.

The results in Panel B of Table 4 provide consistent support for the view that the effect of DPAD varies with the bidder firms' contracting environment as predicted by existing theories of the firm. In particular, more financially constrained firms, or those with bonding needs, appear to use DPAD flows to make especially value increasing acquisitions whereas firms subject to managerial incentives for a quiet life seem to derive no value gain from their acquisitions.

4.2.2. Synergies

We now investigate whether higher synergies are related to the higher average M&A CARs we estimate for the DPAD-bidders. The synergy question is important in determining the economy-wide gains from DPAD-induced acquisitions.

We use equation (1) in Table 5 to estimate regressions of the acquisition synergies for the 1,806 transactions in our sample where both parties to the deal are publicly traded firms. As in Bradley, Desai, and Kim (1988), the dependent variable in all models is the total percentage synergistic gain from acquisitions (or merger synergy). We compute this variable as the three day CAR for a value-weighted portfolio of the acquirer and the target around the merger announcement date. This CAR is calculated as the residual from the market model estimated during the one year window ending four weeks prior to the merger announcement. The independent variable of interest in the five regressions reported in Panel A is ETRR.

The parameter estimates related to ETRR are positive and statistically significant in all of the Panel A regressions. The ETRR coefficient estimate in model (1) indicates that a single standard deviation increase in that variable is associated with a 0.53% increase in the combined return upon the deal's public announcement. This evidence is in agreement with *Prediction 2a* of the neoclassical theory of M&A, but not with *Prediction 2b* of the free cash flow agency theory.

Panel B of Table 5 reports triple differences analyses (based on equation (2)) that use the proxies for financial constraints, bonding, and quiet life defined earlier. Consistent with *predictions 3a* and *3b*, the estimates are positive and statistically significant for the financial constraint- and bonding-based triple difference parameters, respectively. Using the estimates in model (1) of Panel B, raising ETRR by one standard deviation is related to an additional 0.36%

synergy gain for bidders with a high KZ index. An equal ETRR increase in model (3) leads to an extra 0.24% in the synergies earned by bidders with a major strategic alliance.

Coefficients are negative and significant for the quiet life-based triple difference parameters, a result which is in line with *prediction 3c*. According to model (5) of Panel B, synergies decrease by 0.51% (with a standard deviation increase in ETRR) for acquirers in noncompetitive industries. In fact, we again find that the total ETRR effect measured by $\beta_1 + \beta_2$ is not statistically significant. This result indicates that for quiet life firms, a higher DPAD is not associated with acquisitions that generate higher synergies. The evidence in Panel B supports the contractual environment theory, which argues that the quality of M&A deals related to a Section 199 deduction will change according to key characteristics of the bidder firms.

4.2.3. Target premiums

In the regressions reported in Table 6, the four-week acquisition premium reported by SDC is the dependent variable.[18] We run these tests using the 1,806 M&A deals in our sample where both the acquirer and the target are publicly traded firms. The results in Panel A, which are based on equation (1), also provide support for the neoclassical theory predicting better quality (more frugal) M&A deals by DPAD-advantaged bidders. According to the coefficients in model (1), a one standard deviation increase in ETRR is related to a 1.48% premium reduction. For the average public target in our sample, this estimate implies a decrease of about US$15 million in terms of deal value. Thus, based on the evidence in Tables 4, 5, and 6, it appears that the average deal in which the bidder benefits from the tax policy exhibits a transfer of rent from shareholders of the target to shareholders of the acquirer.

[18] See Appendix A for a more precise definition.

The premium results in Panel B support *predictions 3a, 3b, and 3c* of the contracting environment theory. The coefficient for the triple difference term in model (1) indicates that a single standard deviation ETRR increase is associated with a further drop in the premium of 0.73% for high KZ bidders. For acquirer firms with an important strategic alliance, which we analyze in model (3), the same ETRR increase leads to an additional premium decrease of 0.42%. In contrast, model (5) reveals that a standard deviation increase in ETRR boosts premiums by 1.17% in deals executed by bidders in noncompetitive industries which all but eliminates the DPAD effect on takeover premiums.

5. Additional analyses

We extend our baseline results from Section 4 with tests of auxiliary acquisition outcomes that shed additional light on the research questions we address. We investigate these outcome variables with the same basic econometric structure used throughout, as represented by equation (1). Again, the main focus will be the contribution of ETRR to acquisition outcomes. In this regard, we provide evidence on three types of M&A characteristics: percentage of cash used, division of acquisition gains, and *ex post* acquisition quality. Table 7 showcases these results. In addition, we also examine the acquisition activity of firms in non-competitive industries following the implementation of Section 199.

5.1. Percentage of cash used in bids

We are concerned about the fraction of cash offered as bid consideration because we implicitly assume that the extra cash generated by DPAD is the mechanism responsible for more

and different quality acquisitions. If, in fact, few of the acquisitions by high-DPAD acquirers were to use cash, some other mechanism might be at play.

In Panel A of Table 7, we report regression results on a sample of 2,743 acquisitions for which we have form of payment data. In those tests, the dependent variable is the percentage of cash used in a takeover bid. Using all five formulations of equation (1), we find a positive association between ETRR and cash percentage that is statistically significant at the 5% level (or better). The estimate in model (1) indicates that the percentage of cash increases by 3% for one standard deviation increase in ETRR. This evidence reinforces the possibility that the DPAD cash infusion may be the channel that facilitates the change in merger prevalence and outcomes.

5.2. Share of acquisition gains

For the sample of 1,806 acquisitions with publicly traded targets, we examine the division of merger gains in Panel B of Table 7. Our dependent variable is the dollar gain to the target minus that going to the acquirer per dollar of combined firm market value. Ahern (2012) uses a similar variable (which we describe in greater detail in Appendix A) to measure the *relative* gain going to the target in a takeover. This is an interesting measure of deal quality, supplemental to our measures in Tables 4 through 6, as lower relative gains to targets would indicate more effective negotiations on the bidder side.

The ETRR coefficient in Panel B is negative and significant at better than the 5% level in all five of our models. This suggests that, on average, high-DPAD acquirers negotiate a higher fraction of any gains from the merger, consistent with our baseline findings that high-DPAD acquirers generally make acquisitions of higher quality. Based on model (1), a one standard deviation increase in ETRR leads to a 0.99% decline in the gain to the target relative to the

bidder. This evidence is congruent with *prediction 2a* of the neoclassical theory, but not with *prediction 2b* of the agency cost of free cash flow.

5.3. Post-deal accounting measures of deal quality

We are mindful that stock-price-dependent measures (such as bidder CARs, synergies, and target premiums) are often subject to the concern of potential bias related to investor perceptions and market sentiment.[19] To circumvent this concern, in Panels C and D of Table 7 we perform tests based on *ex post* (long-run) accounting measures of performance. The advantage of this approach is that it provides evidence based on accounting realizations, rather than on future expectations or sentiment embedded in asset prices. In Panel C, the dependent variable is the combined (merged) firm's 3-year average return on assets (ROA) after the acquisition minus the weighted average ROA of the target and the acquirer before the acquisition. In Panel D, the dependent variable is set to "one" if the combined firm takes a goodwill write-off in the three years subsequent to the acquisition.[20] Our interest in goodwill write-offs is based on the arguments by Li, Shroff, Venkataraman, and Zhang (2011) and Gu and Lev (2011) that the impairment of goodwill often identifies M&A deals involving overpayment and/or agency problems. As such, goodwill could be used as a proxy for deal quality.

ETRR estimates in all models of Panels C and D are statistically significant in the direction of *prediction 2a*, that high-DPAD firms make higher quality acquisitions. After M&A deals are completed, those with high-DPAD acquirers exhibit an improvement in ROA and are less likely to exhibit a goodwill write-off. Based on model (1) of each panel, a one standard deviation

[19] See, for example, Lee (2001) and Daniel, Hirshleifer, and Teoh (2002).

[20] The requirement of pre-acquisition financial data on the target limits the Panel C (and model (5) of Panel D) sample size to 1,660 acquisitions of publicly traded targets, while the requirement for post-acquisition data limits the Panel D sample to 4,761 observations.

increase in ETRR generates a 2.61% increase in the average post-deal ROA and a 3% reduction in the probability of a goodwill write-off. These effects are economically important when benchmarked against the average post-deal ROA of 11% and the 30.8% incidence of goodwill write-offs in the set of completed acquisitions in our full sample.

Overall, the findings in Panels B, C, and D of Table 7 are consistent with the baseline results in Tables 4, 5, and 6. All tests consistently support *prediction 2a*, that Section 199-related tax cuts result in higher quality mergers on average, but not *prediction 2b* that the average effect of DPAD is to encourage self-serving managers to overpay and/or make wealth-destroying acquisitions. Moreover, the substantial improvement in post-deal performance shown in Table 7 in takeovers by DPAD-advantaged bidders rationally explains the market's assessment of deals by these firms (higher acquirer M&A announcement CARs) and mitigates the concern that our baseline evidence is somehow biased by either market sentiment or investor psychology.

5.4. Acquisition activity of firms in non-competitive industries

In untabulated analyses, we examine acquisition activity in the subset of firms that benefit from DPAD based on industry concentration. The results indicate that DPAD-advantaged firms that do not face intense industry competition are 1.76 percentage points less likely than other firms to make an acquisition. These results, together with those in Panel B of Tables 4, 5, and 6, indicate that DPAD firms in low competitive environments make fewer acquisitions and the acquisitions they make exhibit lower quality.

6. Robustness tests

We begin by providing a graphical robustness test that addresses methodological concerns. Afterwards, the regression analyses in Table 8 explore whether our results are sensitive to particular measures, statistical procedures, or subsamples. Our strategy in Table 8 is to redo the OLS specification in model (1) of Tables 4, 5, and 6, with changes in various proxy variables, samples, or econometric approaches.

6.1. Permutation tests

We perform nonparametric permutation tests for our outcome variables similar to those in Ohrn (2016), Zidar (2015), and Chetty, Looney, and Kroft (2009). The permutation tests are helpful in assessing the suitability of using industry ETRRs at the acquirer firm level. The tests also alleviate concerns about serial correlation (Bertrand et al., 2004). As noted by Chetty et al. (2009), since the permutation tests do not make parametric assumptions about the error structure, they are immune to the overrejection bias of the t-test in the presence of serial correlation.

Each permutation relies on a "placebo ordered pair" that consists of an [IRS industry]-[acquirer firm year]. We begin by randomly selecting a placebo implementation year between 1997 and 2004 (before DPAD is enacted). We then assign (without replacement) another industry's actual ETRR treatment from the years 2005-2013 to the placebo implementation year. For each outcome variable, we then re-estimate the baseline specification in equation (1), acting as if the placebo ordered pair is the actual treatment pair. We repeat this process 2,000 times using as many different random number generator seeds. For each iteration, we record the point estimates to produce the plots in Figure 1.

Each of the three panels in Figure 1 displays a cumulative density function (CDF) of the 2,000 placebo estimates for our three outcome variables, respectively. The CDFs appear smooth because of the large number of points used in the plots and not due to parametric smoothing (which we do not apply). In each CDF plot, the vertical lines provide the average ETRR treatment we obtain in our baseline regressions. For the acquirer CAR(-1,+1), 82 out of 2,000 (or 4.1%) of the placebo coefficients are larger than the estimated effect in model (1) of Table 4 Panel A (0.0101). For the combined CAR (-1,+1), 38 out of 2000 (or 1.9%) of the placebo coefficients are larger than the estimated effect in model (1) of Table 5, Panel A (0.0097). For the offer premium, 43 out of 2000 (or 2.2%) of the placebo coefficients are smaller than the estimated effect in model (1) of Table 6 Panel A (-0.0269). In general, it is reassuring that the non-parametric results confirm those from our baseline DiD analyses. Importantly, the results from the permutation tests (1) mitigate the concern of artificially small standard errors, (2) imply that random differences in time trends at the industry level do not account for the DPAD treatment effects in our baseline tests, and (3) supplement the tests in Panel C of Table 2 in mitigating concerns related to the use of the bidder-industry ETRR at the acquirer-firm level.

6.2. Different measures of deal quality

Panels A and B of Table 8 use alternative measures of deal quality as dependent variables instead of the 4-week SDC premium. In model (1) of Panel A, we compute a 5-day (-2,+2) CAR for acquirer returns centered on the deal announcement instead of the 3-day CAR. In models (2) and (3) of Panel A, we respectively use target CARs covering periods (-20,+1) as in Jarrell and Poulsen (1989) and (-42,+126) as in Schwert (1996). In model (4) of Panel A, we use the combined premium of Officer (2003) as our surrogate for the offer premium.

Table 8 also looks at alternative proxies for post-deal performance to replace the accounting dependent variables reported in Table 7. In model (1) of Panel B, we use 3-year buy-and-hold-returns (BHAR) calculated once the merger is completed. Model (2) uses a 3-year CAR, while model (3) adjusts the 3-year BHAR for matched size and book-to-market decile portfolio returns.

The results in Panels A and B are all consistent with our earlier analyses. All results remain statistically significant in the same direction and approximate magnitude as previous tests. The ETRR coefficient for the acquirer CAR test in model (1) of Panel A is .0092, whereas the corresponding result in model (1) of Panel A of Table 4 is .0101. Similarly, the ETRR coefficients in the premium tests in models (2)-(4) of Panel A range from -.0158 to -.0209; these compare to the analogous Table 6 coefficient of -.0269. Likewise, the ETRR estimate in Panel B of Table 8 generates inferences consistent with those drawn from Panel C of Table 7.

6.3. Alternative measures of financial constraint

In panels C and D of Table 8, we examine alternative classifications of firms facing financial constraints. Tables 4, 5, and 6 classify firms as financially constrained based on their KZ Index or based on whether they have a credit rating. Our alternative classifications in Panel C are based on the Whited and Wu (2006) index (WW) and the HP index from Hadlock and Pierce (2010). In both cases, we designate firms with a score in the top tercile of these indexes as financially constrained with an indicator variable of 1; all other firms are assigned a zero.

In panel D, we classify firms as constrained based on their payout policy. A firm gets an indicator of 1 in the first row if its ratio of dividends to earnings before interest and taxes is in the bottom tercile of the distribution; all other firms get zero. This taxonomy is similar to that in

Denis and Sibilkov (2010). In the second row, we assign an indicator of 1 only to firms without a dividend payout in the last 30 years.

The results in Table 8 Panels C and D show no conflict with those in Panel B of Tables 4, 5, and 6. All coefficients on the financial constraint-ETRR interaction terms in regressions of acquirer CARs and combined CARs are positive and statistically significant. Similarly, all coefficients on the interaction terms in regressions of offer premiums are negative and statistically significant. Deal quality seems to improve for financially constrained firms with high Section 199 tax cuts regardless of how we measure financial constraints.

6.4. Econometric alternatives

Panels E and F of Table 8 use alternative econometric test structures to probe the robustness of our results. Following Roberts and Whited (2013), in the falsification tests reported in Panel E, instead of using current ETRR (as in Tables 4, 5, and 6), we use ETRR from three years before the acquisition bid. Some misspecification could be driving the results if this placebo test produces results similar to those in earlier tables. Nevertheless, Panel E shows no ETRR coefficients significantly different from zero. This result suggests that potential misspecification is not the cause of our baseline results.

Panel F employs a specification that follows the prescription of Gormley and Matsa (2014) in dealing with the potential for unobserved heterogeneity. Because of the 3000+ fixed effects required by this technique, we must keep all acquisition bids in the sample, even if the targets are not public. Therefore we restrict the dependent variable in Panel F to acquirer returns only. The five different models in Panel F incorporate different combinations of our large number of interactive fixed effects. Notably, all five regressions in Panel F include one or more interactive

fixed effects formed with the target's industry. The inclusion of the target industry is important because a potential motive for the M&A transaction could be related to the target's own DPAD. As such, the (Target industry x Year) fixed effects control for unobserved, time-varying differences across the targets' industries. Thus, the target industry-based fixed effects complement model (5) of Panel A in Tables 4, 5, and 6 which control for target firm specific attributes (which also include the target's ETRR).

The results in Panel F on the ETRR coefficient in all regressions are remarkably similar to what we report in Table 4. All specifications produce an ETRR estimate significant at the 5% level or better. In Panel F, the coefficients on ETRR range from 0.0085 to 0.0122; in Table 4 Panel A, the coefficients range from 0.0101 to 0.0162. Thus, the tests that control for unobserved heterogeneity at various levels generate results similar to the baseline specification.

6.5. Alternative samples

In Panels G, H, I, and J of Table 8, we alter the sample to rule out potential confounding factors that may be influencing our results. Panel G excludes acquisitions in the period before 2003 to make sure the effects are not due to "before and after" the Bush tax cut. Using only data after 2003 ensures that the differences are due to "before and after" the DPAD tax policy.

Panel H and I exclude acquirers with substantial income from foreign operations in one of the three fiscal years before the merger announcement. This check may be important to the results for two reasons. One is that firms with substantial foreign operations may have had a large tax benefit from the Extraterritorial Tax Incentive (ETI) before DPAD, and therefore our DPAD measurement may be misleading for these firms. In addition, firms with foreign operations may have been affected by a repatriation tax holiday provision of the 2004 AJCA that

came along with DPAD. This tax holiday, which is studied by Blouin and Krull (2009), Dharmapala, Foley, and Forbes (2011), and Hanlon, Verdi, and Lester (2015) among others, may influence the amount and quality of domestic acquisitions in ways unrelated to Section 199. Indeed, Hanlon, et al. (2015) find that the repatriation tax holiday provision of the 2004 AJCA is associated with an increase in domestic acquisitions. The sample of firms without substantial foreign operations in Panels H and I is the same one we analyze in Panel C of Table 2 and consists of 1,392 observations.[21]

Our sample of acquisitions in Panel J of Table 8 excludes all acquisitions before 2011. There are at least two reasons for the importance of this exclusion. First, during the phase-in to the maximum 9% DPAD rate in 2010, there may have been incentives to shift income ahead from the year before (Lester, 2016). These time-shifting incentives could have an effect on the outcomes we study, independent of the effect of the DPAD level itself. By removing deals before 2011, we eliminate the potential that these shifting incentives affect our results. Second, the sample in Panel I is immune to the concern that AJCA repatriation provisions could affect our results as it excludes transactions occurring during 2003-2006.

Despite smaller sample sizes, the results in Panels G, H, I and J of Table 8 are similar to our earlier findings. All ETRR coefficients have the same sign as the analogous estimates of Tables 4, 5, and 6, and all coefficients are statistically significant at conventional levels.

There appears to be no evidence stemming from the robustness tests in Table 8 to change our earlier conclusions about the role of DPAD. On average, high-DPAD firms engage in acquisition activity with higher acquirer returns, higher synergy gains, and smaller offer premiums.

[21] In untabulated analyses we find that once the tax policy is in effect, DPAD-advantaged firms with no foreign operations are just as likely to make acquisitions as DPAD-advantaged firms with foreign operations. This evidence mitigates the concern that repatriated funds fuel the surge in acquisition activity we document in Table 3.

7. Conclusions

We use difference-in-differences quasi-experimental methods to examine the Domestic Production Activities Deduction (IRC Section 199). Our research design exploits the fact that this policy produces plausibly exogenous variation in effective corporate income tax rates to study whether corporate income tax cuts affect M&A transactions. Despite the seemingly modest nature of the effective tax rate reductions, which never exceed 3.01% in any industry in any year of our sample, its effect on merger deals is substantial. Our tests show that firms with Section 199 deductions become more acquisitive. Furthermore, a one standard deviation increase in DPAD's effective tax rate reduction is associated with a 1.12% increase in the dollar amount spent on acquisitions. Notwithstanding past mixed evidence on the impact of other corporate taxes, our results make a strong case for DPAD having a first order effect on M&As in the US.

Our difference-in-differences method also uncovers important results about the effect of DPAD on average acquisition quality. Bidder firms in high DPAD industries make better acquisitions for their shareholders in terms of acquirer returns and overall synergies. Furthermore, they appear to be more frugal on average with their shareholders' money, offering lower premiums to targets. Assuming that the policy improves the investment opportunity set for firms generating high ETRRs through DPAD, this evidence is consistent with the prediction from the neoclassical theory suggesting that mergers will be wealth maximizing for shareholders. It is inconsistent, however, with a variant of the agency hypothesis about managerial empire building with free cash flow.

Using triple difference analyses, we find that various corporate contractual environments lead to different effects of Section 199-related tax reductions on acquisition quality as predicted by existing theories of the firm. In particular, consistent with theories of capital constrained

investment, acquisition quality is better for high DPAD firms previously facing financial constraints than for firms with better access to capital. Also, in line with the bonding hypothesis of Johnson et al. (2015), DPAD-advantaged firms with incentives to protect their reputation for avoiding opportunistic behavior improve acquisition quality more than other high DPAD firms. On the other hand, firms with managers who have "quiet life" incentives because of reduced industry competition do not appear to use DPAD advantages to perform value increasing acquisitions. Overall, our evidence on the heterogeneity of DPAD effects complements the findings in contemporaneous work by Blouin et al. (2014), Lester (2016), and Ohrn (2016) and also contributes to the ongoing policy debate on the implementation of corporate income tax deductions.

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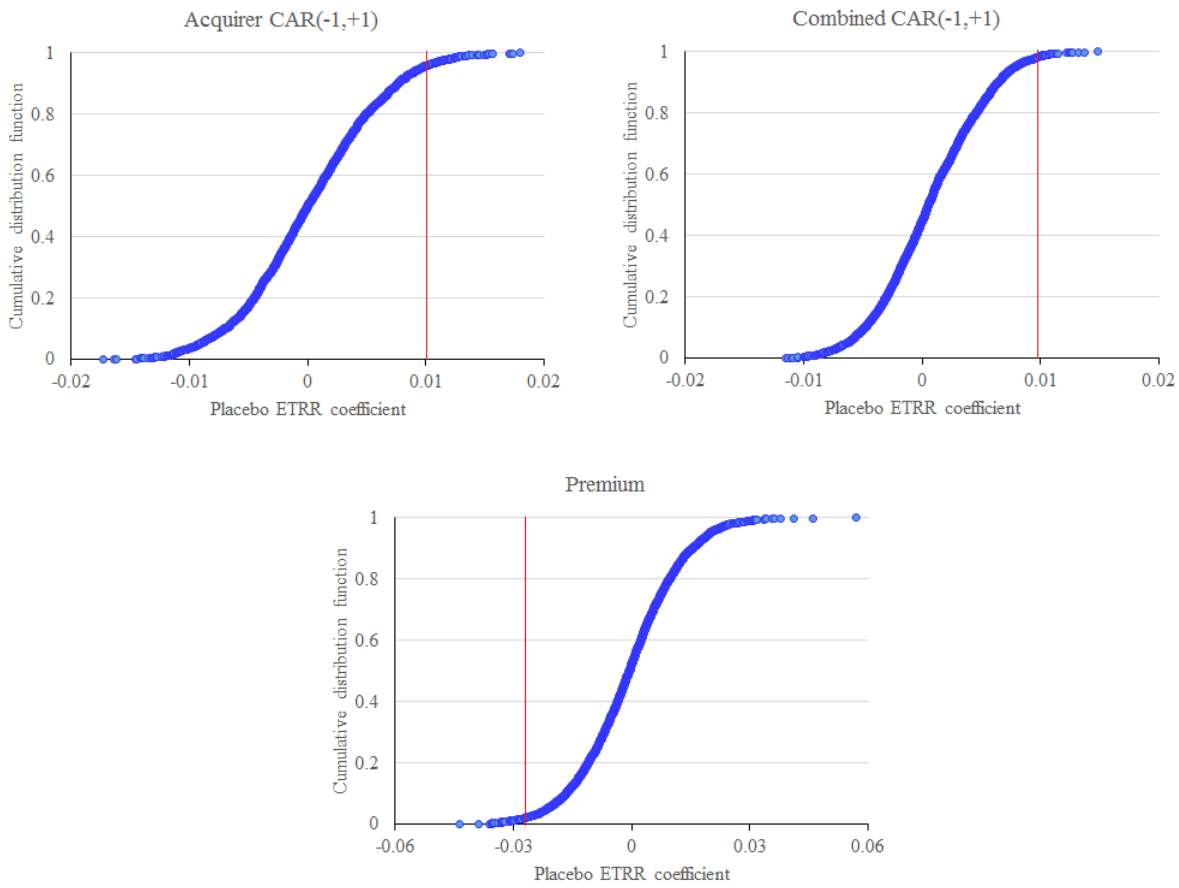

Figure 1: Permutation tests

This figure plots the distributions of placebo effects for each of the key acquisition outcome variables: acquirer CAR(-1,+1), combined CAR(-1,+1), and offer premium. Each cumulative distribution function is constructed by regressing the acquisition outcome variable on 2000 randomly assigned ETRR treatments as in Model (1) of Panel A of Tables 4, 5, and 6. To create the random treatments, each IRS industry is randomly assigned another industry's actual ETRR treatment. We do not apply parametric smoothing. The vertical lines show the treatment effects reported in Model (1) of Panel A of Tables 4, 5, and 6. For the acquirer CAR(-1,+1), 82 out of 2000 (4.1%) of the placebo coefficients are larger than the estimated effect in Model (1) of Table 4 Panel A (0.0101). For the combined CAR(-1,+1), 38 out of 2000 (1.9%) of the placebo coefficients are larger than the estimated effect in Model (1) of Table 5 Panel A (0.0097). For offer premium, 43 out of 2000 (2.2%) of the placebo coefficients are smaller than the estimated effect in Model (1) of Table 6 Panel A (-0.0269).

Table 1: Sample characteristics

This table describes our sample which consists of 5,072 U.S. merger and acquisition (M&A) bids by public acquirers announced during 1997-2013 and tracked in the Securities Data Company's (SDC) M&A database. We screen deals from SDC following the criteria used in Moeller, Schlingemann, and Stulz (2004). Specifically, we exclude observations involving spinoffs, recapitalizations, exchange offers, repurchases, self-tenders, privatizations, acquisitions of remaining interest, and partial interests or assets, and those with deal value less than US$1 million or with relative size (deal value / acquirer's market value of equity two days before deal announcement) less than 1%. In addition, we require that all acquirers have stock market and accounting data available from the Center for Research in Security Prices and Compustat, respectively. In Panel A, we report deal status, mode of acquisition, method of payment, deal attitude, deal value, and financial characteristics of the acquirers and the public targets in our sample. All financial variables are measured at the end of the fiscal years 1997-2012 before the merger public announcement date and winsorized at the 1% and 99% level. In Panels B and C, we report summary statistics for our key variable, ETRR, which is the percentage point reduction in an acquirer's effective income tax rate generated by the domestic production activities deduction (DPAD) by year and the Internal Revenue Service's industry, respectively.

Panel A: Deal and firm characteristics

	Proportion of sample	Mean	Median
Deal characteristics			
All cash payment	0.3095		
Tender offer	0.0641		
Hostile deal	0.0089		
Multiple bidders	0.0327		
Toehold	0.0321		
Merger of equals	0.0061		
Diversifying deal	0.3364		
Completed	0.9209		
Public targets	0.3561		
Deal value (US$ billion)		0.8574	0.0930
Relative size (Deal value / Acquirer market cap)		0.3437	0.1267
Acquirer CAR(-1,+1) %		0.0834	-0.2186
Combined CAR(-1,+1) %		1.6199	1.1242
Offer premium %		44.6374	35.6600

	Mean	Median
Acquirer characteristics		
Market value of equity (US$ billion)	5.3787	0.7346
Market-to-book ratio	3.4519	2.2763
Leverage	0.1426	0.1002
ROA	0.1296	0.1029
Public target characteristics		
Market value of equity (US$ billion)	0.9946	0.2051
Market-to-book ratio	2.4915	1.8066
Leverage	0.1627	0.1126
ROA	0.0995	0.0614

Panel B: Temporal distribution of acquirers' effective tax rate reduction (ETRR)

Deal announcement year	N	Mean	Median	Min	Max	Std dev
1997-2004	2,856	0.00	0.00	0.00	0.00	0.00
2005	335	0.01	0.00	0.00	0.62	0.07
2006	337	0.27	0.21	0.01	0.80	0.26
2007	322	0.34	0.25	0.01	1.44	0.33
2008	234	0.66	0.81	0.03	1.75	0.56
2009	161	0.73	0.86	0.06	1.97	0.57
2010	200	0.73	0.61	0.07	1.97	0.63
2011	181	1.05	0.84	0.15	2.94	0.85
2012	216	1.04	0.72	0.14	3.01	1.00
2013	230	0.92	0.18	0.18	2.94	1.02
All	5,072	0.25	0.00	0.00	3.01	0.55

Panel C: Industrial distribution of acquirers' ETRR during 2005-2013

Industry	N	Mean	Median	Min	Max	Std dev
Agricultural production	3	0.83	0.23	0.00	2.28	1.25
Mining	102	0.71	0.61	0.00	1.31	0.33
Utilities	27	1.06	1.15	0.00	1.35	0.37
Construction of buildings	9	1.60	1.54	0.00	2.33	0.85
Heavy and civil engineering construction and land subdivision	14	1.37	1.29	0.69	2.04	0.37
Specialty trade contractors	9	0.81	0.54	0.37	1.91	0.53
Food manufacturing	27	1.47	1.44	0.00	2.52	0.73
Beverage and tobacco product manufacturing	4	1.45	1.41	0.74	2.24	0.61
Apparel manufacturing	10	0.18	0.18	0.00	0.42	0.12
Leather and allied product manufacturing	6	0.17	0.20	0.00	0.32	0.16
Wood product manufacturing	3	1.50	1.51	0.78	2.20	0.71
Paper manufacturing	13	1.55	1.49	0.00	2.58	0.97
Printing and related support activities	15	1.14	1.19	0.00	2.14	0.73
Petroleum and coal products manufacturing	10	0.28	0.32	0.00	0.57	0.21
Chemical manufacturing	139	0.98	1.09	0.00	1.85	0.59
Plastics and rubber products manufacturing	3	1.95	2.52	0.79	2.52	1.00
Nonmetallic mineral product manufacturing	4	1.40	1.29	0.78	2.24	0.69
Primary metal manufacturing	22	1.26	0.77	0.00	2.82	0.85
Fabricated metal product manufacturing	20	1.51	1.55	0.00	2.57	0.83
Machinery manufacturing	55	0.85	0.60	0.00	2.05	0.67
Computer and electronic product manufacturing	265	0.95	0.64	0.00	2.43	0.74

Electrical equipment, appliance, and component manufacturing	37	1.00	0.94	0.00	2.11	0.62
Transportation equipment manufacturing	41	1.25	1.29	0.00	2.49	0.83
Furniture and related product manufacturing	3	2.71	2.83	2.47	2.83	0.21
Miscellaneous manufacturing	42	1.03	1.15	0.00	1.93	0.68
Durable goods	27	0.27	0.30	0.00	0.81	0.24
Nondurable goods	27	0.40	0.45	0.00	0.57	0.19
Motor vehicle dealers and parts dealers	1	0.00	0.00	0.00	0.00	N/A
Furniture and home furnishings stores	2	0.07	0.07	0.07	0.08	0.01
Electronics and appliance stores	1	0.06	0.06	0.06	0.06	N/A
Building material and garden equipment and supplies dealers	1	0.00	0.00	0.00	0.00	N/A
Food, beverage and liquor stores	4	0.17	0.10	0.00	0.47	0.20
Health and personal care stores	15	0.13	0.10	0.00	0.49	0.14
Clothing and clothing accessories stores	10	0.08	0.05	0.00	0.18	0.08
Sporting goods, hobby, book, and music stores	4	0.04	0.02	0.00	0.12	0.05
General merchandise stores	1	0.01	0.01	0.01	0.01	N/A
Miscellaneous store retailers	3	0.07	0.02	0.00	0.20	0.11
Nonstore retailers	16	0.07	0.05	0.00	0.17	0.06
Air, rail, and water transportation	15	0.01	0.01	0.00	0.04	0.01
Truck transportation	6	0.02	0.02	0.01	0.03	0.01
Transit and ground passenger transportation	5	0.00	0.00	0.00	0.00	0.00
Pipeline transportation	38	0.01	0.00	0.00	0.06	0.02
Other transportation and support activities	3	0.01	0.00	0.00	0.01	0.01
Publishing industries (except Internet)	120	1.37	1.44	0.00	2.94	0.94
Motion picture and sound recording industries	5	1.50	0.92	0.15	2.90	1.19
Broadcasting (except Internet)	28	1.71	1.89	0.00	3.01	1.01
Telecommunications (including paging, cellular, satellite)	46	0.43	0.36	0.00	0.84	0.26
Internet service providers, web search portals, and data processing services	21	0.44	0.24	0.00	1.13	0.40
Other information services	50	0.14	0.15	0.00	0.28	0.09
Credit intermediation	424	0.06	0.01	0.00	0.18	0.07
Securities, commodity contracts, other financial investments, and related activities	27	0.03	0.01	0.00	0.17	0.05
Insurance carriers and related activities	43	0.01	0.01	0.00	0.03	0.01
Funds, trusts, and other financial vehicles	2	0.02	0.02	0.02	0.02	0.00
Real estate	80	0.03	0.04	0.00	0.06	0.02
Rental and leasing services	10	0.17	0.08	0.02	0.71	0.25
Lessors of nonfinancial intangible assets (except copyrighted works)	11	0.44	0.52	0.02	0.80	0.35
Professional, scientific, and technical services	116	0.39	0.40	0.00	0.79	0.25
Administrative and support services	33	0.04	0.04	0.00	0.09	0.03
Waste management and remediation services	11	0.12	0.14	0.03	0.16	0.05
Educational services	7	0.16	0.13	0.01	0.31	0.13
Offices of health practitioners and outpatient care centers	50	0.05	0.02	0.00	0.12	0.05
Miscellaneous health care and social assistance	7	0.03	0.03	0.02	0.05	0.01
Hospitals, nursing, and residential care facilities	8	0.01	0.00	0.00	0.02	0.01
Other arts, entertainment, and recreation	2	0.10	0.10	0.08	0.12	0.03
Amusement, gambling, and recreation industries	14	0.08	0.03	0.00	0.23	0.10
Accommodation	3	0.06	0.07	0.00	0.11	0.06
Food services and drinking places	5	0.08	0.06	0.02	0.27	0.10
Personal and laundry services	6	0.06	0.03	0.00	0.18	0.08
Others	25	0.00	0.00	0.00	0.00	0.00

Table 2: Parallel trends assumption and internal validity of DPAD

The sample consists of 5,072 mergers and acquisitions by public acquirers announced during 1997-2013 described in Table 1. Panel A presents statistics related to the parallel trends assumption for the difference-in-differences specification during the five years before DPAD is implemented. Specifically, Panel A compares the mean and median values in the outcome variables for a treatment (DPAD) group and a control group. Panel B provides a similar comparison once DPAD is in effect. The control firms are those operating in industries that get little or no benefit from DPAD. For every IRS industry, we add QPAI from fiscal years 2005 until 2012 and then divide this sum by the aggregated taxable income reported during the same period for all firms in the same industry. The control group consists of firms belonging to any of the 21 industries for which this ratio is less than 3% (corresponding to the first quartile of the ratio's distribution). The treatment (DPAD) group is populated by the remaining firms. Panel C presents the effect of the domestic production activity deduction on GAAP effective tax rate and cash effective tax rate. The key independent variable, ETRR, is the percentage point reduction in the effective income tax rate for the acquirer's industry generated by the domestic production activities reduction. All variables are defined in Appendix A. Standard errors are adjusted for heteroskedasticity and double-clustered by industry and year. We report *p*-values in parentheses in Panel C. We use *, **, and *** to denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Pre-DPAD trends

	DPAD acquirers		Non-DPAD acquirers		Difference	
	Mean	Median	Mean	Median	*t*	*Z*
Year *t-1* N=348	N=214		N=134			
Acquirer CAR(-1,+1) %	0.75	0.08	-0.39	-0.31	1.41	0.84
Combined CAR(-1,+1) %	1.82	0.62	0.37	0.20	1.43	0.80
Offer premium %	38.80	29.21	32.18	26.99	1.09	0.61
Year *t-2* N=312	N=186		N=126			
Acquirer CAR(-1,+1) %	-0.23	-0.42	-0.83	-0.90	0.74	0.78
Combined CAR(-1,+1) %	-1.31	-0.25	0.49	-0.32	-1.52	0.51
Offer premium %	35.39	31.49	30.83	25.95	0.95	0.99
Year *t-3* N=256	N=167		N=89			
Acquirer CAR(-1,+1) %	-0.17	0.63	0.01	-0.03	-0.24	0.49
Combined CAR(-1,+1) %	1.65	2.29	1.08	0.01	0.42	0.74
Offer premium %	46.59	35.48	37.88	30.58	1.07	0.33
Year *t-4* N=317	N=203		N=114			
Acquirer CAR(-1,+1) %	-1.43	-1.44	0.05	-0.30	-1.41	-1.53
Combined CAR(-1,+1) %	0.36	0.35	0.99	1.04	-1.26	-1.31
Offer premium %	50.20	46.37	45.29	40.68	1.12	1.22
Year *t-5* N=461	N=320		N=141			
Acquirer CAR(-1,+1) %	-1.62	-1.71	-1.00	-0.87	-0.77	-1.10
Combined CAR(-1,+1) %	0.03	0.15	0.99	0.94	-0.86	-0.92
Offer premium %	54.40	48.81	49.90	46.43	1.09	1.21
Years *t-5* to *t-1* N=1694	N=1090		N=604			
Acquirer CAR(-1,+1) %	-0.66	-0.70	-0.48	-0.50	-0.50	-0.57
Combined CAR(-1,+1) %	0.46	0.58	0.76	0.51	-1.29	0.93
Offer premium %	46.11	42.00	39.35	35.79	1.55	1.58

Panel B: DPAD in effect

	DPAD acquirers		Non-DPAD acquirers		Difference	
	Mean	Median	Mean	Median	*t*	*Z*
N = 2216	N=1506		N=710			
Acquirer CAR(-1,+1) %	0.84	0.20	-0.13	-0.43	3.41***	4.57***
Combined CAR(-1,+1) %	3.28	2.26	1.59	0.91	3.73***	4.27***
Offer premium %	35.77	30.64	40.44	35.45	-1.74**	-1.72**

Panel C: The effect of DPAD on effective tax rates

Dependent variable =	GAAP effective tax rate		Cash effective tax rate	
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
ETRR	-0.0112***	-0.0095*	-0.0130***	-0.0102***
	(0.0018)	(0.0909)	(0.0001)	(0.0001)
Excluding firms with significant foreign operations	No	Yes	No	Yes
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes
N	5,072	1,392	5,072	1,392
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001

Table 3: DPAD and M&A activity

This table presents the effect of DPAD on M&A activity. The sample consists of 106,506 firm-years with data available from CRSP and Compustat during fiscal years 1997-2012. ETRR is defined in Table 1. Model (1) estimates a logistic regression while other models use OLS. Control variables for firm characteristics include *log of market value of assets, market-to-book ratio, leverage, prior year return.* Standard errors are double clustered by firm and year. We report *p*-values in parentheses. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Dependent variable =	Bid (0,1)	*ln*(1 + # of bids)	*ln*(1 + deal value)
	Model (1)	**Model (2)**	**Model (3)**
ETRR	0.0757**	0.0039***	0.0204**
	(0.0432)	(0.0055)	(0.0390)
Firm characteristics	Yes	Yes	Yes
Industry fixed effects (1digit SIC)	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
N	106,506	106,506	106,506
Regression's *p*-value	0.0001	0.0001	0.0001

Table 4: Effective tax rate reduction and acquirer returns

This table presents difference-in-differences estimates of the effect of the acquirer's effective tax rate reduction (ETRR) on acquirer returns around the merger announcement. The sample consists of 5,072 mergers and acquisitions by public acquirers announced during 1997-2013 described in Table 1 in Models (1) – (4) and a subset of 1,806 deals by public acquirers and public targets in Model (5). The dependent variable is the acquirer's cumulative abnormal return (CAR) over three days around the merger announcement date. The key independent variable ETRR is defined in Table 1. Control variables for deal characteristics include *public target (0,1)* in Models (1)-(4), *cash only payment (0,1), tender offer (0,1), hostile deal (0,1), multiple bidders (0,1), toehold (0,1), merger of equals (0,1),* and *diversifying deal (0,1)* in all models. Control variables for acquirer and target characteristics include *log of market value of assets, market-to-book ratio, leverage, prior year return,* and *the target firm's ETRR*. All variables are defined in Appendix A. Standard errors are adjusted for heteroskedasticity and double-clustered by industry and year. We report *p*-values in parentheses. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Baseline regressions

Dependent variable = Acquirer CAR (-1,+1)	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
ETRR	0.0101***	0.0128***	0.0162**	0.0125***	0.0154***
	(0.0044)	(0.0007)	(0.0299)	(0.0019)	(0.0016)
Deal characteristics		Yes	Yes	Yes	Yes
Acquirer characteristics		Yes	Yes	Yes	Yes
Target characteristics					Yes
Acquirer fixed effects			Yes		
State fixed effects				Yes	
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes	Yes
N	5,072	5,072	5,072	5,072	1,806
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001

Panel B: Triple differences analysis

	Financial constraint		Bonding		Quiet life	
Dependent variable = Acquirer CAR (-1,+1)	*High KZ index (0,1)*	*Unrated firm (0,1)*	*Strategic alliance (0,1)*	*Major industrial customer (0,1)*	*Noncompe-titive industry (0,1)*	*Mature firm (0,1)*
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
ETRR	0.0083**	0.0093**	0.0091**	0.0089**	0.0115**	0.0107**
	(0.0172)	(0.0101)	(0.0127)	(0.0220)	(0.0193)	(0.0214)
ETRR × Indicator	0.0047**	0.0026*	0.0021*	0.0056**	-0.0105**	-0.0089**
	(0.0349)	(0.0828)	(0.0893)	(0.0124)	(0.0183)	(0.0143)
Indicator	0.0014	-0.0008	-0.0016	-0.0034	-0.0049	-0.0022
	(0.4230)	(0.6361)	(0.3662)	(0.8750)	(0.3812)	(0.7765)
Fixed effects as in Panel A Model (1)	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Effective tax rate reduction and acquisition synergies

This table presents difference-in-differences estimates of the effect of the acquirer's effective tax rate reduction (ETRR) on acquisition synergies. The sample consists of 1,806 mergers and acquisitions by public bidders and public targets announced during 1997-2013 described in Table 1. The dependent variable is the three day cumulative abnormal return (CAR) for the value-weighted portfolio of the acquirer and the target around the merger announcement. The key independent variable ETRR is defined in Table 1. Control variables for deal characteristics include *public target (0,1), cash only payment (0,1), tender offer (0,1), hostile deal (0,1), multiple bidders (0,1), toehold (0,1), merger of equals (0,1),* and *diversifying deal (0,1)*. Control variables for acquirer and target characteristics include *log of market value of assets, market-to-book ratio, leverage, prior year return,* and *the target firm's ETRR*. All variables are defined in Appendix A. Standard errors are adjusted for heteroskedasticity and double-clustered by industry and year. We report *p*-values in parentheses. We use *, **, and *** to denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Baseline regressions

Dependent variable = Combined CAR (-1,+1)	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
ETRR	0.0097**	0.0128***	0.0107**	0.0134***	0.0148***
	(0.0167)	(0.0021)	(0.0348)	(0.0007)	(0.0002)
Deal characteristics		Yes	Yes	Yes	Yes
Acquirer characteristics		Yes	Yes	Yes	Yes
Target characteristics					Yes
Acquirer fixed effects			Yes		
State fixed effects				Yes	
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes	Yes
N	1,806	1,806	1,806	1,806	1,806
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001

Panel B: Triple differences analysis

	Financial constraint		Bonding		Quiet life	
Dependent variable = Combined CAR (-1,+1)	*High KZ index (0,1)*	*Unrated firm (0,1)*	*Strategic alliance (0,1)*	*Major industrial customer (0,1)*	*Noncompe-titive industry (0,1)*	*Mature firm (0,1)*
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
ETRR	0.0078**	0.0067**	0.0095***	0.0075***	0.0099***	0.0107***
	(0.0161)	(0.0196)	(0.0013)	(0.0013)	(0.0035)	(0.0060)
ETRR × Indicator	0.0066**	0.0062**	0.0043*	0.0091***	-0.0092***	-0.0093**
	(0.0141)	(0.0453)	(0.0690)	(0.0029)	(0.0056)	(0.0102)
Indicator	0.0007	0.0012	-0.0011	0.0074	-0.0009	-0.0021
	(0.8101)	(0.5249)	(0.6899)	(0.7370)	(0.6632)	(0.4923)
Fixed effects as in Panel A Model (1)	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Effective tax rate reduction and offer premium

This table presents difference-in-differences estimates of the effect of the acquirer's effective tax rate reduction (ETRR) on the offer premium. The sample consists of 1,806 mergers and acquisitions by public bidders and public targets announced during 1997-2013 described in Table 1. The dependent variable is the four-week acquisition premium reported by SDC. The key independent variable ETRR is defined in Table 1. Control variables for deal characteristics include *public target (0,1), cash only payment (0,1), tender offer (0,1), hostile deal (0,1), multiple bidders (0,1), toehold (0,1), merger of equals (0,1),* and *diversifying deal (0,1)*. Control variables for acquirer and target characteristics include *log of market value of assets, market-to-book ratio, leverage, prior year return,* and *the target firm's ETRR*. All variables are defined in Appendix A. Standard errors are adjusted for heteroskedasticity and double-clustered by industry and year. We report *p*-values in parentheses. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Baseline regressions

Dependent variable = Offer premium	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
ETRR	-0.0269*	-0.0318**	-0.0304***	-0.0357***	-0.0312**
	(0.0536)	(0.0441)	(0.0087)	(0.0029)	(0.0401)
Deal characteristics		Yes	Yes	Yes	Yes
Acquirer characteristics		Yes	Yes	Yes	Yes
Target characteristics					Yes
Acquirer fixed effects			Yes		
State fixed effects				Yes	
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes	Yes
N	1,806	1,806	1,806	1,806	1,806
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001

Panel B: Triple differences analysis

	Financial constraint		Bonding		Quiet life	
Dependent variable = Offer Premium	*High KZ index (0,1)*	*Unrated firm (0,1)*	*Strategic alliance (0,1)*	*Major industrial customer (0,1)*	*Noncompe-titive industry (0,1)*	*Mature firm (0,1)*
	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**	**Model (6)**
ETRR	-0.0218**	-0.0209**	-0.0218**	-0.0245**	-0.0289**	-0.0296***
	(0.0204)	(0.0154)	(0.0309)	(0.0265)	(0.0222)	(0.0073)
ETRR × Indicator	-0.0133*	-0.0149**	-0.0076*	-0.0115*	0.0212**	0.0129*
	(0.0547)	(0.0321)	(0.0798)	(0.0564)	(0.0198)	(0.0697)
Indicator	-0.0078	0.0043	-0.0054	0.0024	0.0011	-0.0014
	(0.5406)	(0.5329)	(0.4847)	(0.8792)	(0.9781)	(0.9246)
Fixed effects as in Panel A Model (1)	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Additional analyses

This table presents additional analyses of the effect of the acquiring industry's effective tax rate reduction (ETRR) on different acquisition outcomes: method of payment (Panel A), division of merger gains (Panel B), post-deal operating performance (Panel C), and post-deal goodwill impairment write-offs (Panel D). The key independent variable ETRR is defined in Table 1. All variables are defined in Appendix A. We report *p*-values in parentheses. We use *, **, and *** to indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Method of payment

Dependent variable = Percentage of cash	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
ETRR	5.0029**	5.1146***	5.4244***	5.0502**	5.7138**
	(0.0284)	(0.0097)	(0.0017)	(0.0152)	(0.0448)
Deal characteristics		Yes	Yes	Yes	Yes
Acquirer characteristics		Yes	Yes	Yes	Yes
Target characteristics					Yes
Acquirer fixed effects			Yes		
State fixed effects				Yes	
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes	Yes
N	2,743	2,743	2,743	2,743	1,806
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001

Panel B: Division of merger gains

Dependent variable = Relative gains of target vs. acquirer per dollar of combined market value	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
ETRR	-0.0181***	-0.0151**	-0.0148**	-0.0149**	-0.0140**
	(0.0032)	(0.0196)	(0.0207)	(0.0225)	(0.0225)
Deal characteristics		Yes	Yes	Yes	Yes
Acquirer characteristics		Yes	Yes	Yes	Yes
Target characteristics					Yes
Acquirer fixed effects			Yes		
State fixed effects				Yes	
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes	Yes
N	1,806	1,806	1,806	1,806	1,806
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001

Panel C: Post-deal operating performance					
Dependent variable = Change in combined firm ROA	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
ETRR	0.0474**	0.0373***	0.0545**	0.0396**	0.0358**
	(0.0132)	(0.0047)	(0.0281)	(0.0111)	(0.0105)
Deal characteristics		Yes	Yes	Yes	Yes
Acquirer characteristics		Yes	Yes	Yes	Yes
Target characteristics					Yes
Acquirer fixed effects			Yes		
State fixed effects				Yes	
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes	Yes
N	1,660	1,660	1,660	1,660	1,660
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001

Panel D: Post-deal goodwill write-off					
Dependent variable = Goodwill write-off (0,1)	**Model (1)**	**Model (2)**	**Model (3)**	**Model (4)**	**Model (5)**
ETRR	-0.4763**	-0.4580*	-0.5939**	-0.5206**	-0.5370**
	(0.0420)	(0.0539)	(0.0217)	(0.0388)	(0.0251)
Deal characteristics		Yes	Yes	Yes	Yes
Acquirer characteristics		Yes	Yes	Yes	Yes
Target characteristics					Yes
Acquirer fixed effects			Yes		
State fixed effects				Yes	
(Industry × Year) fixed effects	Yes	Yes	Yes	Yes	Yes
N	4,761	4,761	4,761	4,761	1,660
Regression's *p*-value	0.0001	0.0001	0.0001	0.0001	0.0001

Table 8: Robustness checks

This table presents robustness checks of the effect of the acquirer's effective tax rate reduction (ETRR) on different acquisition outcomes. The key independent variable ETRR is defined in Table 1. All variables are defined in Appendix A. We report *p*-values in parentheses. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Alternative measures of acquirer and target returns

	Model (1)	**Model (2)**	**Model (3)**	**Model (4)**
Dependent variable =	Acquirer CAR (–2,+2)	Target CAR (–20,+1)	Target CAR (–42,+126)	Combined Premium
ETRR	0.0092**	-0.0176*	-0.0158*	-0.0209**
	(0.0304)	(0.0702)	(0.0775)	(0.0314)
Fixed effects as in model (1) of	Table 4 Panel A	Table 6 Panel A	Table 6 Panel A	Table 6 Panel A
N	5,072	1,806	1,806	1,806

Panel B: Alternative measures of acquirer post-deal performance

	Model (1)	**Model (2)**	**Model (3)**
Dependent variable =	Post-deal three-year BHAR	Post-deal three-year CAR	Matched size and B/M decile portfolios post-deal three-year BHAR
ETRR	0.2959**	0.2150*	0.5934*
	(0.0486)	(0.0950)	(0.0727)
Fixed effects as in model (1) of	Table 7 Panel C	Table 7 Panel C	Table 7 Panel C
N	1,660	1,660	1,660

Panel C: Alternative measures of financial constraint

	Model (1)	**Model (2)**	**Model (3)**
Dependent variable =	Acquirer CAR	Combined CAR	Offer Premium
ETRR × High WW index (0,1)	0.0037*	0.0041*	-0.0135**
	(0.0620)	(0.0850)	(0.0317)
ETRR × High HP index (0,1)	0.0056**	0.0067**	-0.0113*
	(0.0202)	(0.0119)	(0.0699)
Fixed effects as in Panel B of	Table 4	Table 5	Table 6
N	5,072	1,806	1,806

Panel D: Payout policy

	Model (1)	**Model (2)**	**Model (3)**
Dependent variable =	Acquirer CAR	Combined CAR	Offer premium
ETRR × Low payout ratio (0,1)	0.0061**	0.0037*	-0.0177**
	(0.0083)	(0.0634)	(0.0230)
ETRR × No dividend payout	0.0048**	0.0068**	-0.0133**
in the past 30 years (0,1)	(0.0172)	(0.0134)	(0.0269)
Fixed effects as in Panel B of	Table 4	Table 5	Table 6
N	5,072	1,806	1,806

Panel E: Falsification tests using DPAD three years before the merger announcement

	Model (1)	Model (2)	Model (3)
Dependent variable =	Acquirer CAR	Combined CAR	Offer premium
ETRR	0.0028	0.0028	-0.0117
	(0.7335)	(0.5686)	(0.4330)
Fixed effects as in model (1) of	Table 4 Panel A	Table 5 Panel A	Table 6 Panel A
N	5,072	1,806	1,806

Panel F: Unobserved heterogeneity

Dependent variable = Acquirer CAR (-1,+1)	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)
ETRR	0.0085**	0.0114**	0.0114**	0.0090**	0.0122**
	(0.0275)	(0.0211)	(0.0193)	(0.0225)	(0.0263)
(Acquirer industry × Year) fixed effects	Yes		Yes	Yes	Yes
(Target industry × Year) fixed effects	Yes		Yes	Yes	Yes
(Acquirer ind.× Target ind. × Year) FEs		Yes	Yes	Yes	Yes
(Acquirer state × Year) fixed effects				Yes	Yes
Deal characteristics					Yes
Acquirer characteristics					Yes
N	5,072	5,072	5,072	5,072	5,072

Panel G: Excluding the period before 2003 "Bush Tax Cuts"

	Model (1)	Model (2)	Model (3)
Dependent variable =	Acquirer CAR	Combined CAR	Offer Premium
ETRR	0.0101***	0.0097**	-0.0266*
	(0.0044)	(0.0167)	(0.0565)
Fixed effects as in model (1) of	Table 4 Panel A	Table 5 Panel A	Table 6 Panel A
N	2,876	945	945

Panel H: Excluding acquirers with significant foreign operations			
	Model (1)	**Model (2)**	**Model (3)**
Dependent variable =	Acquirer CAR	Combined CAR	Offer Premium
ETRR	0.0135**	0.0098**	-0.0221*
	(0.0294)	(0.0171)	(0.0669)
Fixed effects as in model (1) of	Table 4 Panel A	Table 5 Panel A	Table 6 Panel A

Panel I: Excluding acquirers with significant foreign operations – Triple differences analysis			
	Model (1)	**Model (2)**	**Model (3)**
Dependent variable =	Acquirer CAR	Combined CAR	Offer Premium
ETRR × High KZ index (0,1)	0.0040**	0.0043*	-0.0140**
	(0.0477)	(0.0616)	(0.0356)
ETRR × Unrated firm (0,1)	0.0034*	0.0046*	-0.0165**
	(0.0541)	(0.0758)	(0.0232)
ETRR × Strategic alliance (0,1)	0.0033**	0.0078**	-0.0102*
	(0.0184)	(0.0168)	(0.0511)
ETRR × Major industrial customer (0,1)	0.0049**	0.0069**	-0.0146**
	(0.0103)	(0.0340)	(0.0372)
ETRR × Noncompetitive industry (0,1)	-0.0104**	-0.0095***	0.0278***
	(0.0199)	(0.0011)	(0.0072)
ETRR × Mature firm (0,1)	-0.0073**	-0.0097**	0.0231**
	(0.0047)	(0.0102)	(0.0146)
Fixed effects as in Panel B of	Table 4	Table 5	Table 6

Panel J: Excluding deals before 2011 when income shifting due to DPAD is possible			
	Model (1)	**Model (2)**	**Model (3)**
Dependent variable =	Acquirer CAR	Combined CAR	Offer Premium
ETRR	0.0077**	0.0098**	-0.0207*
	(0.0481)	(0.0359)	(0.0959)
Fixed effects as in model (1) of	Table 4 Panel A	Table 5 Panel A	Table 6 Panel A
N	627	219	219

Appendix A: Variable definitions

Key independent variable	
ETRR	the percentage point reduction in the effective income tax rate for a firm's industry generated by the domestic production activities deduction
Effective tax rates	
GAAP effective tax rate	the ratio of current tax expense over taxable income, scaled by the top statutory tax rate, with taxable income estimated using the methodology in Lev and Nissim (2004)
Cash effective tax rate	computed as the ratio of cash paid for income taxes over taxable income, scaled by the top statutory tax rate, with taxable income estimated using the methodology in Lev and Nissim (2004)
Deal characteristics	
Acquirer CAR	the acquirer's cumulative abnormal return over the window around the merger announcement date, calculated as the residual from the market model estimated during the one year window ending four weeks prior to the merger announcement
Target CAR	the target's cumulative abnormal return over the window around the merger announcement date, calculated as the residual from the market model estimated during the one year window ending four weeks prior to the merger announcement
Combined CAR	the three day cumulative abnormal return for the value-weighted portfolio of the acquirer and the target around the merger announcement
Offer premium	the offer price divided by the target's stock price four weeks before the merger announcement date, as reported by SDC and limited between 0% and 200%
Combined premium	Following Officer (2003), we first estimate a premium based on "component" data using the aggregate value of cash, stock, and other securities offered by the bidder to target shareholders as reported by SDC. We then estimate premiums based on "initial price" and "final price" data, respectively. These prices are also reported by SDC. All premium measures are then deflated by the target's market value 42 trading days prior to the bid announcement. The combined premium is based on the component measure if it is greater than 0% and less than 200%; otherwise the premium relies on the initial price measure (or on the final price measure if initial price data are missing).
Relative gains of target vs. acquirer per dollar of combined market value	the target's gain relative to the acquirer's gain (as in Ahern, 2012). To construct this variable we first estimate the target $CAR and the acquirer $CAR as the firm's three day cumulative abnormal merger announcement return multiplied by market equity of the firm two days before the merger announcement. Next, we compute the target's $CAR minus the acquirer's $CAR. We then divide this difference by the sum of acquirer and target market values 50 trading days before the merger announcement. This measure represents the relative gain of the target versus the acquirer for each dollar of total market value, without the concern that total gains may be negative.
Post deal combined ROA	the change in the combined firm's average ROA three years after deal completion compared to the weighted average ROA of the acquirer and the target before the deal, with the weights being their respective market cap a month before deal announcement

Post-deal three-year BHAR	the combined firm's buy and hold abnormal return during the period of three years after deal completion using the CRSP value weight market returns as benchmark
Post-deal three-year CAR	the combined firm's cumulative abnormal return during the period of three years after deal completion, calculated as the net-of-market return using the CRSP value weight market returns as benchmark
Matched size and B/M decile portfolios post-deal three-year BHAR	the combined firm's buy and hold abnormal return during the period of three years after deal completion using the expected returns of matched portfolios as benchmark (obtained from Kenneth French's website)
Post deal goodwill write-offs (0,1)	one if the acquirer reports an impairment of goodwill related to the merger during the period of three years after the completion date
Public target (0,1)	one if the target is publicly traded
Cash payment (0,1)	one if the deal is paid entirely in cash
Tender offer (0,1)	one if the form of the deal is tender offer
Hostile deal (0,1)	one if the deal is classified hostile by SDC
Multiple bidders (0,1)	one if the deal has multiple bidders identified by SDC
Toehold (0,1)	one if the bidder owns some of the target's shares outstanding
Merger of equals (0,1)	one if the deal is classified by SDC as a merger of equals
Diversifying deal (0,1)	one if the target and the acquirer belong to a different Fama and French (1997) 48 industrial classification group
Financial characteristics	
Size	the natural logarithm of the market value of assets
Market-to-book	the market value of assets divided by the book value of assets
Leverage	the book value of debt divided by the sum of book value of debt and market value of equity.
ROA	the operating income before depreciation divided by the beginning book value of assets
Prior year return	the buy-and-hold abnormal return during the one year window ending four weeks prior to the merger announcement, calculated as the residual from the market model estimated during the year before
Significant income from foreign operations (0,1)	one for firms having substantial income from foreign operations in one of the three fiscal years before the merger announcement. Following Lev and Nissim (2004), income from foreign operations is defined to be substantial if the ratio of the absolute value of "pretax income-foreign" (*pifo*) to the sum of that amount and the absolute value of "pretax income-domestic" (*pidom*) exceeds 20%. All variables in italics are Compustat data items.
Financial constraint proxies	
High KZ index (0,1)	one for firms that have a KZ index in the top tercile of all firms in the previous year, with KZ Index being constructed following Lamont, Polk, and Saa-Requejo (2001) as –1.001909[(*ib* + *dp*)/lagged *ppent*] + 0.2826389[(*at* + *prcc_f*×*csho* - *ceq* - *txdb*)/*at*] + 3.139193[(*dltt* + *dlc*)/(*dltt* + *dlc* + *seq*)] – 39.3678[(*dvc* +*dvp*)/lagged *ppent*] – 1.314759[*che*/lagged *ppent*], where all variables in italics are Compustat data items
High WW index (0,1)	one for firms that have a WW index in the top tercile of all firms in the previous year, with WW Index being constructed following Whited and Wu (2006) and Hennessy and Whited (2007) as –0.091 [(*ib* + *dp*)/*at*] – 0.062[indicator set to one if *dvc* + *dvp* is positive, and zero otherwise] +

	0.021[*dltt/at*] – 0.044[log(*at*)] + 0.102[average industry sales growth, estimated separately for each three-digit SIC industry and each year, with sales growth defined as above] – 0.035[sales growth], where all variables in italics are Compustat data items
High HP index (0,1)	one for firms that have a HP index in the top tercile of all firms in the previous year, with HP Index being constructed following Hadlock and Pierce (2010) as $-0.737\text{Size} + 0.043\text{Size}^2 - 0.040\text{Age}$, where Size equals the log of inflation-adjusted Compustat item *at* (in 2004 dollars), and Age is the number of years the firm is listed with a non-missing stock price on Compustat
Low payout ratio (0,1)	one for firms that have a dividend payout ratio (*dvt/ebit*) in the bottom tercile of all firms in the previous year, where all variables in italics are Compustat data items
Unrated firm (0,1)	one for firms that do not have a credit rating from S&P, Moody's, Fitch, or Duff & Phelps, using data obtained from Compustat (variable *splticrm*) or for firms that do not have debt outstanding
Bonding proxies	
Strategic alliance (0,1)	one for firms having an active strategic alliance entered within 5 years before the merger announcement date, using data from SDC
Major industrial customer (0,1)	one for firms having at least one major customer listed in the Compustat customer segment database and that none of these major customers are government organizations
Quiet life proxies	
Noncompetitive industry (0,1)	one if the firm's industry is in the top quartile of all industries sorted annually by the Herfindahl index. An industry's Herfindahl index is computed as the sum of squared market shares of all firms in the industry using data on sales.
Mature firm (0,1)	one for firms with age in the top quartile of all firms in the previous year, using data from Compustat