Distributive inefficiency in horizontal mergers: Evidence from wealth transfers between merging firms and their customers[1]

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Abstract

The ultimate goal of antitrust enforcement is to maximize the surplus consumers enjoy through enhancing productive efficiency and eliminating market power. Previous literature reports no evidence of market power in horizontal mergers, based on the net average wealth effects on merging firms and corporate customers. In this paper, we focus on wealth transfer and find a strong and negative relation between the combined abnormal returns on the merging firms and those on their corporate customers. Such a negative relation is more pronounced when market power is more likely to be present. On average, the merging firms gain and their customers do not lose. Overall, our results suggest that while horizontal mergers enhance productive efficiency, the presence of market power prevents customers from enjoying the full consumer surplus. Distributive inefficiency exists in horizontal mergers.

Keywords: distributive efficiency; productive efficiency; wealth transfer; mergers and acquisitions; market power; consumer surplus.

JEL Classification: G34; G38; K21; L4

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1. Introduction

For decades, financial economists have disagreed with antitrust authorities on the sources of gains for firms that merge horizontally. Large-sample studies using stock market returns yield no evidence of market power. Rather, previous studies conclude that merging firms benefit from productive efficiency gains (Eckbo, 1983, 1985, 1992; Eckbo and Wier, 1985; Ellert, 1976; Stillman, 1983; Fee and Thomas, 2004; Shahrur, 2005; Bernile and Lyandres, 2019) or from enhanced buying power against suppliers (Galbraith, 1952; Snyder, 1996; Fee and Thomas, 2004; Bhattacharyya and Nain, 2011).

Extant literature relies on the average abnormal returns on the merging and economically related firms (e.g., rivals, customers, and suppliers) to distinguish between market power and productive efficiency as sources of horizontal-merger gains, beginning with Eckbo (1983) and Stillman (1983). Fee and Thomas (2004) and Shahrur (2005) further point out that it can be ambiguous to identify the sources of gains using the supplier and rival price reactions.[2] Instead, as the authors posit, the abnormal returns to corporate customers offer a cleaner way for the identification of the sources of merger gains. Specifically, when merger gains arise from improved productive efficiency, corporate customers experience positive announcement returns if the merging firms pass at least some productive efficiency gains downstream. In contrast, when a merger is proposed in the pursuit of market power, corporate customers have a zero or negative wealth effect measured by stock price reaction.

Nevertheless, customers' positive price reaction does not guarantee the absence of market power. Customer abnormal returns are positive whenever the efficiency gains passed down to corporate customers outweigh their losses due to pre-existing or newly generated market power. However, if the merging firms exercise their market power to keep product

[2] Downstream mergers may squeeze suppliers via increased purchasing efficiency or monopsonistic collusion. Rivals' stock prices can rise on merger announcements if investors believe that rivals can realize similar efficiency gains through future mergers of their own (Song and Walking, 2000) or that mergers generate industry monopoly rents.

prices above the competitive level, corporate customers may not enjoy the full increase in consumer surplus arising from mergers. Sadly, the extant literature is silent on whether market power moderates the extent to which efficiency gains from mergers are distributed between customers and merging firms. In this study, we examine the distributive efficiency of horizontal mergers by analyzing the wealth transfer effect between the merging firms and their corporate customers.

We postulate that the wealth transfer effect captured by a negative relation between the merging firms' combined abnormal returns (*Combined CAR*) and the reliant corporate customers' abnormal returns *(Reliant Customer CAR)* enable us to detect the loss in consumer surplus due to merging firms' market power. Fixing the amount of net productive efficiency gains, merging firms gain more if they use market power to withhold more productive efficiency gains from corporate customers. Such a wealth transfer effect arises whenever the merging firms, maybe in collusion with their industry peers (Stigler, 1964), use their market power to prevent customers from obtaining the full increase in consumer surplus. The dominance of productive efficiency over market power does not pre-empt such a wealth transfer effect. Examining the wealth transfer effect and distributive efficiency is consistent with Lande's (1982) well-cited statement that wealth redistribution is the original and primary concern of antitrust regulation, and that (corporate) "efficiency was never the primary goal".[3,4] Absent market power, merging firms share productive efficiency gains with

[3] Lande (1982) emphasizes the importance of wealth redistribution in the context of antitrust regulation: "Congress wanted to encourage economic efficiency and to ensure that the fruits of this efficiency were passed on to consumers, but efficiency was never the primary goal. Congress attempted to accomplish its overriding redistributive aims in such a way that the benefits of modern productivity would still be substantially realized. The evidence does not suggest, however, that Congress wanted the antitrust laws to allow increases in corporate efficiency at the cost of undermining its basic redistributive goals" (Lande, 1982, p.151).

[4] Baker (2003) discusses the relevance of the loss of consumer surplus and the general case for antitrust enforcement.

their customers at a new competitive equilibrium, which implies a non-negative relation between the abnormal returns on the merging firms and their corporate customers.[5]

To measure merger-induced wealth effects on the merging firms and their customers, we follow the previous literature and compute cumulative abnormal returns (*CAR*s) over a three-day window (−1, 1) centered around merger announcements (day 0). We use the *CAR*s of corporate customers who are most reliant on the merging firms' industry output (henceforth, reliant customers) because these customers are most vulnerable to merging firms' anticompetitive expropriation. We compute the value-weighted average of the *CAR*s of the merging firms and denote it as *Combined CAR*. We measure reliant customers' abnormal returns using the *CAR*s of value-weighted customer portfolios and denote it as *Reliant customer CAR*.[6]

To estimate the extent to which an increase in *Combined CAR* causes a decrease in *Reliant Customer CAR* (i.e., the wealth transfer effect), we regress the latter on the former. Causality exists when investors of customer shares infer the downstream share price implications from *Combined CAR*. *Combined CAR*, however, can be endogenous relative to *Reliant customer CAR* due to omitted variables or simultaneity. Unmeasured factors relating to economic liberalization, macroeconomic, or industry conditions may affect the returns of all firms and coincide with merger waves (e.g., Mitchell and Mulherin, 1986). For example, mergers that coincide with technology shocks may convey good news that merging firms have a competitive technological advantage (Harford, 2005), leading to high combined returns to merging firms and meanwhile benefitting customers. Also, simultaneity may be present because of the strategic interactions between merging firms and their customers. For example, the market may expect corporate customers to possess countervailing power that

[5] Productive efficiency gains can lead to both increased consumer surplus and increased producer surplus. In the absence of market power, merging firms pass all consumer surplus rather than all productive efficiency gains.
[6] Equal-weighting gives similar results.

mitigates the wealth transfer from customers to the merging industry. Both sources of endogeneity—omitted variables and simultaneity—cause the ordinary least square (OLS) estimate of the relation between *Reliant customer CAR* and *Combined CAR* to be upward biased. We conduct a Durbin and Wu–Hausman test and show that *Combined CAR* is indeed endogenous. To address this endogeneity, we adopt an instrumental variable (IVs) approach which we describe in detail in the methodology section.

Our sample consists of 422 horizontal mergers in non-financial and non-regulated industries between 1985 and 2008. The coefficient on *Combined CAR* is positive but statistically insignificant under the OLS specifications. Nonetheless, when we rely on the instrumented *Combined CAR* for inference and adjust for heteroscedasticity using the generalized method of moments (GMM) estimation, *Combined CAR* has a significant and negative effect on the *Reliant customer CAR*, which demonstrates the presence of a wealth transfer effect. This negative coefficient on *Combined CAR* is economically meaningful at −0.329. It means that the *Reliant customer CAR* falls by 0.329% when *Combined CAR* increases by 1%, i.e., for each percentage point increase in *Combined CAR*, 0.329 percentage points arise at the expense of reliant customers. More nuanced analyses further find that the wealth transfer effect is most pronounced among those deals in the industries with high industrial concentration, in the industries with low foreign competition, or announced under a Republican administration. To ensure that the negative relation between *Reliant customer CAR* and *Combined CAR* is not due to factors such as macroeconomic conditions and industry developments, we randomly sample a set of pseudo-event dates and subject our baseline result to falsification tests. We find that there is no significant relation between the pseudo *Reliant customer CAR* and the pseudo *Combined CAR*. The falsification tests further minimize the concern that the negative relation between *Reliant customer CAR* and *Combined CAR* is due to unmeasured factors that influence both sets of returns.

In this study, we use the wealth transfer effect between merging firms and their corporate customers to infer the extent to which distributive efficiency sacrifices in horizontal mergers. We find an economically meaningful and statistically significant negative relation between the announcement returns on the merging firms and the returns on their reliant customers, demonstrating the existence of wealth transfer. The previous stock-market based large-sample studies focus on the relative strength of productive efficiency and market power and make inference based on the average announcement abnormal returns on merging firms and their economically related firms such as industry rivals (e.g., Eckbo, 1983, 1985; Stillman, 1983; Eckbo and Wier, 1985), suppliers, or customers (e.g., Fee and Thomas, 2004; Shahrur, 2005). These studies show that the effect of enhanced productive efficiency dominates that of market power in horizontal mergers. As we mentioned above, however, average abnormal returns only capture the net effect of improved productive efficiency vis-à-vis market power. The dominance of productive efficiency may well mask the presence of market power, leaving the distributive inefficiency undetected between the merging firms and their customers. We contribute to the literature by studying the wealth transfer effect and revealing the existence of distributive inefficiency.[7,8] Our findings support the view that market power is present in horizontal mergers and affects the gains for the merging firms and their corporate customers. The presence of a negative wealth transfer effect implies that merging firms, maybe in collusion with their industry peers, have the market power to retain productive efficiency gains, which harms consumers' rights to purchase at the competitive price.

[7] Given that productive efficiency and market power are, as sources of gains to horizontal mergers, not mutually exclusive, our results do not refute the findings of previous studies that productive efficiency is a key source of merger gains.

[8] Our results also complement previous evidence of market power from clinical and industry studies (e.g., Barton and Sherman, 1984; Borenstein, 1990; Kim and Singal, 1993; Singal, 1996; Prager and Hannan, 1998; Focarelli and Panetta, 2003; Devos et al., 2016; Chorniy et al., 2018).

Our findings have two obvious policy implications. First, antitrust authorities may not want to force the abandonment of mergers that enhance productive efficiency. However, with a better understanding of distributive efficiency, the antitrust agencies can negotiate the restructuring or consent decrees more appropriately with the merging firms to enhance the ultimately benefit consumers (Lande, 1982). Many merger cases potentially improve productive efficiency. Market power, however, co-existing with the improved productive efficiency, may prevent consumers from enjoying the full consumer surplus. The antitrust authorities, therefore, face a trade-off between two questions 1) how much market power should be allowed to encourage productive efficiency and 2) how much distributive efficiency should be achieved to ensure consumers' right to the full consumer surplus. Second, we find there is no significant wealth transfer effect when foreign competition is high or industry concentration is low, which implies that the antitrust agencies should direct more resources to those horizontal mergers in the areas with less foreign or domestic competition. Also, in recent years, while countries are deliberating how desirable it is to localize their economies, policymakers should beware of the possibility that big companies, shielded from the pressure of international competition, will be in a better position to expropriate consumer surplus.

The rest of the paper continues as follows. Section 2 reviews relevant literature and develops testable hypotheses. Section 3 discusses the methodology. Section 4 describes the data and sample. Section 5 reports the empirical results. Section 6 summarises and concludes. In Appendix A and B, we define the variables, describe how we identify corporate customers, and how we distinguish between the market-power domains and non-market-power domains.

2. Literature review and hypothesis development

2.1. Efficiency in horizontal mergers

Large-sample studies in the literature conclude that firms merge horizontally mainly to enhance productive efficiency (e.g., Eckbo, 1983, 1985, 1992; Eckbo and Wier 1985; Stillman, 1983). This conclusion is based mainly on the average wealth effects of merging firms and their related firms, especially corporate customers. But as we explain in the introduction, average abnormal returns measure only the net wealth effect of the sources of merger gains. Lande (1982) postulates that firms, while striving to become monopolists, often increase productive efficiency. Put differently, firms' desire to become monopolists often motivates them to improve productive efficiency (e.g., by lowering costs and improving product quality) or to merge with other firms to achieve economies of scale and other productive efficiencies. Therefore, gains in productive efficiency and market power often co-exist in horizontal mergers. A key concern of the antitrust authorities, as Lande (1982) explains, is how gains in productive efficiency are distributed between merging firms and their corporate customers. Merging firms and the merging industry may have pre-existing market power as well as newly created market power due to industrial consolidation (Stigler, 1964). When merging firms use their market power to set monopolistic prices, consumer surplus is transferred from the customers to the merging firms. It is a long-standing doctrine of the U.S. Congress that consumers have the rightful entitlement to purchase at the competitive price (Lande, 1982). Therefore, by using their market power to retain productive efficiency gains in an excessive manner, merging firms disadvantage consumers from the perspective of lawmakers.

2.2. Evidence of gains in productive efficiency from horizontal mergers

Previous literature based on stock market reactions emphasize productive efficiency gains rather than allocative efficiency. Neoclassical theory suggests that firms merge horizontally to form new firm boundaries optimally (Rhodes-Kropf and Robinson, 2008; Mitchell and Mulherin, 1996). Firms merge in response to changes in economic or trading

conditions, industrial regulatory changes, or technological transformations. By streamlining operations, replacing management, or reducing costs, merging firms increase productive efficiency and achieve synergistic gains (e.g., Jensen, 1993; Comment and Schwert, 1995; Maksimovic and Phillips, 2002; Lambrecht, 2004). Theory of merger waves also attributes wave formation to the pursuit of increased productive efficiency in response to economic, regulatory, or technological shocks (e.g., Mitchell and Mulherin, 1996; Harford, 2005; Ahern and Harford, 2014).

Previous empirical studies support the view that, on average, horizontal mergers generate productive efficiency gains. A strand of literature examines the average abnormal returns on merging firms and related firms on the supply chain and conclude that market power is unlikely to be the predominant reason driving horizontal mergers (e.g., Eckbo, 1983; Stillman, 1983; Eckbo and Wier, 1985; Eckbo, 1992; Fee and Thomas, 2004; Shahrur, 2005). Several other studies investigate what the possible sources of productive efficiency are. Using plant-level data, Li (2013) shows that acquirers increase the productivity of their target firms through more efficient use of capital and labor. Maksimovic et al. (2011) find that acquirers selectively retain the plants acquired and restructure target companies to exploit their comparative advantage and increase productivity. Several recent studies also find product differentiation and corporate innovation to be sources of synergy (e.g., Hoberg and Phillips, 2010; Bena and Li, 2014). Devos et al. (2009) use cash flow forecasts from the Value Line Investment Survey to decompose the sources of merger gains and find that the bulk of gains are from operating synergies and a small portion from tax savings. Apart from these cross-sectional large-sample studies, some industry-specific studies (e.g., Erel, 2011, on the deregulated banking industry; Becher et al., 2012, on electric utilities) also support the view that horizontal mergers on average improve productive efficiency.

2.3. Evidence of market power

Since market power refers to a company's ability to set product prices above the competitive level, a direct way to detect market power would be to examine the impact of horizontal mergers on product prices. Data on product prices, however, are barely obtainable. Examining product prices also has several weaknesses (Eckbo, 1983, p 242). Most large-sample studies of horizontal mergers, therefore, follow the stock-market-based approach of Eckbo (1983) and Stillman (1983). Eckbo (1983) postulates that a convenient approach to studying merger motives is to measure the wealth effect of a merger on the merging firms and their related firms, at different announcement dates related to the deal. Eckbo (1983) lists several advantages of this stock-market-based approach. First, product prices may not capture merger-induced effects in non-price competition (e.g., quality or service improvements), missing the full effects of a merger. In contrast, changes in stock prices in an efficient market reflect the overall price effects on firms. Second, stock prices react to merger announcements more quickly than do product prices, reducing confounding effects from subsequent non-merger events. Third, the availability of stock price data makes large-sample studies possible, unrestricted to specific cases or industries. Finally, as productive efficiency and market power have contrasting wealth effects on related firms (especially on customer firms as we mentioned earlier) and we can distinguish between efficiency and market-power effects by examining related firms' abnormal returns.

Eckbo (1983) and Stillman (1983) examine the abnormal returns on merging firms and their industry rivals at the merger deal announcement and the subsequent announcement of an antitrust challenge. They find no evidence supporting the presence of market power, based on which the authors question the validity of antitrust intervention. Specifically, Eckbo (1983) shows that an antitrust-challenge announcement does not reduce the share prices of rivals; and Stillman (1983) reports that, in nine out of eleven challenged horizontal mergers, rivals have significant abnormal returns at neither deal announcement not the antitrust challenge

announcement. Several other studies based on average industry rivals' reactions also report no evidence of market power (Eckbo, 1985, 1992; Eckbo and Wier, 1985; Song and Walkling, 2000). Fee and Thomas (2004) and Shahrur (2005) extend Eckbo (1983) and Stillman's (1983) framework and study the market reactions of related firms on the supply chain. Fee and Thomas (2004) find that rivals do not experience negative abnormal returns at antitrust challenge announcements and customer companies experience insignificant abnormal returns at the merger announcement, suggesting market power is not a primary source of merger gains. Shahrur (2005) finds that rivals, customers, and suppliers on average all gain at merger announcement if the combined average abnormal returns on merging firms are positive, suggesting the absence of market power.

2.4. Hypotheses

While previous studies advocate the absence of evidence for market power, their conclusions are based largely on average abnormal returns, which only reflect the net price effect. Since we emphasize the distribution of productive efficiency gains between the merging firms and their corporate customers, we examine the wealth transfer effect measured by the relation between abnormal returns on reliant corporate customers (*Reliant customer CAR*) and those on merging firms (*Combined CAR*). When market competition is imperfect, the merging firms can expropriate surplus from customers by using their market power to set product prices above the competitive level.

Figure 1 illustrates the mechanism we consider. The figure shows the industry product demand curve on a plot of price and quantity, both before and post a merger. Pre-merger, without loss of generality, we assume perfect competition in the industry. The price *P* equals the marginal cost *MC.* Customers enjoy the full consumer surplus which equals the area

below the demand curve and above the horizontal price line.[9,10] We assume that a merger in the industry generates productive efficiency gains and causes the marginal cost falling to *MC'*. The merger, however, also results in some market power so that the new industry product price *P'* is now above the new marginal cost and below the pre-merger price. The outcome is the combination of 1) an overall increase in the surplus to customers equal to the area *P*AB*P'*, 2) a transfer of consumer surplus to producer surplus which equals to the area *P'*BC*MC'*, and 3) a deadweight loss which equals to the area BDC. In this setting, the higher the post-merger price is the higher is the magnitude of wealth transfer from customers to producers. The gains to customers (i.e., *P*AB*P'*) does not mean they capture the full consumer surplus generated by the merger. Thus, we have our first hypothesis below,

H1: *Reliant customer CAR is negatively related to Combined CAR of merging firms.*

The degree of market power influences the strength of the wealth transfer effect. Previous studies suggest several factors that determine the severity of market power. The first is industrial concentration. Oligopoly models originating with Cournot ([1838] 1927) and Nash (1950) imply that greater industry concentration leads to greater market power. Stigler (1964) also maintains that it is easier for companies to collude for market power in a more concentrated industry because it is easier for firms to monitor and discipline each other. The second factor is foreign competition. Katics and Petersen (1994) find that greater import competition reduces the price-cost margins in concentrated industries. Mitchell and Mulherin (1996) show that enhanced import pressure prompts domestic firms to merge to improve efficiency, leading to industry merger waves. Shahrur (2005) finds that foreign competition

[9] A further simplification in the figure is that the marginal cost curve is horizontal so that in perfect competition there is no producer surplus. Without affecting the analysis of the consumer surplus, the marginal cost curve could be upward sloping, resulting in a producer surplus equal to the area between the price line and the marginal cost curve.

[10] Figure 1 only needs slight revision to allow market power to exist before merger announcement. Pre-existing market power can impact allocative efficiency too.

reduces the gains to merging firms in concentrated industries. These findings suggest that foreign competition constrains market power and domestic firms in industries with weak foreign competition are more likely to have market power. In contrast, firms operating in industries with intense foreign competition are more likely to merge to increase productive efficiency and they are more likely to pass productive efficiency gains to corporate customers. The third factor is antitrust intensity and legal environment. Ghosal (2011) finds Democrats initiated more civil cases than the Republicans after the antitrust regime shift of U.S. antitrust enforcement in the mid and late 1970s. Antitrust challenges against mergers are more likely to lead to civil lawsuits than criminal convictions.[11]

Therefore, we have the following additional hypotheses.

H2: *The negative relation between Reliant customer CAR and Combined CAR is more pronounced for deals announced in more concentrated industries.*

H3: *The negative relation between Reliant customer CAR and Combined CAR is more pronounced for deals announced in industries with weaker foreign competition.*

H4: *The negative relation between Reliant customer CAR and Combined CAR is more pronounced for deals announced under Republican than under Democratic administrations.*

3. Methodology

3.1. The baseline model

We test the hypothesized wealth transfer effect by estimating the following baseline model, first using OLS then using instrumented GMM,

$$Reliant\,customer\,CAR_j = \beta_0 + \beta_1 Combined\,CAR_j + \beta_2 X_j + \mu_j, \quad (1)$$

[11] Violations that are more likely to lead to criminal convictions include price-fixing, bid-rigging, market-allocation schemes; in contrast, civil court cases relate to mergers, exclusive contracts, tying agreements, bundling, vertical restraints (Ghosal, 2011).

where *j* indexes deals, *Reliant customer CAR* and *Combined CAR* are the abnormal returns to reliant corporate customers and the merging firms respectively, and *X* is a vector of control variables. The vector *X* includes characteristics of both the merging industry and the bid, namely foreign competition in the merging industry (*Foreign competition*) and the merging industry's concentration structure measured by the sales-based Herfindahl–Hirschman Index (*HHI of merging ind.*), the merger-induced change in industry concentration (Δ*HHI of merging ind*), bidder size (Ln *Bidder size*), bidder profitability (*Bidder profitability*), bidder growth prospects (*Bidder P/E*), and whether the deal surprises the market (*Surprise deal dummy*); reliant customer industry characteristics, namely, the reliant customer industry's concentration structure (*Reliant customer concentration*), input purchase dependence level (*Reliant customer dependence*), and the logarithm of relative firm size (Ln *Relative customer size*); and an antitrust legal environment dummy that equals one if the merger is in Republican administration years and zero in Democratic administration years (*Republican administration*). Appendix A defines all the variables in detail.

We control for these variables because they supposedly affect the wealth effect of reliant corporate customers according to previous literature (e.g., Shahrur, 2005). Foreign competition increases supply elasticity and motivates domestic firms to reallocate resources to improving productive efficiency rather than to maintaining market power (Bernard et al., 2006; Tybout, 2003). Industry concentration may relate to the extent to which firms in an industry can achieve efficiency (Demsetz, 1973) or anticompetitive rents (Stigler, 1964). A horizontal merger's influence on downstream firms may depend on the merging industry's external and internal competitive environment. Therefore, we control for *Foreign competition*, *HHI of merging ind*, and Δ*HHI of merging ind* to address this concern. Bidder size and growth opportunities influence merging firms' ability to expropriate or benefit downstream firms. Therefore, we include Ln *Bidder size*, *Bidder profitability*, and *Bidder*

P/E. Cai, Song, and Walkling (2011) find that the response of related firms to merger announcements depends on the extent to which the market anticipates a deal. To address this concern, we include a *Surprise deal dummy*, which indicates if the announcement of a proposed deal is largely anticipated due to pre-merger information leakage, rumors, previous bids, or any consolidation signal in the merging industry. Also, certain reliant customer industry characteristics, such as industry concentration, procurement dependence on the merging industry, and firm size relative to the bidder, are associated with the ability of the reliant customer industry to protect itself by counteracting expropriation. We include *Reliant customer concentration*, *Reliant customer dependence*, and the logarithm of *Relative customer size* to control for these effects. Lastly, antitrust intensity and legal environment differ across Republican and Democratic administrations (Ghosal, 2011), which may affect customers' expectations of the likelihood of antitrust intervention in a proposed deal. We add the control variable *Republican administration* to address this concern.

The key explanatory variable in Equation (1), *Combined CAR*, may be endogenous due to omitted variables or simultaneity as we explained in the introduction. OLS estimation, therefore, may be inconsistent. To address this issue, we instrument *Combined CAR* using three instruments, namely excess cash reserves, means of payment, and hostile takeover, all industry-adjusted. Previous literature suggests these three variables affect the *Combined CAR* directly. No study we are aware of suggests they have any immediate effect on the *Reliant customer CAR*. Excess cash reserves proxy for either agency costs or valuable financial slack, which correlate with the wealth effect of merger deals (Jensen, 1986; Harford, 1999; Keynes, 1936; Gao and Mohamed, 2018). Following Opler et al. (1999), we estimate *Excess cash reserve ratio* as the residual from of a regression of the actual cash reserve on a set of determinants of cash reserve, which include macroeconomic and supply chain conditions. Stock offers indicate the extent to which bidder shares are overvaluation (Travlos, 1987;

Shleifer and Vishny, 2003; Rhodes-Kropf et al., 2005), or the degree of business complementarity and information asymmetry between the merging firms (Eckbo et al., 2018), which influences the announcement wealth effects to the merging firms. To avoid any influence of industry trends, we adjust the percentage of stock consideration for a merger transaction by the median stock percentage of all mergers in the merging industry in the year before deal announcement (*Ind-adjusted stock payment*). Hostile takeovers are often proposed to remove inefficient target management (Morck et al., 1988; Shivdasani, 1993; Schwert, 2000) and, therefore, relate to the potential merger gains to merging firms. To ensure our deal attitude instrument (*Hostile takeover dummy*) does not pick up information related to hostile takeover waves, we adjust it by identifying hostile deals in years of extremely high hostile deal intensity. In particular, we define *Hostile takeover dummy* as being equal to one if a merger is hostile and does not occur in a year with a hostile deal percentage more than two standard deviations above the sample mean and zero otherwise. Therefore, all these instruments are firm-specific and purged of broader economic conditions that potentially impact upstream and downstream at the same time.[12] The baseline IV model is,

$$Combined\,CAR_j = \pi_0 + \pi_1 X_j + \pi_2 Z_j + v_j \quad (2)$$

$$Reliant\ customer\ CAR_j = \beta_0 + \beta_1 Combined\ CAR_j^* + \beta_2 X_j + \varepsilon_j \quad (3)$$

where *Z* is the vector of instruments, and *Combined CAR** is the fitted value of *Combined CAR* from Equation (2). We use GMM estimation in the second stage since it generates efficient estimates in the presence of heteroskedasticity of unknown form (Newey and McFadden, 1994; Baum et al., 2003).

[12] We do not include, in the first stage, any instrument that relates to market power directly. Such a variable would not satisfy the exclusion criterion, because it may have a downstream impact through the rival firms of merging firms. Some of the impact of our instruments on *Combined CAR*, however, is driven by investors' concern about market power. When investors in customer firms try to infer wealth implications from *Combined CAR*, they cannot distinguish the sources of gains. They take a Bayesian approach and attribute a proportion of the *Combined CAR* to market power.

3.2. Market-power domains

To investigate whether the relation between *Combined CAR* and *Reliant customer CAR* varies according to the degree of market power, we split the sample into deals in market-power domains and deals in non-market-power domains, and repeat the baseline test (i.e., Equations (2) and (3)) for these subsamples. The market-power (non-market-power) domain refers to the horizontal mergers announced in industries with high (low) concentration, in industries with low (high) foreign competition, and those deals announced in Republican (Democratic) administration years. We form the high versus low concentration industry subsamples according to the *1992 DOJ/FTC Horizontal Merger Guidelines* classification. We also form the low versus high foreign competition subsamples based on the sample median foreign competition level of merging industries (more details in the next Section). We expect distributive efficiency to be more severe in the market-power domain.

4. Data and sample

We extract all proposed mergers and acquisitions (completed and withdrawn) from the Securities Data Corporation (SDC) Mergers and Acquisitions (M&A) database and apply the following screening criteria. First, we follow the previous literature and require a deal to be one of the major types of acquisitions, namely mergers or acquisitions of majority interests as defined by the SDC.[13] Second, both the bidder and the target are publicly listed firms and have data available from the Centre for Research in Security Prices (CRSP), so that we can calculate abnormal returns at the deal announcement. Third, the bidder and target have Compustat data available at both the firm and segment levels, and they have at least one four-digit segment SIC code in common. Using segment four-digit SIC codes to define horizontal mergers is in line with previous research of horizontal mergers (e.g., Fee and Thomas,

[13] According to the SDC, in a merger, there is a 100% combination business between the merging firms; in an acquisition of majority interest, the acquirer owns less than 50% of the target before the transaction and more than 50% after the transaction.

2004).[14] Fourth, we exclude horizontal deals in financial and regulated industries (Compustat Segment SIC codes 6000–6999, 4000–4099, 4500–4599, and 4800–4999). Fifth, we require the deal value to be no less than $10 million to ensure its impact on market price is significant. These criteria are largely consistent with Fee and Thomas (2004) and Shahrur (2005). Since the information from the SDC is less reliable before 1984 (Chen et al., 2007), we restrict our sample to the period beginning on January 1, 1985, and ending on December 31, 2008.[15]

The above procedure identifies a sample of 819 horizontal mergers. Next, we retrieve data from the Bureau of Economic Analysis (BEA) Input-Output (IO) accounts to identify reliant customer industries and retrieve stock return data to calculate reliant customer portfolio *CARs* for each horizontal merger. This step reduces the sample size to 594. We further require data from the BEA Use table to calculate import ratios for each merging industry, reducing the sample to 559. Lastly, we require data to be available to calculate a bidder's excess cash reserve following Opler et al. (1999), and to calculate the industry-median percentage of stock consideration of all horizontal mergers in each merging industry in the year before a deal announcement. This requirement reduces our final sample to 422. We use the 422 horizontal deals for our baseline analysis. Table 1 reports the year distribution of our sample mergers and the relative sizes of bidders and targets. Panel A shows considerable variation in the annual frequency: the lowest frequency occurred in year 1993 with 11 deals and the highest frequency occurred in year 2005 and 2006 with 24 deals

[14] If a bidder and a target have more than one business segment in common, each pair of overlapping segments defines a horizontal merger deal, because each merging business segment has a distinct group of reliant customer firms. Using segment-level SIC codes to define horizontal mergers is more accurate than using firm SIC codes.

[15] Constructing the variable *Ind-adjusted stock payment* requires us to adjust the stock consideration of a deal by the industry median of all horizontal mergers in a merging industry estimated in the year before the deal announcement. As we retrieve stock consideration data from the SDC, setting the sample period to begin in 1985 (rather than 1984) ensures we can use the 1984 median to adjust observations in 1985.

each. The average ratio of target market value of equity to bidder market value of equity is 36%, which is lower than 45% reported by Fee and Thomas (2004) but not by far. The average market value of equity is $10,286 million for bidders and $953 million for targets. In panel B we allocate the deals into Fama and French (1997) industries. The three Fama–French industries with the most mergers are business services, retail, and electronic equipment. Mergers in these three industries account for 62% of our sample. Panel C reports on the deal characteristics. There are about 7% of our sample deals that are challenged by the Department of Justice (DOJ) and the Federal Trade Commission (FTC), which is close to the proportion of 7.04% that Fee and Thomas (2004) report. To decide whether a deal is challenged or not, we manually check the "Annual Report to Congress Pursuant to Subsection (j) of the Clayton Act Hart-Scott-Rodino Antitrust Improvements Act of 1976" issued by the Department of Justice (DOJ) and the Federal Trade Commission (FTC). These reports were issued in successive years from 1985 (the 9th report) to 2009 (the 32nd report). We include the 2009 annual report because the DOJ and FTC sometimes document their investigation outcomes in the year following the deal announcement.[16] There are 353 deals (84%) that are eventually completed. About 64% of the deals use stock to finance the transaction. About 4% of the sample deals are hostile. In nearly 6% of the deals, bidders have toeholds in targets before the deal announcement, and the average toeholds in the targets is 16% (not tabulated) across these targets. In 2% of our sample deals, merging firms have more than one overlapping segments (not tabulated). If we define a horizontal merger based on the overlap of the largest segments of the bidder and target respectively, our results remain qualitatively the same.

[16] There are 24 reports covering the 25-year period, 1985–2009. The 10th annual report covers 1986–1987. These reports are available on the FTC website, www.ftc.gov.

In Appendix B, we provided the details on how we identify corporate customers (B.1), measure firms announcement-period abnormal returns, measure foreign competition and industry concentration (i.e., the two market-power domain measures), and estimate the excess cash reserve (i.e., one of the instrumental variables). We do not explain these here for the sake of brevity.

5. Empirical results

5.1. Univariate analysis

Table 2 reports the *CAR (−1, 1)* of the merging firms and their reliant customers (value-weighted).[17] Bidders have a significantly negative *CAR* of −2.285%, while targets have a significantly positive *CAR* of 22.244%. *Combined CAR* is significantly positive at 1.754%. These findings are close to the three-day *CAR* that Fee and Thomas (2004) report for their horizontal merger sample from 1981 to 1997. Reliant customer firms on average have a *CAR* of −0.207% which is insignificant at conventional levels (*p*-value = −0.99). These results suggest that although combined firms have positive synergies, reliant customers on average do not benefit from mergers. We further find that the *Combined CAR* is higher in more concentrated industries. For example, *Combined CAR* is 2.988% and statistically significant at 1% for the high industry concentration subsample but is only 1.067% and significant at 5% for the low industry concentration subsample, with a significant (at the 5% level) difference between these two subsamples. There is no significant difference in *Reliant customer CAR*, however, between the industries with high and low concentration. These results further indicate that merging firms retain more merger gains in more concentrated industries where market power is more likely to be present. However, differences in *Combined CAR* and in *Reliant customer CAR* are indistinguishable from zero between the domains of high and low

[17] We obtain similar results using an equal-weighted *Reliant customer CAR* and using a five-day window, *CAR* (−2, 2), to measure the announcement wealth effect. These results are not tabulated for the sake of brevity but are available upon request.

foreign competition or of Republican and Democratic administrations based on the univariate tests.

5.2. Baseline analysis

The presence of market power implies a negative relation between *Combined CAR* and *Reliant customer CAR*. In this section, we use multivariate regressions to test this hypothesized relation. Table 3 presents the summary statistics of the independent variables in our multivariate analysis. Before estimating the regressions, we winsorize all variables at the 1st and 99th percentiles to avoid any bias caused by outliers.

We estimate our baseline model, Equation (1), using both OLS and GMM–IV regressions. For each baseline model, we estimate two specifications. The first regresses *Reliant customer CAR* (value-weighted) on *Combined CAR* and control variables, adding industry effects, and the second further adds year effects while omitting *Republican administration* since it does not vary within years. To facilitate comparison, we report OLS results in models (1) and (2) in panel A of Table 4, and the second-stage GMM–IV results in models (3) and (4); panel B reports the first-stage estimates of the GMM–IV regression; and panel C reports the diagnostics relating to the appropriateness of the GMM–IV procedure.

In panel A, the coefficient on *Combined CAR* is positive in both OLS models, but statistically insignificant. This result is similar to that of Shahrur (2005).[18] This result suggests no significant wealth transfer between merging firms and reliant customers. When we turn to the GMM-IV specification, however, we find the coefficient on the *Combined CAR* is negative and significant at 5% in both models (3) (with industry effects) and model (4) (with industry and year effects). In particular, the coefficient on *Combined CAR* in model (3) (model 4) is −0.408 (−0.329), suggesting that 40.8% (32.9%) of the increase in *Combined*

[18] Shahrur (2005) uses weighted least squares and includes *Combined Wealth Effect* (equivalent to our *Combined CAR*) as a control variable. He reports an insignificant coefficient of 0.00 on *Combined Wealth Effect* in his table 8, model (2).

CAR is due to a net wealth transfer from reliant customers to merging firms. The GMM-IV estimates provide clear evidence of wealth transfer to the merging firms from their reliant customers, demonstrating the presence of market power.

We perform several additional tests to ensure the robustness of our results. First, we replace value-weighted *Reliant customer CAR* with an equal-weighted *Reliant customer CAR* and find our results are unchanged. This finding indicates that wealth transfer is not just from large reliant customer firms but also small ones. Second, repeating our tests with the subsample of unchallenged horizontal mergers or the subsample of completed deals does not change our conclusion. This robustness check addresses the concern that the average wealth transfer effects might be due to a small percentage of deals that antitrust regulators eventually curbed. It is also consistent with the implication of Gao et al. (2017) that antitrust enforcement does not always aim at eradicating market power. For brevity, we do not tabulate the results of these robustness checks, but they are available upon request.

The first-stage results of the GMM estimation in panel B report the determinants of *Combined CAR*. Model (3) controls for industry effects and model (4) further controls for year effects and drops *Republican administration*. The negative coefficient on Ln *Bidder size* (significant at 5%) is in line with the size effect in acquisition announcement returns (Moeller, Schlingemann, and Stulz, 2004). The instruments, *Ind-adjusted stock payment* is significantly associated with *Combined CAR* in both models. The negative coefficients on *Ind-adjusted stock payment* reflect the market reaction to an assortment of signals conveyed by stock offers. Although the coefficients on *Excess cash reserve ratio* and *Hostile takeover* are not significant at the conventional levels in models (3) and (4), an unreported Wald test suggests that these three instruments are jointly significant in both specifications.

Following Larcker and Rusticus (2010), we examine the validity of our instruments and report test results for instrument validity, endogeneity, and instrument strength in panel C.

Sargan-Hansen's *J*-test of over-identifying restrictions yields *p*-values of 0.85 and 0.78 in models (3) and (4), implying that we cannot reject the null hypothesis that our instruments are correctly excluded from the second-stage regressions. Based on the endogeneity tests, we reject the null that the *Combined CAR* is exogenous in both models. The under-identification test further confirms that the excluded instruments correlate significantly with *Combined CAR* in both specifications. We also follow Baum et al. (2007) and use the *Kleibergen-Paap rk Wald F-statistic* to test for weak identification of the model. This statistic exceeds the critical value of 20% maximal IV relative bias in model (4) (Staiger and Stock, 1997). Although the *Kleibergen-Paap rk Wald F-statistic* does not exceed the critical value of 30% maximal IV relative bias in model (3), which might raise concerns over the presence of weak instruments, we apply the Anderson-Rubin (1949) test, which is robust in the presence of weak identification (Baum et al., 2007). This test rejects the null that the endogenous variables are insignificant jointly and the orthogonality conditions are valid, indicating that we can still trust the inferences from the GMM-IV estimation in the presence of weak identification. Overall, these results suggest that the selected instruments are excluded correctly from the second-stage regression and that the consistency of GMM–IV estimates is preserved in the presence of overidentification and weak instruments.

A remaining concern is that macroeconomic conditions or industry trends may be the causes of the wealth effect on reliant corporate customers even in the absence of mergers in the upstream industry. To address such a concern, we construct a pseudo-sample where, for each horizontal merger in our sample, we generate a random event date between 1985 and the actual deal announcement date, assuming a uniform distribution.[19] Then we use this pseudo-sample to repeat our cross-sectional GMM-IV regressions specified in Equations (2) and (3).

[19] We generate an alternative pseudo-sample using a random event-date between 1985 and 2008 and conduct the pseudo test. The results remain intact.

We calculate the abnormal returns on the merging firms and their reliant customers, as well as all other variables, based on the randomly generated event dates. If the wealth transfer effect between the merging firms and their reliant customers is due to macroeconomic conditions or industry trends, the coefficient on the pseudo-sample *Combined CAR* would be negative. We report the estimates using this pseudo-sample in models (5) and (6) of panel A. The coefficient on *Combined CAR* is insignificant in both models. This pseudo-sample result further strengthens our conclusion that the wealth transfer effect is specific to the proposed horizontal mergers.

5.3. The heterogeneous wealth-transfer effect across industry concentration, foreign competition, and partisanship

In this section, we report our subsample analysis of the wealth-transfer effect across the levels of industry concentration, foreign competition intensity, or partisanship. Specifically, we estimate Equations (2) and (3) on those subsamples in a market-power domain (i.e., high industry concentration, low foreign competition, and Republican administration) and those in a non-market power domain. Hypotheses 2–4 predict that the wealth transfer effect is more pronounced in market-power domains. Table 5 reports the subsample results for horizontal mergers in concentrated and unconcentrated industries. Models (1) and (2) report the GMM–IV estimates for high-concentration industries, while models (5) and (6) report those for low-concentration industries. Models (1) and (5) control for industry effects, and models (2) and (6) further include year effects and drop *Republican administration.*

Both Models (1) and (2) have a significantly negative coefficient on *Combined CAR* in high-concentration industries and models (5) and (6) each has a coefficient that is insignificant at conventional levels on *Combined CAR* in low-concentration industries. For example, in model (2), the coefficient on *Combined CAR* is −0.259 (significant at 5%), suggesting that, for horizontal mergers in highly concentrated industries, merging firms gain

at the expense of reliant customers—as much as 25.9% of the increase in *Combined CAR* is due to a net wealth transfer from corporate customers to merging firms. In model (6), the coefficient on *Combined CAR* is insignificant, indicating that for horizontal mergers in low-concentration industries, the wealth-transfer effect is absent. In an untabulated analysis, we find the negative coefficient on *Combined CAR* is not sensitive to the change in the merging industry's concentration (i.e., ΔHHI) either, which suggests that merger-induced market power is not as relevant to distributive inefficiency as the pre-existing market power.

Table 6 reports the subsample results for the horizontal mergers announced in industries with low and high foreign competition. We conduct a set of subsample tests similar to those reported in table 5. Models (1) and (2) report the results for the mergers in industries with low foreign competition (in the market-power domain), while models (5) and (6) report results for the deals in industries with high foreign competition. Both models (1) and (2) produces a significantly negative coefficient on *Combined CAR*, indicating that with little foreign competition, the wealth transfer effect is strong and significant. For example, the coefficient on *Combined CAR* is −0.424 (significant at 1%) in model (2), indicating that 42.4% of the increase in the *Combined CAR* comes from a net wealth transfer from corporate customers. This result demonstrates that the industries facing minimal foreign-competition pressure have a substantial wealth transfer effect for horizontal mergers. In model (6), the coefficient on *Combined CAR* is statistically insignificant and economically weak (–0.059), indicating that the wealth transfer effect is almost absent under intensive foreign competition. Altogether, these results suggest that absent foreign competition, merging firms can use their market power to retain efficiency gains that could have benefited customers. In contrast, strong foreign competition significantly constrains market power and forces the merging firms to pass merger efficiency gains to the downstream industries, which benefits customers. Our

findings highlight the importance of free trade in pre-empting social welfare losses due to anti-competitive activities.

In Table 7, we examine how the antitrust intensity and legal environment under Republican or Democratic administrations moderate the wealth transfer effect. Ghosal (2011) suggests that Democratic administrations are more likely to challenge the market power of merging firms, which, we hypothesize, will weaken the wealth transfer effect. We conduct a set of subsample tests similar to those in tables 5 and 6. We drop the variable *Republican administration* in all models because it does not vary with the subsamples classified according to the partisan administrations. Models (1) – (2) and models (5) – (6), estimate the GMM–IV model for the subsamples under the Republican and Democratic administrations respectively, controlling for industry effects or industry and year effects. The coefficient on *Combined CAR* is significantly negative in models (1) and (2). For example, in model (2), the coefficient on *Combined CAR* is −0.265, indicating that, when Republicans are in power, 26.5% of the increase in *Combined CAR* derives from a net wealth transfer from corporate customers to merging firms. In contrast, the coefficient on *Combined CAR* is insignificant in models (5) and (6), suggesting that the wealth transfer effect is absent under the Democratic administrations. These results imply that antitrust regulation and enforcement under Democratic administrations force merging firms to pass more merger gains to their customer firms.

To rule out the possibility that the wealth transfer effect reported in tables 5–7 is due to factors unrelated to mergers, such as macroeconomic or industry factors, we conduct pseudo-subsample tests similar to those we report in table 4. We report the pseudo-sample results in models (3) and (4) for the market-power domain and models (7) and (8) for the nonmarket-power domain in all three tables. Models (3) and (7) control for industry effects, and models (4) and (8) control for industry and year effects. The coefficient on *Combined CAR* is

insignificant for all pseudo subsamples. This battery of falsification tests confirms that the wealth transfer effect in these three market-power domains is due to merger transactions rather than to broader economic and industry-wide factors.

For brevity, we do not report in detail the results of the first-stage regressions and the relevant endogeneity and instrument quality tests (available upon request). We have two observations, however. First, the endogeneity test confirms the endogeneity of *Combined CAR* in all the market-power domain subsamples. Second, the three instruments pass the tests for instrument validity and instrument strength in all the market-power domain subsamples.

6. Summary and concluding remarks

The U.S. Congress holds a long-standing view that consumers are entitled to purchase goods at competitive prices without sacrificing other consumer interests, such as optimal product quality (Lande, 1982). The presence of market power deprives consumers of this right. When two companies merge horizontally and generate productive efficiency gains, the competitiveness of the market determines how much of the gains the merging companies will pass on to downstream corporate customers. Market power enables merging companies, maybe in collusion with their industrial peers (Stigler, 1964), to retain productive efficiency gains. The retention of productive efficiency gains in the upstream merging industry essentially leads to a wealth transfer from corporate customers to merging firms which manifest through a negative relation between the abnormal returns on the merging firms and those on the corporate customers. Our findings in this paper support the existence of such a wealth transfer effect. Such an effect is most pronounced in those industries with high concentration or low foreign competition. It is also more obvious under the Republican administrations when the antitrust environment is supposedly lighter. It is our emphasis on the wealth transfer effect and the distributive efficiency that distinguishes the current study from the previous literature which focuses on the average wealth effects.

As we mentioned in the introduction, our findings have important policy implications. Our focus on distributive efficiency differs from the focus of previous studies on productive efficiency. Despite many merger cases potentially enhance productive efficiency, market power prevents consumers from receiving the full increase in consumer surplus. A challenge faced by the antitrust authority is, therefore to strike the optimal balance between productive efficiency and distributive efficiency in regulating horizontal mergers. Moreover, we find the wealth transfer effect to be the strongest when foreign or domestic competition is weak. A concern about reducing global competition is the possible loss of consumer surplus due to enhanced market power in the domestic market.

Appendix A

This appendix defines all variables in detail. All variables are measured at the end of the fiscal year before the merger announcement unless noted otherwise.

Variable	Definition
Bidder CAR	Market model-adjusted return of the bidder firm over a (−1, 1) window centered around the merger announcement day. Day 0 is the announcement day.
Bidder P/E	The ratio of the bidder's share price at the end of the fiscal year before the merger announcement to earnings per share, in decimal.
Bidder profitability	The ratio of the bidder's operating income before depreciation to its total assets.
Combined CAR	Value-weighted abnormal returns of merging firms. Abnormal returns are market-model-adjusted returns in a (−1, 1) window centered around the merger announcement. Day 0 is the announcement day.
Excess cash reserve ratio	The difference between the bidder's actual cash reserve ratio and its required cash reserve ratio. The cash reserve ratio is cash and short-term investments over total assets net of cash and short-term investments. The required cash reserve ratio is estimated following Opler, Pinkowitz, Stulz, and Williamson (1999) using a cross-sectional OLS regression for each of the Fama–French 12 industries each year.
Foreign competition	Measured by the import ratio, i.e., the merging industry's total imports divided by its total domestic supply. Total domestic supply is commodity output adjusted by imports, exports, change in private inventories, and sales of scrap and used goods (Streitwieser, 2010). Raw data for imports and domestic supply construction is from the 1982, 1987, 1992, 1997, and 2002 Use tables of the BEA, available at http://www.bea.gov/industry/io_benchmark.htm.
HHI of merging industry	The sales-based Herfindahl–Hirschman index of the merging four-digit SIC industry, calculated from Compustat.
Δ*HHI of merging industry*	Equals 2 × percentage of bidder sales in the merging sector × percentage of target sales in the merging sector.
Hostile takeover	Equals one if the merger is hostile and does not occur in a year with a hostile deal percentage more than two standard deviations above the sample mean, and zero otherwise.
Ind-adjusted stock payment	Equals the deal's consideration paid in stock reported by the SDC (calculated as value paid in stock divided by total value) minus the median consideration paid in stock of all horizontal mergers in the merging industry in the year before the deal announcement.
Ln *Bidder size*	The logarithm of the bidder's book value of assets in $billions.
Ln *Relative customer size*	The logarithm of the ratio of the average reliant customer's book value of assets in $millions to the bidder's book value of assets in $millions.
Reliant customer CAR	The market model-adjusted portfolio return of reliant corporate customers in a (−1, 1) window centered around a merger announcement. A customer firm is reliant if 1) it operates in the downstream industry with the greatest dependence on the merging industry's product as inputs, across all industries, and 2) it sources more than 1% of its input from the merging industry. The data on purchases from upstream industries are from the 1982, 1987, 1992, 1997, and 2002 Use tables of the BEA, available at http://www.bea.gov/industry/io_benchmark.htm. We apply two weighting schemes, value- and equal-weighted when constructing reliant customer CAR, and report the value-weighted portfolio CAR for main results. We use equal weights as a robustness check.
Reliant customer concentration	The sales-based Herfindahl–Hirschman index of the four-digit SIC customer industry that is most dependent on the merging industry's output among all customer industries, calculated from Compustat segment data.
Reliant customer dependence	The ratio of the dollar amount of the merging industry's output sold to the most reliant customer industry divided by the total output of the customer industry.
Republican administration	Equals one if the merger is announced during Republican administration years, and zero if the merger is in Democratic administration years.
Surprise deal dummy	Equals one if there is no leakage of information or rumors of the horizontal merger and no previous bids in the six months before the merger announcement, and there are no other mergers in the merging industry in the year before the deal announcement, zero otherwise. For each proposed horizontal merger in our sample, we search on Factiva for news of information leakage and rumors for six months before the merger announcement.
Target CAR	Market model-adjusted return of the target firm over a (−1, 1) day window around a merger announcement.

Appendix B

B.1. Identification of corporate customers

Following previous literature (e.g., Fan and Goyal, 2006; Shahrur, 2005), we employ the Use table from the Bureau of Economic Analysis (BEA) Benchmark Input-Output (IO) accounts to identify those firms that operate in the downstream of the merging firms' supply chains. The Use table contains the estimates of the dollar value of an upstream industry's output used by a downstream industry as input, for every pair of industries. Every five years since 1987, BEA issues a new version of the Use table.[20] Consistent with Shahrur (2005), when constructing the customer portfolios, we consider only single-segment firms covered by CRSP and Compustat. There are two benefits to this approach. First, multi-segment customer firms may have segments that are affected by information from industries other than the merging industry. Using single-segment firms enables us to filter the noise added from other industries and preserves the test power. Second, this approach ensures that customer portfolios do not contain any firm with segments operating in the merging industry. Merger announcements may release information about the merging industry and affect any firm that has segments in the merging industry (Song and Walkling, 2000). Had our customer portfolio include any firms that have segments in the merging industry, we would have mixed customer effects with the rival effects.

We follow Shahrur (2005) to define reliant corporate customers and construct the reliant customer portfolios. For each customer industry downstream of a merging industry, we calculate a *Customer input coefficient* (*CIC*) (i.e., the value of the merging industry's output sold to the customer industry divided by the value of the customer industry's total output). Since more input from the merging industry implies that the downstream firms are more affected by upstream consolidation, we define a corporate customer as being reliant if it

[20] The archives are available from http://www.bea.gov/industry/io_benchmark.htm.

operates in the downstream industry with the highest *CIC* across all downstream industries. We require reliant corporate customers to operate in a downstream industry with a *CIC* no less than 1% to remove some downstream industries that have negligible dependence on the merging industry, similar to Shahrur (2005) and Kale and Shahrur (2007). To account for contemporaneous cross-correlation between individual customer returns, we construct a portfolio of reliant customers for each deal. A reliant customer portfolio contains a mean of 21 (a median of 6) firms.

By design, these reliant customers identified using the Use table are potential customers rather than actual. This is similar to Shahrur (2005) but differs from Fee and Thomas (2004), who identify customers using actual product market relationships with the merging firms. As actual customers are not necessarily affected by a merger, if their switching costs are low, we believe that examining the overall reaction from downstream firms that have potential product-market relationships with merging firms captures the downstream effect of horizontal mergers better. More importantly, market power affects all firms in the downstream industries, not only actual customers.

Since the SDC, Compustat, and the Use tables adopt different industry classification systems (i.e., the SDC and Compustat use four-digit SIC codes while the Use table uses six-digit IO codes), we match IO and SIC codes to identify product-market relationships. For 1982, 1987 and 1992 Use tables, following Shahrur (2005), we use the conversion tables of Fan and Lang (2000) to convert IO to SIC codes. We include an industry only if we can unambiguously match its SIC code to a unique IO code. But we allow an IO code to have more than one corresponding SIC code. For the 1997 and 2002 Use tables, since no direct IO–SIC mapping is available, we adopt the conversion strategy of Bhattacharyya and Nain (2011). First, we use the IO–North American Industrial Classification System (NAICS)

conversion tables provided by the BEA to convert IO codes to NAICS codes.[21] Then we use correspondence tables provided by the U.S. Census Bureau to convert NAICS to SIC codes.[22] Finally, we match all 1982, 1987, 1992, 1997, and 2002 Use tables data to the horizontal merger sample using the SIC code of the overlapping segment from the Compustat segment tapes. This gives us the customer firms of the merging industries. Given that product market relations may change over time, we use the 1982, 1987, 1992, 1997 and 2002 Use tables for proposed deals announced during 1985–1986, 1987–1991, 1992–1996, 1997–2001, and 2002–2008 respectively.

B.2. Measuring announcement period abnormal returns

We use the standard event study methodology to estimate the wealth effects on the merging firms and their customer firm. We calculate market-model-adjusted abnormal returns using $AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}$ where R_{it} is firm *i*'s return on day *t*, R_{mt} is the CRSP equal-weighted index return on day *t*, and $\hat{\alpha}$ and $\hat{\beta}$ are parameter estimates. We estimate the market model parameters over 250 trading days starting 300 days before the announcement day (day 0) and require a firm to have at least 100 daily returns available during the estimation period. Following Fee and Thomas (2004), we calculate the *Combined CAR* as the value-weighted cumulative abnormal returns to the acquirer and the target, over a (−1, 1) window surrounding the merger announcement. The weights are the relative bidder

[21] The IO–NAICS concordance for 1997 is available in Table A of the "Benchmark Input-Output Accounts of the United States, 1997", available at http://www.bea.gov/scb/pdf/2002/12December/1202I-OAccounts2.pdf. The IO–NAICS concordance for 2002 is available in Table A of the "U.S. Benchmark Input-Output Accounts, 2002", available at http://www.bea.gov/scb/pdf/2007/10%20October/1007_benchmark_io.pdf. Both concordance tables include an NAICS industry unambiguously matched to a unique IO code, while allowing an IO code to have more than one corresponding NAICS code.

[22] The 1997 and 2002 NAICS–SIC concordance tables are available at http://www.census.gov/eos/www/naics/concordances/concordances.html. We allow multiple matches. For robustness, we also include only industries that have unique IO–NAICS matches and unique NAICS–SIC matches in order to retain a clean matching result for the 1997 and 2002 Use tables. The unique IO–NAICS and NAICS–SIC matching does not qualitatively change our conclusions. However, this restriction substantially reduces the number of up-downstream pairs identified for the 1997 and 2002 tables.

and target pre-merger market values of equity, excluding the value of any pre-merger holdings (i.e., toeholds) in the target by the bidder, as in Bradley et al. (1988).

To measure downstream merger-induced wealth effects, we estimate *Reliant customer CAR* for the portfolio of reliant customer firms for each merger and report the portfolio *CAR*s in univariate analysis (Table 2). We report results based on value-weighted *Reliant customer CAR*, although our results persist when using equal-weighted *Reliant customer CARs* (not tabulated).

B.3. Foreign competition and industry concentration measures

Consistent with Mitchell and Mulherin (1996) and Shahrur (2005), we measure *Foreign competition* as a merging industry's total imports divided by its total domestic supply. We retrieve import data and data required for calculating domestic supply from the BEA Use tables in 1982, 1987, 1992, 1997, and 2002. Following Streitwieser (2010), we calculate domestic supply as the sum of commodity output net of imports, exports, change in private inventories, and sales of scrap and used goods. As the foreign competition environment of industry changes over time, we match import data from the 1982, 1987, 1992, 1997 and 2002 Use tables to horizontal merger deals during 1985–1986, 1987–1991, 1992–1996, 1997–2001, and 2002–2008, respectively. We use the sample median value of *Foreign competition* to classify merging industries into high and low foreign competition industries.[23]

We use the sales-based HHI to measure the concentration of four-digit SIC industries. In the U.S., SFAS No. 14 and SFAS No. 131 require firms to report sales and operating data for each significant business segment that accounts for at least 10% of total revenue, profit, or assets. This segment level information enables us to measure industry concentration more accurately than using firm-level data. We follow the procedure of Li (2010, Appendix B) to

[23] Using imports scaled by the sum of domestic supply and imports as an alternative measure (Giroud and Mueller, 2010; Valta, 2012) leaves our conclusions qualitatively unchanged.

compute industry concentration variables from the Compustat Segments database. For each company, we aggregate its segmental sales based on the segments' primary four-digit SIC code (Item ssic1). We calculate the HHI for the merging industries (*HHI of merging industry*) and their reliant customer industries (*Reliant customer concentration*) using the aggregated segmental sales data. Following Fee and Thomas (2004) and Shahrur (2005), we measure the merger-induced change in industry concentration (Δ*HHI of merging industry*) as 2 × target market share × bidder market share in the year before the merger announcement, where the bidder and target market shares equal their sales in the merging industry divided by the sum of segmental sales in the merging industry of all firms. We use *HHI of merging industry* to separate the merging industries into three groups according to the *1992 DOJ/FTC Horizontal Merger Guidelines* classification. Specifically, we define high concentration industries as "moderately concentrated industries" (*HHI of merging industry* between 0.1 and 0.18) and "concentrated industries" (*HHI of merging industry* greater than 0.18), and define low concentration industries as "unconcentrated industries" (*HHI of merging industry* less than 0.1).[24]

B.4. Excess cash reserve

An important instrumental variable that we use is the bidder's excess cash reserve ratio. Using excess rather than actual cash reserve considers a company's target cash level and is in line with the previous literature (e.g., Opler et al., 1999). In particular, we estimate a firm's required cash reserve ratio using a pooled time-series cross-sectional OLS regression with year dummies and calculate *Excess cash reserve ratio* as the residual from the regression.

[24] The *1992 DOJ/FTC Horizontal Merger Guidelines* use HHI to classify industries, defining "moderately concentrated industries" as industries with HHI between 1000 and 1800, "concentrated industries" as industries with HHI greater than 1800, and "unconcentrated industries" as industries with HHI less than 1000.

The actual cash reserve ratio is the ratio of cash and short-term investment to total assets net of cash and short-term investment.

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Figure 1

Wealth transfers and the deadweight welfare loss

(Discussed in Section 2.4 Hypotheses)

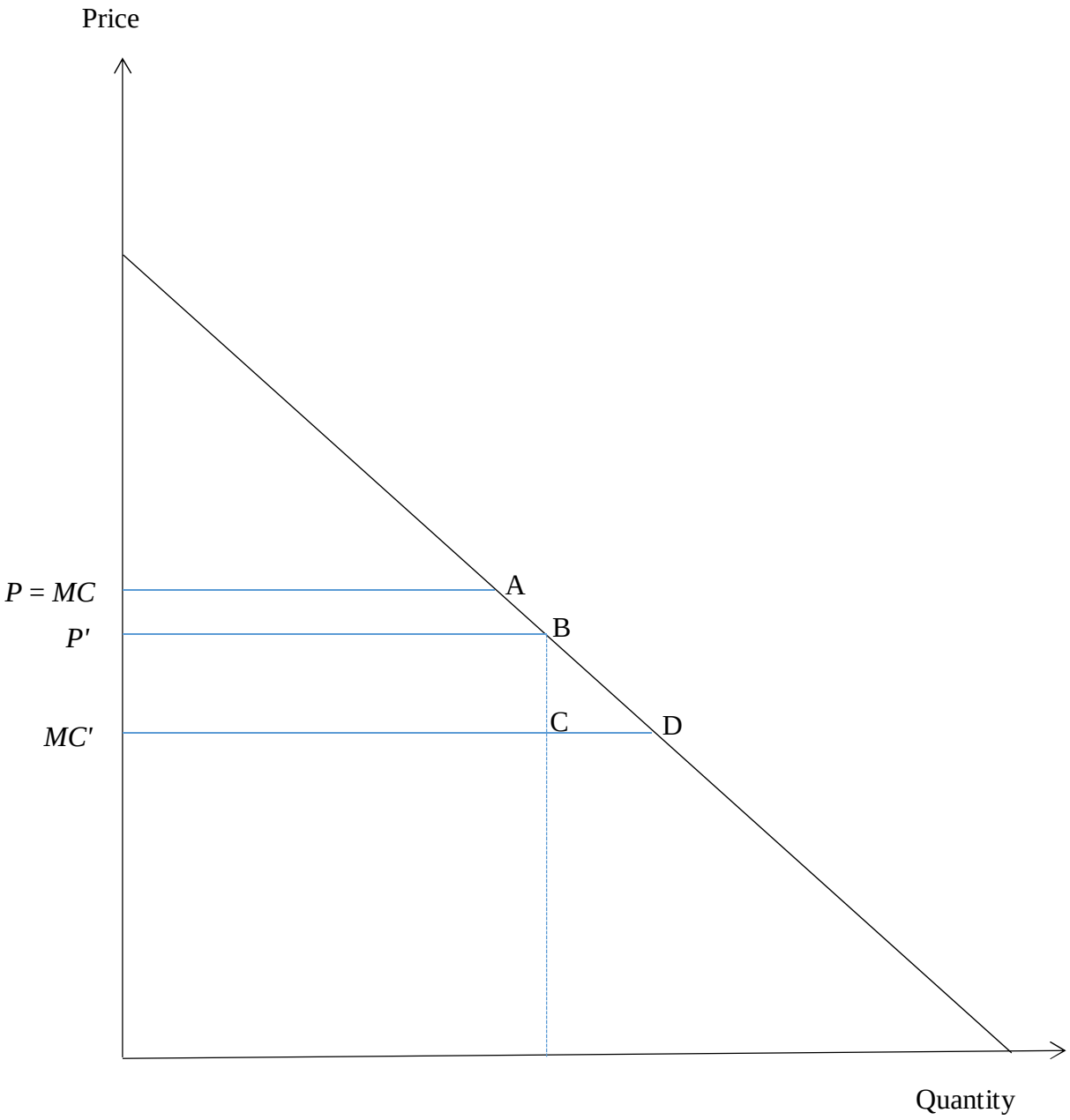

Table 1: Sample description

Distribution of horizontal mergers in nonfinancial and unregulated industries, 1985–2008. A horizontal merger is between two firms with at least one overlapping four-digit SIC business segment. Panel A reports the distribution by year. Panel B reports the distribution by industry. Industries in panel B are defined as in Fama–French (1997). Panel C reports the sample distribution by deal characteristics. We manually check the "Annual Report to Congress Pursuant to Subsection (j) of the Clayton Act Hart-Scott-Rodino Antitrust Improvements Act of 1976" issued by the Department of Justice (DOJ) and the Federal Trade Commission (FTC), to decide whether a proposed merger is challenged. Information regarding deal completion status, type of consideration, deal attitude, and toehold is from the SDC. MVE is the market value of equity.

Year	Deals	Percentage	Average bidder MVE ($ millions)	Average target MVE ($ millions)	Target MVE/ bidder MVE
Panel A: Frequency of deals by year					
1985	13	3.08	16,372.04	455.30	0.42
1986	15	3.55	18,675.60	1864.52	0.36
1987	17	4.03	4,547.83	434.97	0.37
1988	19	4.50	3,595.06	546.13	0.33
1989	18	4.27	12,868.44	1,012.23	0.29
1990	15	3.55	2,097.43	749.61	0.44
1991	20	4.74	9,030.63	648.47	0.40
1992	19	4.50	4,462.42	966.16	0.23
1993	11	2.61	3,223.29	1,280.34	0.58
1994	17	4.03	11,681.03	832.23	0.32
1995	15	3.55	11,186.46	476.18	0.36
1996	15	3.55	17,088.67	616.43	0.32
1997	15	3.55	6,061.89	839.73	0.50
1998	13	3.08	1,854.84	412.24	0.22
1999	21	4.98	2,093.90	418.02	0.38
2000	20	4.74	12,797.28	2,740.58	0.57
2001	23	5.45	4,484.24	444.28	0.26
2002	17	4.03	13,159.52	172.00	0.18
2003	19	4.50	18,413.65	673.40	0.26
2004	14	3.32	22,797.27	1028.68	0.40
2005	24	5.69	9,099.03	2,053.99	0.48
2006	24	5.69	11,057.62	2,143.30	0.34
2007	18	4.27	20,187.19	684.46	0.31
2008	20	4.74	12,373.98	462.43	0.38
All deals	422	100	10,262.28	950.85	0.36
Panel B: Frequency by Fama and French (1997) industries					
Business services	156	36.97	9,185.01	552.41	0.35
Retail	53	12.56	5,141.32	1227.58	0.40
Electronic equipment	51	12.09	15,007.85	893.84	0.39
Pharmaceutical products	48	11.37	27,701.67	2,385.19	0.23
Restaurants, hotels, motels	32	7.58	990.73	473.22	0.53
Other	82	19.43	6,079.81	912.21	0.34
Panel C: Deal characteristics					
Challenged	30	7.11	27,788.46	4,209.35	0.42
Completed	353	83.60	11,667.77	909.71	0.31
Payment including stock	271	64.22	7,744.94	1,225.95	0.46
Hostile	18	4.27	17,866.26	4,817.28	0.48
Toehold	25	5.92	5,070.73	463.74	0.36

Table 2: Announcement abnormal returns to merging firms and reliant customers

This table reports abnormal returns (%) over a three-day (−1, 1) window around merger announcements (day 0) to merging firms and their customers. Mean diff is the difference in mean abnormal returns between the deals in paired subsamples, i.e., deals in high concentration industries (merging-industry *HHI greater* than 1000, including "*moderately concentrated industries*" with *HHI* between 1000 and 1800 *and* "*concentrated industries*" with *HHI* greater than 1800 according to the *1992 DOJ/FTC Horizontal Merger Guidelines* classification), and low concentration industries (merging-industry *HHI* less than 1000, defined as "*unconcentrated industries*" according to the *1992 DOJ/FTC Horizontal Merger Guidelines* classification), deals in low and high foreign competition industries, and deals under Republican and Democratic administrations. The *t*-statistics under Mean diff in parentheses are for a *t*-test of the equality of means. *, **, and *** denote significance at 10%, 5%, and 1%. Appendix A defines all variables.

Firm Portfolio	*Merging Firms*			*Reliant Customers*
	Combined CAR	*Bidder CAR*	*Target CAR*	*Reliant customer CAR*
Overall Sample				
Mean (%)	1.754***	−2.285***	22.244***	−0.207
(*t*-stat)	(4.60)	(−5.95)	(17.15)	(−0.99)
N	422	422	422	422
High concentration industries				
Mean (%)	2.988***	−1.373**	24.106***	−0.202
(*t*-stat)	(4.47)	(−2.06)	(10.33)	(−0.61)
N	151	151	151	151
Low concentration industries				
Mean (%)	1.067**	−2.793***	21.206***	−0.209
(*t*-stat)	(2.32)	(−5.98)	(13.72)	(−0.78)
N	271	271	271	271
Mean diff (%)	−1.922**	−1.421*	−2.900	−0.007
(*t*-stat)	(−2.43)	(−1.78)	(−1.07)	(−0.02)
Low foreign competition industries				
Mean (%)	1.879***	−1.919***	21.758***	−0.134
(*t*-stat)	(3.70)	(−3.84)	(12.35)	(−0.48)
N	245	245	245	245
High foreign competition industries				
Mean (%)	1.581***	−2.790***	22.916***	−0.307
(*t*-stat)	(2.73)	(−4.65)	(12.02)	(−0.98)
N	177	177	177	177
Mean diff (%)	−0.298	−0.871	1.158	−0.173
(*t*-stat)	(−0.38)	(−1.12)	(0.44)	(−0.41)
Republican administration				
Mean (%)	1.557***	−2.504***	22.770***	−0.292
(*t*-stat)	(3.39)	(−5.60)	(14.09)	(−1.15)
N	295	295	295	295
Democratic administration				
Mean (%)	2.212***	−1.775**	21.021***	−0.007
(*t*-stat)	(3.22)	(−2.39)	(9.90)	(−0.02)
N	127	127	127	127
Mean diff (%)	0.655	0.730	−1.749	0.285
(*t*-stat)	(0.79)	(0.87)	(−0.62)	(0.63)

Table 3: Descriptive statistics

Summary statistics of the independent variables. Appendix A defines all variables in detail.

Variable	Mean	Median	Std. Dev.	Obs.
Foreign competition	0.085	0.002	0.121	422
Ln *Bidder size*	0.259	0.221	2.049	422
Bidder profitability	0.124	0.134	0.142	422
Bidder P/E	20.035	17.727	90.069	422
Surprise deal dummy	0.284	0.000	0.452	422
Reliant customer concentration	0.339	0.200	0.346	422
Reliant customer dependence	0.101	0.098	0.082	422
Ln *relative customer size*	−1.566	−1.571	2.383	422
Republican administration	0.699	1.000	0.459	422
HHI of merging industry	0.107	0.078	0.079	422
Δ*HHI of merging industry*	0.004	0.000	0.018	422
Excess cash reserve ratio	−0.032	−0.038	0.157	422
Ind-adjusted stock payment	−0.239	−0.047	0.435	422
Hostile takeover	0.040	0.000	0.197	422

Table 4: OLS and GMM–IV estimates of baseline specifications

This table reports the results of OLS and GMM–IV regressions of *Reliant customer CAR* on *Combined CAR*. Panel A, models (1) – (2) report OLS estimates, and models (3) and (4) report GMM–IV 2-step feasible efficient GMM estimates for our actual sample. In models (3) and (4), *Reliant customer CAR* is the dependent variable, and *Combined CAR* is endogenous. *Excess cash reserve ratio*, *Ind-adjusted stock payment*, and *Hostile takeover* are instruments. Models (5) and (6) repeat the analysis in models (3) and (4) respectively, using a pseudo-sample of randomly generated event dates between 1985 and 2008. We calculate all the explanatory variables around the random-event dates. Models (1), (3) and (5) control for industry effects, and models (2), (4) and (6) further control for year effects while dropping *Republican administration*. We partial out industry dummies in models (3) and (5), and the industry and year dummies in models (4) and (6) to make the covariance matrix of the remaining orthogonality conditions full rank and enable efficient GMM estimation. Panel B reports the first-stage OLS estimates of regressions of *Combined CAR* in models (3) and (4). Panel C presents the test results of overidentification, endogeneity, instrument validity, and instrument strength in models (3) and (4). Appendix A defines all variables. All variables are winsorized at the 1st and 99th percentiles. *t*-statistics (in parentheses) are based on robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1%.

Panel A: OLS and 2-step feasible efficient GMM estimation

	Dependent Variable: *Reliant customer CAR*					
	OLS (original sample)		GMM-IV (original sample)		GMM-IV (pseudo sample)	
Independent Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Combined CAR	0.027	0.027	−0.408**	−0.329**	0.0228	0.138
	(0.88)	(0.85)	(−2.52)	(−2.46)	(0.61)	(0.52)
Foreign competition	0.127	0.258	0.093	0.225	0.077**	0.076*
	(0.65)	(1.27)	(0.27)	(0.80)	(2.13)	(1.80)
HHI of merging ind	0.038	0.033	0.013	0.009	0.050	0.047
	(0.96)	(0.77)	(0.25)	(0.16)	(1.13)	(1.27)
Δ*HHI of merging ind*	−0.412*	−0.389*	−0.472**	−0.467**	0.777**	0.844**
	(−1.95)	(−1.70)	(−2.37)	(−2.21)	(2.37)	(2.35)
Ln *Bidder size*	−0.003	−0.003	−0.005**	−0.005**	−0.002	−0.003
	(−1.20)	(−1.23)	(−1.99)	(−1.99)	(−0.93)	(−1.30)
Bidder profitability	0.024	0.016	0.047*	0.032	0.012	0.029
	(1.09)	(0.74)	(1.78)	(1.34)	(0.71)	(1.56)
Bidder P/E ($\times 10^{-2}$)	−0.002	−0.003	−0.000	−0.002	−0.001	−0.002
	(−1.04)	(−1.40)	(−0.12)	(−0.83)	(−0.13)	(−0.57)
Surprise deal dummy	0.004	0.004	0.006	0.004	0.024**	0.023*
	(0.64)	(0.71)	(0.91)	(0.73)	(2.47)	(1.90)
Reliant customer concentration	0.006	0.007	0.006	0.007	−0.005	−0.008
	(0.84)	(0.91)	(0.68)	(0.82)	(−0.57)	(−0.96)
Reliant customer dependence	0.054	0.032	−0.024	−0.041	0.030	0.028
	(0.56)	(0.34)	(−0.20)	(−0.39)	(0.62)	(0.55)
Ln *relative customer size*	−0.001	−0.001	−0.002	−0.002	−0.001	−0.002
	(−0.48)	(−0.48)	(−0.72)	(−0.71)	(−0.72)	(−0.99)
Republican administration	−0.001		−0.003		0.001	
	(−0.29)		(−0.45)		(0.25)	
Industry effects	Y	Y	Y	Y	Y	Y
Year effects	N	Y	N	Y	N	Y
Obs.	422	422	422	422	277	277
R^2/Centered R^2	0.14	0.19	−0.56	−0.36	−0.00	0.08

Table 4 (continued)

Panel B: First-stage regression of GMM estimation

	Instrumented variable: *Combined CAR*	
	GMM-IV (original sample)	
Independent Variable	Model (3)	Model (4)
Excess cash reserve ratio	−0.046	−0.048
	(−1.46)	(−1.54)
Ind-adjusted stock payment	−0.028***	−0.033***
	(−2.83)	(−3.32)
Hostile takeover	0.021	0.029*
	(1.11)	(1.68)
Foreign competition	−0.154	−0.177
	(−0.29)	(−0.33)
HHI of merging ind	−0.096	−0.104
	(−0.99)	(−1.08)
Δ*HHI of merging ind*	−0.005	−0.130
	(−0.01)	(−0.30)
Ln *Bidder size*	−0.009**	−0.009**
	(−2.17)	(−2.22)
Bidder profitability	0.027	0.015
	(0.64)	(0.36)
Bidder P/E (×10^{-2})	0.004	0.003
	(1.14)	(0.69)
Surprise deal dummy	0.005	−0.000
	(0.51)	(−0.02)
Reliant customer concentration	−0.003	−0.002
	(−0.33)	(−0.15)
Reliant customer dependence	−0.151	−0.176
	(−1.15)	(−1.44)
Ln *relative customer size*	−0.003	−0.003
	(−0.93)	(−0.90)
Republican administration	−0.007	
	(−0.73)	
Obs.	422	422
R^2	0.21	0.28
Partial R^2	0.04	0.08

Panel C: Tests of endogeneity, instrument validity, and instrument strength for GMM estimation

	GMM-IV (original sample)	
	Model (3)	Model (4)
Overidentification test		
(H0: The instruments are valid, i.e., uncorrelated with the error term, and the excluded instruments are correctly excluded from the estimated equation.)		
Sargan-Hansen's J-statistic	0.33	0.48
[*p-value*]	[0.85]	[0.78]
Endogeneity test		
(H0: The specified endogenous regressors are exogenous.)		
Endogeneity test $\mathcal{X}^2$	11.21***	9.58***
[*p-value*]	[0.00]	[0.00]
Underidentification test		
(H0: The equation is underidentified, i.e., the excluded instruments are not correlated with the endogenous regressors.)		
Kleibergen-Paap rk LM statistic	15.19***	20.12***
[*p-value*]	[0.00]	[0.00]
Weak identification test		
(H0: The equation is weakly identified, i.e., excluded instruments are weakly correlated with the endogenous regressors.)		
Kleibergen-Paap rk Wald F-statistic	4.69	6.53
Stock-Yogo weak ID test critical values	5.39	6.46
(maximal IV relative bias)	(30%)	(20%)
Weak-instrument-robust inference (Tests of joint significance of endogenous regressors B1 in the main equation)		
(H0: B1=0 and orthogonality conditions are valid)		
Anderson-Rubin Wald test *Chi-sq*(3)	10.85**	9.62**
[*p-value*]	[0.01]	[0.02]

Table 5: GMM IV estimates of reliant customer CAR in industries with high and low concentration

This table reports the results of GMM–IV regressions of *Reliant customer CAR* on *Combined CAR*, conditional on industry concentration. Models (1) – (4) report the estimates for deals in high concentration industries, while models (5) – (8) report the estimates for deals in low concentration industries. High concentration industries include "moderately concentrated industries" (HHI between 1000 and 1800) and "concentrated industries" (HHI greater than 1800), and low concentration industries include "unconcentrated industries" (HHI less than 1000). Models (1), (2), (5) and (6) report GMM–IV 2-step feasible efficient GMM estimates for our actual sample. *Reliant customer CAR* is the dependent variable, and *Combined CAR* is endogenous. *Excess cash reserve ratio*, *Ind-adjusted stock payment*, and *Hostile takeover* are instruments. Models (3), (4), (7) and (8) repeat the analysis in models (1), (2), (5) and (6) respectively, using a pseudo-sample of randomly generated event dates between 1985 and 2008. We calculate all the explanatory variables around the random-event dates. Appendix A defines all variables. All the variables are winsorized at the 1st and 99th percentile. *t*-statistics (in parentheses) are based on robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1%.

	Dependent Variable: *Reliant customer CAR*							
	Subsample: deals in industries with a high concentration				Subsample: deals in industries with a low concentration			
	GMM-IV (original sample)		GMM-IV (pseudo sample)		GMM-IV (original sample)		GMM-IV (pseudo sample)	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
Combined CAR	−0.396**	−0.259**	0.422	0.507	−0.233*	−0.173	−0.222	−0.077
	(−2.31)	(−2.47)	(0.85)	(0.76)	(−1.74)	(−1.48)	(−0.51)	(−0.27)
Foreign competition	0.474	0.221	0.036	0.126	0.504***	0.566**	0.093	0.140*
	(1.55)	(0.86)	(0.90)	(1.16)	(2.95)	(2.47)	(1.14)	(1.93)
HHI of merging ind	−0.023	−0.070	0.049	0.019	0.063	0.044	0.493**	0.261
	(−0.33)	(−0.92)	(0.59)	(0.25)	(0.27)	(0.18)	(2.04)	(0.72)
Δ*HHI of merging ind*	−0.451**	−0.309	0.554***	0.728**	0.580	1.458	1.026	1.321**
	(−2.04)	(−1.42)	(2.78)	(1.97)	(0.32)	(0.77)	(1.25)	(2.14)
Ln *Bidder size*	−0.005	−0.007**	0.001	−0.006	−0.007*	−0.006*	−0.006**	−0.004
	(−1.31)	(−2.02)	(0.22)	(−0.83)	(−1.93)	(−1.83)	(−2.20)	(−1.21)
Bidder profitability	0.024	0.000	0.002	−0.019	0.041	0.032	0.010	0.023
	(0.76)	(0.01)	(0.06)	(−0.53)	(1.28)	(1.03)	(0.33)	(0.82)
Bidder P/E ($\times 10^{-2}$)	−0.006	−0.007*	−0.001	−0.005	−0.001	−0.003	−0.005	−0.002
	(−1.45)	(−1.80)	(−0.08)	(−0.30)	(−0.42)	(−1.02)	(−0.85)	(−0.48)
Surprise deal dummy	0.018**	0.010	0.010	0.049	−0.005	−0.007	0.045***	0.050***
	(2.23)	(1.30)	(1.20)	(0.48)	(−0.68)	(−0.94)	(4.89)	(3.77)
Reliant customer concentration	0.027	0.034*	−0.009	−0.022	0.001	−0.002	−0.018	−0.005
	(1.12)	(1.71)	(−0.81)	(−0.91)	(0.07)	(−0.25)	(−1.40)	(−0.47)
Reliant customer dependence	0.038	0.083	0.039	−0.041	−0.241	−0.192	0.049	0.030
	(0.45)	(1.19)	(0.48)	(−0.33)	(−1.23)	(−1.03)	(1.23)	(0.87)
Ln *relative customer size*	0.001	−0.001	−0.000	−0.006	−0.005	−0.004	−0.003**	−0.001
	(0.18)	(−0.42)	(−0.09)	(−0.93)	(−1.39)	(−1.16)	(−1.96)	(−0.32)
Republican administration	−0.007		−0.005		−0.000		−0.000	
	(−0.73)		(−0.79)		(−0.05)		(−0.00)	
Industry effects	Y	Y	Y	Y	Y	Y	Y	Y
Year effects	N	Y	N	Y	N	Y	N	Y
Obs.	151	151	120	120	271	271	157	157
Centered R^2	−0.21	0.05	−0.09	−0.18	−0.20	−0.12	−0.03	0.05

Table 6: GMM IV estimates of reliant customer CAR in industries with low and high foreign competition

This table reports the results of GMM–IV regressions of *Reliant customer CAR* on *Combined CAR*, conditional on the intensity of foreign competition. Models (1) – (4) report the estimates for deals in industries with low foreign competition, while models (5) – (8) report the estimates for deals in industries with high foreign competition. Models (1), (2), (5), and (6) report the GMM–IV 2-step feasible efficient GMM estimates for our actual sample. *Reliant customer CAR* is the dependent variable, and *Combined CAR* is endogenous. *Excess cash reserve ratio, Ind-adjusted stock payment,* and *Hostile takeover* are instruments. Models (3), (4), (7) and (8) repeat the analysis in (1), (2), (5) and (6) respectively using a pseudo sample of randomly generated event dates between 1985 and 2008. We calculate all explanatory variables around the random-event date. Appendix A defines all variables. All variables are winsorized at the 1st and 99th percentiles. *t*-statistics (in parentheses) are based on robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1%.

	Dependent Variable: *Reliant customer CAR*							
	Subsample: deals in industries with low foreign competition				Subsample: deals in industries with high foreign competition			
	GMM-IV (original sample)		GMM-IV (pseudo sample)		GMM-IV (original sample)		GMM-IV (pseudo sample)	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
Combined CAR	−0.418**	−0.424***	0.343*	0.199	−0.535	−0.059	0.093	0.068
	(−2.36)	(−2.70)	(1.78)	(1.41)	(−1.40)	(−0.30)	(0.44)	(0.22)
Foreign competition	−20.567	−36.529*	2.373	−3.671	−0.003	0.197	0.061**	0.059*
	(−1.23)	(−1.78)	(0.31)	(−0.47)	(−0.01)	(0.93)	(2.11)	(1.68)
HHI of merging ind	0.059	0.038	−0.028	−0.028	−0.054	0.011	0.023	0.007
	(0.76)	(0.46)	(−1.13)	(−0.85)	(−0.56)	(0.16)	(0.77)	(0.17)
Δ*HHI of merging ind*	−0.628**	−0.857***	0.007	−0.231	−0.340	0.020	0.090***	1.166***
	(−2.22)	(−2.61)	(0.04)	(−1.20)	(−0.61)	(0.05)	(3.22)	(3.08)
Ln *Bidder size*	−0.006*	−0.006	−0.002	−0.000	−0.005	−0.004	−0.001	−0.003
	(−1.69)	(−1.50)	(−0.85)	(−0.07)	(−1.14)	(−1.52)	(−0.66)	(−0.89)
Bidder profitability	0.048	0.035	−0.005	0.001	0.048	0.008	0.012	0.009
	(1.24)	(0.92)	(−0.17)	(0.03)	(1.05)	(0.31)	(0.79)	(0.57)
Bidder P/E ($\times 10^{-2}$)	−0.002	−0.004	−0.004	−0.004	0.003	−0.006	0.001	0.001
	(−0.61)	(−1.19)	(−0.95)	(−0.69)	(0.33)	(−1.01)	(0.17)	(0.12)
Surprise deal dummy	0.002	−0.001	0.018	−0.009	0.010	−0.001	0.017*	0.025**
	(0.14)	(−0.13)	(0.73)	(−0.41)	(0.91)	(−0.08)	(1.95)	(2.22)
Reliant customer concentration	0.001	0.001	−0.010	−0.008	0.019	0.028*	0.002	−0.000
	(0.09)	(0.06)	(−1.39)	(−1.18)	(1.05)	(1.95)	(0.12)	(−0.01)
Reliant customer dependence	−0.218	−0.215	0.245***	0.168**	0.102	0.137**	0.010	0.007
	(−0.86)	(−0.86)	(3.53)	(2.36)	(1.30)	(2.12)	(0.33)	(0.21)
Ln *relative customer size*	−0.003	−0.002	−0.001	0.001	−0.001	−0.003	−0.001	−0.002
	(−0.69)	(−0.63)	(−0.45)	(0.40)	(−0.17)	(−1.03)	(−0.83)	(−1.02)
Republican administration	−0.004		0.010		−0.003		−0.008*	
	(−0.49)		(1.53)		(−0.31)		(−1.70)	
Industry effects	Y	Y	Y	Y	Y	Y	Y	Y
Year effects	N	Y	N	Y	N	Y	N	Y
Obs.	245	245	140	140	177	177	137	137
Centered R^2	−0.62	−0.65	−0.28	−0.04	−0.79	0.06	0.24	0.20

Table 7: GMM IV estimates of reliant customer CAR for mergers under Democratic and Republican administration

This table reports the results of GMM–IV regressions of *Reliant customer CAR* on *Combined CAR*, conditional on Republican or Democratic administrations. Models (1) – (4) report estimates for deals initiated under Republican administrations, while models (5) – (8) report estimates for deals under Democratic administrations. We drop *Republican administration* from Eq. (1) in all models because it does not vary in either subsample. Models (1), (2), (5), and (6) report the GMM–IV 2-step feasible efficient GMM estimates for our actual sample. *Reliant customer CAR* is the dependent variable, and *Combined CAR* is endogenous. *Excess cash reserve ratio*, *Ind-adjusted stock payment*, and *Hostile takeover* are instruments. Models (3), (4), (7) and (8) repeat the analysis in models (1), (2), (5) and (6) respectively, using a pseudo-sample of randomly generated event dates between 1985 and 2008. We calculate all the explanatory variables around the random-event date. Appendix A defines all variables. All the variables are winsorized at the 1st and 99th percentile. *t*-statistics (in parentheses) are based on robust standard errors. *, **, and *** denote significance at 10%, 5%, and 1%.

	Dependent Variable: *Reliant customer CAR*							
	Subsample: deals under a Republican administration				Subsample: deals under a Democratic administration			
	GMM-IV (original sample)		GMM-IV (pseudo sample)		GMM-IV (original sample)		GMM-IV (pseudo sample)	
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)
Combined CAR	−0.363***	−0.265**	−0.026	−0.170	−0.393	−0.283	0.361	0.382
	(−2.72)	(−2.55)	(−0.08)	(−0.46)	(−0.85)	(−0.84)	(0.98)	(1.56)
Foreign competition	−0.278	−0.091	0.041	0.059	0.402	0.415	0.143	0.105
	(−0.65)	(−0.30)	(0.83)	(1.00)	(1.07)	(1.31)	(1.60)	(1.19)
HHI of merging ind	−0.103	−0.083	0.004	0.017	0.125*	0.132**	0.063	0.079*
	(−1.22)	(−1.07)	(0.14)	(0.51)	(1.92)	(2.26)	(1.37)	(1.67)
Δ*HHI of merging ind*	−0.306	−0.373**	0.846**	0.850**	−0.894	−0.455	0.340	0.466
	(−1.59)	(−2.00)	(2.48)	(2.18)	(−1.04)	(−0.59)	(1.23)	(1.44)
Ln *Bidder size*	−0.003	−0.003	−0.003	−0.003	−0.008	−0.008*	−0.000	0.003
	(−1.02)	(−1.10)	(−1.31)	(−1.25)	(−1.50)	(−1.76)	(−0.10)	(0.73)
Bidder profitability	0.019	0.000	0.023	0.034	0.062	0.049	0.000	0.005
	(0.70)	(0.02)	(0.86)	(0.98)	(0.97)	(0.93)	(0.01)	(0.26)
Bidder P/E ($\times 10^{-2}$)	−0.001	−0.003	−0.003	−0.008	−0.003	−0.004	0.001	−0.000
	(−0.21)	(−0.88)	(−0.72)	(−0.99)	(−1.28)	(−1.52)	(0.12)	(−0.03)
Surprise deal dummy	0.012	0.012*	0.026**	0.033***	−0.013	−0.020*	−0.004	0.009
	(1.53)	(1.74)	(2.39)	(2.67)	(−1.08)	(−1.95)	(−0.28)	(0.62)
Reliant customer concentration	0.005	0.009	−0.010	−0.013	0.012	0.004	−0.004	0.001
	(0.45)	(0.98)	(−1.41)	(−1.48)	(0.51)	(0.23)	(−0.20)	(0.07)
Reliant customer dependence	0.004	−0.021	−0.009	−0.036	0.110	0.269	0.059	0.075
	(0.03)	(−0.19)	(−0.14)	(−0.51)	(0.31)	(0.65)	(1.51)	(1.43)
Ln *relative customer size*	0.000	−0.000	−0.001	−0.001	−0.007	−0.007	−0.002	0.001
	(0.07)	(−0.08)	(−0.63)	(−0.57)	(−1.57)	(−1.53)	(−0.84)	(0.29)
Industry effects	Y	Y	Y	Y	Y	Y	Y	Y
Year effects	N	Y	N	Y	N	Y	N	Y
Obs.	295	295	182	182	127	127	95	95
Centered R^2	−0.33	−0.12	0.07	−0.07	−0.93	−0.47	−0.50	−0.51