Redact When Competitors Act

Examining the threat of rivals' product portfolio modifications

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Abstract

This study investigates whether incumbents are more likely to withhold mandatory disclosures when rivals modify product portfolio to reposition themselves and whether such redactions preserve product market competitiveness. Using a large sample of hand-collected redactions from new material contracts to capture managers' decision to withhold information, we find that product market instability and product threat from new rivals vary directly with the likelihood of redactions. We also document that incumbent firms are more likely to redact only when they have higher leverage or less cash holding relative to new rivals. This highlights that new entries will likely post the greatest threat when they are more financially capable than incumbent firms. Furthermore, redacting firms experience higher market share growth, greater market power and larger abnormal returns. Interestingly, these product market outcomes are concentrated in research/development- and license-related information redactions.

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1. Introduction

We examine whether firms are more likely to redact information from new material contracts when rivals modify product portfolios to reposition their product market strategies. How firms defend against rivals is a central question in many areas of research (Fudenberg and Tirole, 1986; Fresard, 2010; Zingales, 1998; Teece et al., 1997). Managers' disclosure decision is one of the potential defense mechanisms often examined in finance and accounting studies (Beyer et al., 2010; Leuz and Wysocki, 2016; Dambra et al., 2015). However, evidence from academic research is very mixed (Botosan and Harris, 2000; Berger, 2011; Botosan and Stanford, 2005; Karuna, 2014; Bourvean et al. 2018). In this study, we investigate the effect of proprietary cost from a relatively underexplored area – rivals' altering their product portfolio to transform their strategic positioning in the market.

Both anecdotal evidence and prior literature suggest that exposure to predation risk increases when rivals reposition themselves in the product market. For example, the recent creation of AmazonFresh increased product market threat to other grocery delivery companies.[1] Similarly, Microsoft's introduction of Surface computers changed the competitive landscape for high-end personal computer producers.[2] These observations align with the general inference from contestable market theory that a product market is more contestable when entry and exit are less costly (Baumol et al., 1982; Brock, 1983; Baldwin, 1995; Billett et al., 2017). Intuitively, in addition to high entry costs, high exit costs can also act as barriers to entry because, when deliberating product market entry, firms have to consider potential exit costs in case the new product is not a good fit. The heightened entry threat, as a result of low entry and exit costs, can make a market more contestable as firms enter and exit product markets to reposition themselves.

[1] https://www.wsj.com/articles/grocers-make-new-push-into-online-market-1476270231?mg=prod/accounts-wsj
[2] http://www.businessinsider.com/apple-ipad-pro-versus-microsoft-surface-pro-2017-6

Customers often update or change their preferences as firms modify their products. These instabilities increase the risk of conceding market shares to rivals (i.e., predation risk), which likely increase incumbents' concerns about their abilities to defend their market positions.[3]

Existing literature presents two opposing views on how firms can employ disclosure strategies to defend against predation risk. One thought is that firms can disclose their proprietary information to signal their commitment and ability to compete aggressively if necessary. Another is that firms can avoid disclosing proprietary information which might benefit competitors (Kreps and Wilson, 1982; Milgrom and Roberts, 1981; Cho and Kreps, 1987; Bernard, 2016; Shroff, 2016).[4] In this study, we examine whether firms will be more or less likely to withhold proprietary information when predation risks are likely to be high due to rivals' product repositioning. Furthermore, we also investigate whether and what type of information redaction might be effective at defending against product market rivalry.

We use redacted disclosures from new material contracts filed with the Securities and Exchange Commission (the SEC) to capture managers' decision to withhold proprietary information – information potentially exploitable by competitors. This disclosure setting has three advantages. First, firms must submit analyses to the SEC to support their requests for confidential treatment. In almost all cases, companies argue that the required disclosures cause "competitive harm" to their business (Lee, 2015; Thompson, 2011).[5] Hence, our setting likely captures proprietary costs of disclosure with minimal noise or bias. Second, redaction from material

[3] The definition of predation risk varies from one study to another. This definition is broader than some definitions that focus on forcing rivals to exit the market (Bernard, 2016; Shroff, 2016).

[4] Information asymmetry can reduce liquidity and increase cost of capital. Thus, in the absence of costs, managers have incentives to disclose (e.g., Verrecchia, 1983). This study examines an important factor that can significantly increase one of those costs – proprietary costs.

[5] See the related discussion from Staff Legal Bulletin No. 1 (https://www.sec.gov/interps/legal/slbcf1r.htm) and https://media2.mofo.com/documents/faq-confidential-treatment-requests.pdf. We also randomly checked 100 confidential treatment orders, and all 100 requests cited subsection (b) (4) of the Freedom of Information Act (FOIA) as the basis for their requests.

contracts clearly signals that firms are withholding information. This is important because nondisclosure in a voluntary setting can reflect either no information or unwillingness to disclose (i.e. withholding information known to managers) (Hribar, 2004; Guo et al., 2004). Third, examining redactions from new material contracts helps to better align the timing of managers' disclosure decision with product market forces that might have influenced the decision.[6] See Appendix C for redaction examples.

We focus on investigating two aspects of product portfolio modifications that likely capture increases in predation risk. The first feature is product market instability. Frequent entries and exits into the market make a product market unstable (Hoberg et al., 2014). In such markets, the likelihood of predatory behavior may increase as different rivals test the markets. If managers believe redacting proprietary information will help them survive the instability, then we expect the likelihood of redaction to be higher. On the other hand, if managers believe that transparency can help them to send a deterrent signal to their competitors then we will observe a lower likelihood of redaction. Second, we examine whether product market threat from new entrants incrementally affects incumbents' redaction strategies. Raith (2003) argues that product similarity is a fundamental determinant of product market threat.[7] Assuming that new entrants who offer similar products are more likely to prey on existing firms, then these new entrants can engender greater proprietary concerns that might result in a higher likelihood of redaction. We use the firm- and time-varying product peers from Hoberg and Phillips (2016) to identify new rivals. Then, we aggregate product similarity scores for all of the new rivals as an incumbent firm's total *Product*

[6] A large portion of firms have redacted disclosures because a confidential treatment can be granted for anywhere from one to ten years. Existing studies often use textual analysis tools to extract redactions and report that 20-40% of sample firms have redactions. Redactions from all new contracts during our sample period are included – contracts that a firm signs with a new business partner and contracts that firms amended based on a former contract.

[7] This argument is consistent with the insights from prior studies suggesting that predation risk increases in product similarity (Haushalter et al., 2007; Froot et al., 1993).

similarity relative to new rivals. We use the product market *Fluidity* from Hoberg et al. (2014) to capture product market instability. The key benefit of these measures is that they capture rivals' actions at the product level (Foucault and Fresard, 2014). We discuss the details of these measures in Section 3.2.

Using a large sample of hand-collected redactions from new material contracts to capture information withholding, we find that firms are more likely to redact required disclosures when they have higher product similarity to new entrants, or when their product market *Fluidity* is higher. In all of our tests, we control for firms' own product portfolio changes (i.e. *Self-Product change)*. Existing studies demonstrate that firms with higher cash holding and lower leverage are more capable competitors and thus are more likely to survive product market competition (Bolton and Scharfstein, 1990; Zingales, 1998; Campello, 2003; Khanna and Tice, 2005; Fresard, 2010). Therefore, we expect that predation from new rivals will post greater threat when incumbents have lower cash holding or higher leverage relative to new rivals. In these scenarios, incumbents might be more likely concerned about predation risk and, as a result, are more likely to redact. To test this prediction, we compare each new rival's cash holding with that of the incumbent firms in our sample. We aggregate product similarity scores for rivals that have higher (versus lower) cash holding. We then follow the same procedure for leverage. Our findings are consistent with the prediction that new rivals with higher cash holding and lower leverage are more capable rivals. They likely represent higher predation risk and induce greater likelihood of redaction from incumbent firms. This inference also echoes the finding from Bernard (2016).

Prior literature indicates that intangible assets such as R&D and brand recognition often give firms competitive advantages in the product market (Ellis et al., 2012; Boone et al., 2016; Dambra et al., 2015). This suggests that protecting information from R&D and License

arrangements might be particularly important when more competitors are producing similar products or when the product market is changing. Hence, we investigate whether firms are more likely to redact information from these types of contracts. Similar to prior literature, we classify agreements into six categories based on their key objectives: Employment/Incentive, Credit/Leasing, Research & Development/License (R&D/License), Manufacturing/Purchase & Sale of inventory or services (Mfg./P&S), Investment, and Other (Verrecchia and Weber, 2006; Boone et al., 2016). Consistent with expectations, *Product similarity* to new rivals and product *Fluidity* are positive and significantly associated with the likelihood of redaction in R&D/License contracts.

Furthermore, we investigate whether redactions are associated with performance. We find that redacting firms acquire higher market share growth, greater market power and larger returns, and the association is significant only when incumbents face high product market threats. More importantly, we show that these product market outcomes concentrate in R&D/License-related contracts. Overall, these findings provide some initial evidence that redactions, particularly R&D/License-related redactions, can protect valuable proprietary information and enable redacting firms to remain competitive when they encounter high product market threats from rivals. More specifically, we interpret the association as evidence for the notion that redactions help firms to hide information that can generate better performance.[8] This evidence is consistent with the survey findings from Cohen et al. (2000) in which managers rank secrecy as one of the top two mechanisms to protect firms' intellectual assets.

Finally, a series of tests further corroborates our main results. First, given that our findings are most salient in R&D/License-related redactions, we check the robustness of our main results

[8] In other words, we urge readers to use caution in drawing conclusions about a causal relationship between redaction and firm performance.

from R&D/License-related redactions by requiring the control sample to have R&D/License-related agreements. We continue to find that product market *Fluidity* and *Product similarity* to new rivals will lead to a higher likelihood of redaction. Furthermore, R&D/License-related redactions are associated with better performance outcomes when redacting firms face higher product market threat.

Second, the contestable market theory suggests that rivals will evaluate the costs of both entry and exit when making strategic entry decisions. Other lines of prior literature also conjecture that exits may capture ex ante threat of future entries because exits release resources and market share. Thus, exits can attract future entrants or encourage existing firms to grow (Siegfried and Evans, 1994; Pe'er and Vertinsky, 2008). This evidence suggests that exits can increase the level of contestability and predation risk. However, this characterization is counterintuitive and conflicts with predictions from prior studies, which suggest that product market threat decreases when rivals exit the market (Abernathy and Utterback, 1978; Levitt, 1965; Klepper 1996). Interestingly, we find that *Product similarity* to rivals that recently exited the market (i.e., former rivals) also varies directly with the likelihood of redaction after we control for the effects of new rivals and product market instability. This finding is consistent with the notions that exits create ex ante threats and that incumbents have incentives to seize the market released by exiting rivals.

Third, redaction decisions can be influenced by disclosure incentives, other than proprietary cost concerns, that also affect ex ante aggregate product strategies in rival firms. Like Hoberg et al. (2014), we consider this endogeneity scenario unlikely because our focus is on changes in rivals' product strategies. Nonetheless, we recognize the concern and employ an instrumental variable approach and a propensity-score-matched control sample to address this

possibility. Our results are robust. Lastly, we further explore alternative explanations and conduct falsification tests in Section 5.

Our study makes several incremental contributions. First, the evidence from the proprietary cost literature is very mixed (e.g., Botosan and Harris, 2000; Ali et al., 2014; Darrough and Stoughton, 1990; Verrecchia, 1983; Verrecchia and Weber, 2006; Boone et al., 2016; Lee 2015). We examine redactions from new material contracts. Our findings extend existing studies and highlight the important effects of rivals' product portfolio modifications. Moreover, Bernard (2016) uses leverage to proxy for predation risk and finds that leverage influences firms' disclosure compliance choices. In his discussion of Bernard (2016), Shroff (2016) calls for more evidence on how predation risk affects disclosure incentives. Our study adds to the discussion by investigating predation risk from rivals' actions in the product market. Lastly, the economics literature has evolved away from studying the static market structure and progressed to considering dynamic product market entry and exit (e.g., Haushalter et al., 2007; Hoberg et al., 2014). We contribute to this literature by showing that product market dynamics also have a significant effect on information decisions.

2. Institutional Background and Hypothesis Development

2.1 Institutional background on confidential treatment requests

SEC registrants must submit various mandatory filings under the Securities Act of 1933 and the Securities Exchange Act of 1934, both as amended. The mandatory disclosure rules are intended to protect investors' interests. However, mandated disclosures may negatively affect a company if the disclosures give away valuable proprietary information to competitors. To reduce such adverse effects, the SEC formally adopted procedures that allow firms to request confidential treatment.

In general, confidential treatment requests regarding required disclosures are governed by Rule 406 under the Securities Act of 1933 and Rule 24b-2 under the Securities Exchange Act of 1934.[9] A registrant filing for confidential treatment must support its request by citing at least one of the exemptions under the Freedom of Information Act (FOIA). Under the FOIA, the SEC must honor third-party requests for a company's filings and records unless the request is specifically exempted under the act. FOIA specifies nine categories of exemptions. In general, companies use the exemption specified in subsection (b) (4), which allows non-disclosure of documents that would reveal "trade secrets and commercial or financial information obtained from a person and privileged or confidential." In fact, firms that seek confidential treatment of required disclosures almost always argue that the required disclosure would cause substantial competitive harm.

Staff Legal Bulletin No. 1 specifies the procedure to submit a confidential treatment request to the SEC. To file for confidential treatment, a company must submit two filings: (1) a paper filing to the Secretary of the SEC to request confidential treatment, and (2) an online EDGAR filing of a redacted version of the mandatory filing. In the EDGAR filing, the firm must clearly mark the redacted portion and indicate that the redacted disclosures are filed separately with the SEC. The paper filing, which should be submitted at the same time as the EDGAR filing, should include a confidential treatment request application and a complete copy of the unredacted mandatory filing. On this complete copy, the firm must clearly mark (e.g., highlight, circle, etc.) the portions subject to the confidential treatment request. Along with the application, firms must submit their analysis of the basis for their requests. Required disclosures that are material to

[9] For confidential treatment requests regarding disclosures that are not required under the 1933 (1934) Act, Rule 83 applies. For instance, confidential treatment requests regarding responses to SEC comment letters or supplemental information are governed by Rule 83.

investors cannot receive confidential treatment,[10] nor can materials that are publicly available from other sources (SEC 1997, 2001).

Once the SEC receives a confidential treatment request, it aims to finish the initial review and respond within 28 days. If the SEC staff has no comments, a confidential treatment order is issued granting the request. Otherwise, a comment letter is issued to the company. The company has 21 days to respond. After all comments are cleared, the SEC's decision on the confidential treatment request is issued on a confidential treatment order (CTO). The SEC's decision could be an approval, an approval with modified redaction, or a denial. If the decision is an approval with modified redaction or a denial, then the firm must file an amendment of the original EDGAR filing (SEC 1997, 2001). Once a confidential treatment request is granted, the confidential period can last for a maximum of ten years.

In the past, it has been hard for researchers to track down confidential treatment requests in large quantities. One literally had to go through all the firm filings to know whether a request was filed or not. On May 1, 2008, CTOs became available online in the SEC's EDGAR database. This facilitates comprehensive access to all CTOs and identifies firms that file for confidential treatment requests on their new contracts. Please see Appendix B for an example of a CTO.

2.2 Related literature and hypothesis development

Existing archival studies provide mixed evidence about the effect of product market threat on disclosure (Botosan and Stanford, 2005; Botosan and Harris, 2000; Beyer et al., 2010; Berger, 2011; Lang and Sul, 2014; Ali et al., 2014).[11] A large number of these studies focus on competition

[10] Examples include the identity of a 10% customer, the dollar amount of backlog orders, and disclosures about related party transactions (SEC 1997, 2001).

[11] Predictions from theoretical models on proprietary costs of disclosure are also mixed. The predictions can vary depending on many stylized assumptions (Milgrom, 1981; Grossman, 1981; Verrecchia, 1983; Clinch and Verrecchia, 1997; Darrough and Stoughton, 1990; Arya and Mittendorf, 2007; Verrecchia, 2001; Darrough and Stoughton, 1990).

captured by static industry characteristics – most notably, industry concentration as measured by the Herfindahl-Hirschman index (HHI). However, as we know from prior literature, HHI is intended to capture industry structure for a given point in time. It does not have a clear directional association with competition in theory, and various other issues exist with the empirical measures (e.g., Dedman and Lennox, 2009; Li et al., 2018; Ali et al., 2009).[12]

Some recent studies use competition shocks to examine the impact of competition on managers' disclosure behaviors, with mixed results. Huang et al. (2017) use tariff rate reductions as shocks to industry competition. They find that tariff reductions decrease earnings guidance. On the other hand, Burks et al. (2016) use bank deregulation – the Interstate Banking and Branching Efficiency Act (IBBEA), as a shock to increased competition. Their results indicate that increased competition leads to higher disclosures through press releases. Bourveau et al. (2018) using the passage of antitrust law to capture exogenous increase in explicit collusion costs at the industry level and find that firms are less likely to redact disclosures from customer contracts. Unlike the current study, their paper investigates the disclosure effects from existing product peers. Li, Lin and Zhang (2018) use the adoption of the inevitable disclosure doctrine at state level to capture changes in proprietary costs. Their find that firms reduce disclosures on their customer identities when they receive higher protection from states courts regarding information leakage through employees. Overall, these settings provide valuable insights on how various (de)regulations can affect firms' disclosure decisions. The current study, on the other hand, focuses on the impact of rivals' product action.

[12] In short, HHI is an industry-level measure. This means that all firms within an artificially defined industry (i.e., an industry defined by SIC codes) will have the same level of competition, which is unrealistic. In addition, competition can increase or decrease with HHI. Thus, it is hard to extrapolate the effects of competition by using HHI (Dedman and Lennox, 2009; Sutton, 1990; Stiglitz, 1987; Karuna, 2014). These issues with HHI might have contributed to the mixed findings on competition and redaction from Verrecchia and Weber (2006) and Lee (2015).

One recent paper, Bernard (2016), finds that private German firms with high industry-adjusted leverage are less likely to disclose their financial statements even though they are required to disclose. Bernard (2016) posits that leverage is a proxy for predation risk and interprets the results as evidence that predation risk influences firms' compliance choices. In his discussion of Bernard (2016), Shroff (2016) calls for more evidence on how predation affects disclosure incentives, as firms' leverage can be endogenous. Our study provides another perspective on the effect of predation risk.

Our study is also related to existing literature on redacted disclosures. This literature also generates some insights on factors that can influence managers' decisions to redact, although the evidence is mixed. Verrecchia and Weber (2006) conjecture that redaction is more important for small firms with weak information environments. Using a set of firms with market value of equity between $50 and $100 million, they find that the Herfindahl-Hirschman Index (HHI) varies negatively with the likelihood of redaction in fiscal year 2001. On the other hand, using a more general sample, Lee (2015) finds that HHI is positively related to disclosure redactions. Boone et al. (2016) investigate determinants of redaction at initial public offerings (IPOs). They find that product market fluidity is positively related to the likelihood of redaction but not to product substitutability. Glaeser (2017) finds that referencing trade secrets in 10-K filings is positively associated with the likelihood of redactions. Our study complements existing studies but differs from prior redaction studies in three main aspects. First, our study examines the redaction of new material contracts, which can better capture managers' decision point. Second, redacted disclosures at IPOs can have significant implications for investors (Boone et al., 2016; Barth et al., 2017).[13] Third, we focus on product market dynamics when rivals enter and exit product markets

[13] General redaction in material contracts may also have an influence on investors. However, this concern is likely to be significantly reduced because the redacted disclosures are supposed to be immaterial to investors (SEC 1997, 2001).

to reposition themselves. We conjecture that product market threat and thus predation risk are particularly high in a dynamic market as opposed to a relatively static product market.

Our conjecture aligns with the theory of contestable markets (Baumol, 1982; Baumol et al., 1982; Schwartz and Reynolds, 1983; Brock 1983). In a perfectly contestable market, entry and exit are absolutely costless, and they work jointly as drivers of zero barrier to entry. In such a market, incumbents face constant threat from hit-and-run entries. In other words, incumbents are vulnerable to the threat of entry or potential entry because potential entrants can enter, collect their profits and then exit at no cost. Thus, in a perfectly contestable market, the threat of predation risk will discipline managers to behave as if they are facing a perfectly competitive market regardless of existing or equilibrium market structure.

Of course, in actuality, markets are not perfectly contestable. However, the inference that contestability and predation risks are higher in a more dynamic market (a product market with lots of entries and exits as a result of low entry/exit costs) is valuable in helping us understand how product market dynamics shape competitive threat. This important factor is well recognized in the economics and industrial organization literature (Dunne et al., 1988; Pe'er and Vertinsky, 2008; Bernard et al., 2010). Some recent studies find that product market dynamics also have significant influences on various corporate policies (Hoberg et al., 2014; Haushalter et al., 2007; Barrot, 2016). In this study, we conjecture that if predation risk increases with product market dynamics, then product market dynamics can amplify proprietary costs of mandated disclosures. Since managers are allowed to redact disclosures that can cause competitive harm under the FOIA, we predict that the likelihood of redactions is higher in a more dynamic market.

3. Sample and Descriptive Statistics

3.1 Sample selection

Table 1 Panel A describes our sample-generation process – how we identify firm-year observations that redact disclosures from new material contracts. Material contracts are filed with an exhibit number that start with 10.XXX (SEC Exhibit List).[14] We begin with confidential treatment orders (CTO) available from the SEC. CTO filings are available on the SEC's EDGAR website starting from May 2008. Our sample includes CTOs filed from May 2008 to December 2016. We download all 12,394 CTOs filed over this period through the SEC's EDGAR website.[15] Next, we use a C# program to extract the following information from the downloaded CTOs: filing date, filing form and exhibit number for which a redacted disclosure appears. For a balanced sample, we exclude redacted SEC filings (e.g., 8-K, 10-K) from 2016 because not all of the redacted filings in 2016 are identifiable from CTOs in 2016. Sometimes, different CTOs might refer to the same redacted filing. We exclude these duplicates. This process generates 9,167 unique redacted reports.[16] At this point, the unit of observation is at the firm-report level.[17]

Next, we eliminate 838 redacted reports from the utility (4900 – 4999), financial (6000 – 6999) and public administration (9000 – 9999) industries. Some of the CTOs downloaded in our sample refer to financial reports filed before 2008. Given that we do not systematically collect all of the redacted filings before 2008, we exclude these observations from our sample. This process eliminates another 1,493 observations. Sometimes a firm files more than one redacted agreement in a given year. This can happen because the firm files multiple exhibits with redacted disclosures in a single financial report or multiple financial reports with redacted agreements in a given year. For a firm in a given year, if there is more than one redacted agreement, we treat it as one firm-

[14] http://www.EDGARfilings.biz/forms/exhibit_list.pdf
[15] https://www.sec.gov/EDGAR/searchEDGAR/ctorders.htm
[16] During our sample period, we find 10 denied requests, which we exclude from our sample.
[17] For instance, Blyth, Inc. filed a CT order on June 2, 2014. This CT order shows that Blyth, Inc. redacted information on Exhibit 10.2 of Form 10-Q filed on November 1, 2013 and Exhibit 10.15(a) of Form 10-K filed on March 14, 2014. We retain these two redacted disclosures as two records in our sample.

year observation in our base sample for the likelihood of redaction tests. With this process, we eliminate 2,352 duplicate firm-year observations. For details, please see Panel A of Table 1.

In Panel A of Table 1, the unit of observation starting from here on is at the firm-year level. We then merge the redacted sample with the COMPUSTAT data and the text-based competition sample, which includes fluidity and total similarity score. The data on text-based competition are downloaded from the Hoberg-Phillips website.[18] We also require firm-years to have positive assets, sales and equity, which eliminates 1,948 observations. In the end, our base sample for the likelihood of redaction test consists of 2,536 firm-year observations for the treatment group and 14,960 for the control group.

To identify the key task for each redacted agreement, we manually collect the title of the redacted agreement. If the title of the agreement does not reflect the key task of the agreement, we then read the agreement to identify the key task (e.g., Letter Agreement, Branded Jobber Agreement). Following prior literature (Verrecchia and Weber, 2006; Boone et al., 2016), we classify the redacted agreements into six broad categories according to the key task of the agreement: 1) *Employment/Incentive* includes contracts with a firm's employees regarding offers, severance, compensation, long- and short-term incentive plans, bonuses, and resignations. 2) *Credit/Leasing* includes contracts related to loans, credit, and lease/rental. 3) *Research and Development/License* includes contracts related to research, technology, patents, licenses, royalties and trademarks, R&D development/collaboration/alliance/cooperation on joint ventures, and partnerships. 4) *Manufacturing/Purchase and Sale* of inventory or services involves contracts for business activities related to the manufacturing and distributing process (i.e., purchase and sale of inventory and services). 5) *Investment* involves contracts for capital expenditures such as asset or

[18] http://hobergphillips.usc.edu/industryconcen.htm

equipment purchases, mergers and acquisitions, and financial asset investments such as security purchases. The rest of the contracts are categorized as *Other*.

Panel B of Table 1 describes our sample-generating process for the detailed contracting test. We start with our hand collection of 9,167 unique firm reports shown in Panel A. To make the workload manageable without introducing substantial noise into our tests, if a financial report has more than three redacted material contracts (i.e., redacted exhibits), we collect contracting information for up to three agreements as shown on the CT order. In our sample, fewer than 10 percent of the reports have more than three redacted agreements. In total, we collect contracting information on 14,568 redacted agreements. We eliminate 1,267 agreements from the Utilities, Financial and Public Administration industries and 2,348 agreements from reports filed before 2008. We classify the agreements into five identifiable categories as described in the last paragraph. For redaction tests in different contract types, we need to retain only the unique contract types at the firm-year level. Thus, we exclude 4,440 duplicates. After this process, we exclude 3,266 agreement observations with missing data on competition or controls from COMPUSTAT. The remaining sample contains 3,247 observations.[19] Over a year, a firm could file multiple exhibits belonging to different classifications of agreement. In order to eliminate the potential contaminating effect when examining the effect of competition on different types of information redaction, we further exclude firm-years that involve multiple types of agreement redaction. Finally, we obtain a sample of 1,933 observations for firms that file only one type of redacting agreement in a given year.

[INSERT TABLE 1 HERE]

[19] The distribution of agreement type is reported in specification (1) of Table 2 Panel B.

3.2 Definition of peer firms, testing variables and descriptive statistics

We use the product peers defined in Hoberg and Phillips (2016) to capture the identity of the new rivals. Specifically, if a firm is not considered as a peer firm in year t-1 but is a peer firm in year t, we then categorize it as a new rival in year t. Note that this type of categorization captures new rivals at the product level. Our approach of using the product peers is similar to that of Foucault and Fresard (2014). Next, we aggregate the pairwise similarity scores for all new rivals to capture the product similarity relative to entering rivals. The pairwise similarity measure for a random pair of firm *i* and firm *j* in year *t* is measured as the "cosine" similarity between the two firms' product word usage in year *t*. The random pairs have to pass a minimum similarity threshold to be considered as peer firms. Hoberg and Phillips (2016) use a similarity score threshold that will categorize the same proportion of pair firms as peers as if the three-digit SIC codes had applied.[20] For instance, as indicated in Hoberg and Phillips (2016), 2.05% of all random pairs are considered peers if one uses three-digit SIC codes to group peer firms.[21] This threshold can create noise in identifying new rivals if the identification merely captures rivals' small product description modifications that shift them slightly above or below the threshold. We try to address this issue in V.3.

We use the product market *Fluidity* measure from Hoberg et al. (2014) to capture product market instability. It is an unsigned measure intended to capture changes in rivals' products from last year relative to an incumbent firm's current-year product. The product market *Fluidity* for firm

[20] Hoberg and Phillips (2010), Hoberg et al. (2014) and Hoberg and Phillips (2016) provide detailed descriptions of these two competition measures.

[21] Applying 2.05% to all random pairs gives a minimum similarity score of 0.2132. The reported similarity score in the data is pairwise similarity raw score minus the threshold. On their data website, Hoberg and Phillips also provide data for when the two-digit SIC code is used as the benchmark. Given that the two-digit SIC code imposes a less stringent threshold, the categorization of peers is likely to be less accurate. Thus, we expect pairs benchmarked to the two-digit SIC-2 code to generate weaker results if pairwise similarity captures whether two firms are rivals or not. We run these tests and discuss them in Section 5.2.

i in year *t* is a "cosine" similarity between the firm's own product description vector in year *t* and its counterparts' product description change vectors from year *t*-1 to year *t*. It is an unsigned measure. Thus, an increase in product fluidity indicates that there are a lot of changes in the rivals' products relative to products in the incumbents' product space. In other words, there are a lot of entries or exits into the product space of the incumbent firms. Intuitively, higher *Fluidity* represents higher exposure to product market threat due to product market instability.

Table 2 Panel A presents the top ten industries with redacted disclosures on a firm-year basis based on two-digit SIC industry classifications. Firms whose financial reports or statements contain confidential information are largely from Chemicals and Allied Products, Business Services, Instruments & Related Products and Electronic & Other Electric Equipment. They account for more than 59 percent of our redacting sample.

Table 2 Panel B presents the distribution of redacted agreements. Column (1) represents the distribution for 3,247 total agreements with a sample restriction as described in Panel B of Table 1. Column (2) represents the distribution for the 1,933 agreements. Our detailed information redaction tests are based on the latter sample to reduce confounding effects. The distribution shows that around 48 percent of the redacted agreements are related to *Manufacturing/Purchase and Sale* of inventory or services. The other important category of agreements with redacted information is R&D/License, which accounts for almost 25 percent of our sample. The next-largest category is Credit/Leasing agreement, which comprises more than 13 percent of our sample.

[INSERT TABLE 2 HERE]

Table 3 Panel A reports firm characteristics for our redacting and non-redacting samples. The descriptive statistics show that firms with redacted disclosures have higher *Fluidity* and *Product similarity* for new rivals. Additionally, the redacting sample consists of relatively smaller

firms experiencing poor accounting performance but higher market share growth. Redacting firms also raise more capital by issuing debt or equity and conduct more new investment than their counterparts.

Table 3 Panel B reports the Spearman (Pearson) correlations. The Pearson correlations show that all of our testing and control variables are significantly associated with the likelihood of redaction. The Spearman correlations show that all of our testing and controls are significantly associated with the likelihood of redaction. Overall, *Size*, *ROA*, *Age* and *HHI* are all negatively associated with the likelihood of redaction. The rest of the variables are all positively associated with the likelihood of redaction. Our two primary testing measures, *Fluidity* and *Product similarity_New rivals* are also positively correlated.[22] This suggests that when *Fluidity* is high, *Product similarity_New rivals* is also likely to be high. This univariate result aligns with the intuition from the contestable market theory that threat of entry is high in a less stable market. In our multivariate regressions, we focus on explaining the results when we put both measures in the specification so that we can interpret the results on one measure while controlling for the effect of the other measure.

[INSERT TABLE 3 HERE]

4. Research Design and Results

4.1 The effect of product market dynamics on the likelihood of disclosure redaction

To test the effect of product market dynamics on disclosure redaction (H1), we use the following multivariate Probit regression:

[22] Given that some of our variables have high correlations, we also test for multi-collinearity. According to collinearity diagnostics associated with our main tests in Table 4, all variables show a variance inflation factor (VIF) of less than 2.5 and a tolerance greater than 0.4, which are the most conservative thresholds. The general rule of thumb is a VIF less than 10 or a tolerance greater than 0.1 (Allison, 2012).

$$Redactdum_{i,t+1} = \alpha + \beta Rival\_Threat_{i,t} + \gamma X_{i,t} + Year_t + Industry_j + \varepsilon_{i,t} \quad (1)$$

where *i* indicates firms, *t* indicates years, and *j* indicates industry affiliation based on two-digit SIC code. The dependent variable $Redactdum_{i,t+1}$ is an indicator variable set to one if the firm files at least one redacted agreement at any time for a given year, and zero otherwise. We include two measures to capture the product market threat resulting from rivals changing their product mix. Our first measure captures product market threat when the product market is unstable. This is the *Fluidity* measure from Hoberg et al. (2014). Our second measure is *Product similarity_New rivals*, which reflects product substitutability from new entrants.

$X_{i,t}$ is the vector of control variables defined in Appendix A. Managers' disclosure decisions are determined by demand and supply of information. Naturally, firms are more likely to have redactions from contracts when they have more contracts. We use two variables to control for this effect: *Size* and *Num_Exhibits*. We use *Size* to control for the availability of a firm's news (Wasley and Wu, 2006; Tian 2015), which is measured as the natural logarithm of total book value of assets (AT). *Num_Exhibits* is the logged number of exhibits that a firm has. *ROA* is return on assets. It is net income scaled by the average of total assets. We add this control because prior literature suggests that managers' disclosure decisions are influenced by the profitability of the firm (e.g., Kasznik and Lev, 1995; Chen et al., 2002). Existing studies find that firms with high R&D expenses, capital expenditures or investments are less likely to issue certain voluntary disclosures (Dambra et al., 2015; Ellis et al., 2012). We use *NewInvestment* to capture these expenses. HHI is the Herfindahl-Hirschman Index. Following prior studies, we measure it as the sum of squared market share of each firm within the industry. To maintain consistency with prior literature, we classify industry according to two-digit SIC code (Verrecchia and Weber, 2006; Lee, 2015). *Self_Product change* captures product changes by the firm. If firms' disclosure decisions

are determined by their own product strategies, then we expect the coefficient to be significant.[23] Studies also show that firms' disclosure decisions are determined by factors such as age, growth, and financing. However, the predicted direction is unclear (e.g., Dedman and Lennox, 2009; Huang et al., 2017). Thus, we do not have predictions on these variables. Lastly, we also include year and industry fixed effects. Standard errors are clustered at the firm level.

Table 4 reports the results for the likelihood of redaction. Product market *Fluidity* and *Product similarity_New rivals* are both positive and significantly associated with the likelihood of redaction. This indicates that firms are more likely to redact when the product market is less stable (more dynamic). Product market threat from new rivals incrementally increases the likelihood of redaction. Additionally, probit regression involves a nonlinear model. In addition to the results in Table 4, we also compute marginal effects for product market *Fluidity* and *Product similarity_New rivals*. Focusing on the last column, the predicted probability of redaction increases from 12.8% to 20.6% when product market *Fluidity* increases by one standard deviation from its mean. For *Product similarity_New rivals*, the predicted probability of redaction increases from 10.7% to 12.6% when *Product similarity_New rivals* increases by one standard deviation from its mean value. Overall, these results indicate that incumbent firms have incentives to withhold information when their rivals are actively entering and exiting the product market. Threats from an unstable product market and new rivals highlight firms' concerns about keeping valuable information secret.

[INSERT TABLE 4 HERE]

4.2 Will the likelihood of redaction vary with new entrants' capability?

[23] We thank Gerard (Jerry) Hoberg for sharing the self-fluidity data.

An extensive literature examines the impact of capital structure on product market competition. In general, these studies find that firms with higher cash holdings and lower leverage are more likely to survive when product markets become competitive (e.g., Zingales, 1998; Bolton and Scharfstein, 1990; Billett et al., 2017; Bolton and Scharfstein, 1990; Campello, 2003; Khanna and Tice, 2005; Fresard, 2010). Thus, we posit that new entrants with higher cash holdings and lower leverage relative to incumbents are more likely to be capable competitors. As a result, they pose a higher threat to incumbent firms.

To perform these tests, we separate *Product similarity_New rivals* into those that have relatively high versus low cash holdings and high versus low leverage compared to incumbent firms. Specifically, for each incumbent, we compare its level of cash holding with that of the new entrants. If a new entrant's cash holding is higher than the incumbent's, then we categorize the new entrant as having higher cash holding. We aggregate the pairwise product similarity score for the new entrants with higher cash holding and generate a new variable: *Product similarity _New rivals (High)*. If the new entrant's cash holding is lower than the incumbent's, then we categorize it as having lower cash holding. Then we aggregate the pairwise similarity score for new entrants with lower cash holding as *Product similarity _New rivals (Low)*. We follow the same procedure for leverage. Table 5 reports the results. The results indicate that incumbents are more likely to redact only when they face new rivals with relatively higher cash holding and lower leverage. These findings are consistent with the idea that incumbents believe that such new rivals pose a higher predation risk.

[INSERT TABLE 5 HERE]

4.3 Redactions from different types of contracts

Information from certain types of contracts may carry higher proprietary costs than information from others. For instance, prior literature suggests that firms with higher R&D or brand name recognition are likely to have a competitive advantage in the product market (Ellis et al., 2012; Boone et al., 2016; Boone et al., 2016; Dambra et al., 2015). This evidence suggests that protecting R&D- and License-related information might be particularly important in sustaining competitive advantage. Thus, if product market threat from rivals' repositioning is an important determinant of redactions, then we expect to see the strongest effect in R&D/License-related contracts.

To investigate this question, we use hand-collected key tasks to group contracts into six different categories following prior literature: Employment/Incentive, Credit/Leasing, R&D/License, Manufacturing/Purchase & Sale of inventory or services (Mfg./P&S), Investment and Other (Verrecchia and Weber, 2006; Boone et al., 2016). We report the results in Table 6. Consistent with our expectation, both of our testing variables are positive and significantly associated with the likelihood of redaction in R&D/License contracts. In addition, product market *Fluidity* is positive and significantly associated with the likelihood of redactions in all different types of contracts. This indicates that incumbent firms treat rivals' instability in the product market as a significant threat and likely believe that information from various different types of contracts can be valuable to rivals. Interestingly, the coefficient for *Product similarity _New rivals* is also positive and significant at the 1% level for Mfg./P&S-related contracts. Intuitively, this suggests that incumbents believe it is important to hide manufacturing, processing and distribution-related information from rivals who are new to the market.

[INSERT TABLE 6 HERE]

4.4 Information redaction and performance outcomes

In this section, we explore the performance outcomes associated with information redaction. If redacting disclosures from material contracts protects proprietary information, and if the protection helps to sustain product market competitiveness, then we expect a positive association between redaction and firm performance. However, prior studies suggest that information asymmetry can negatively affect product market outcomes (Billett, Garfinkel and Yu 2017). Redactions can increase information asymmetry for incumbents. If this increased information asymmetry outweighs the benefits then redactions can negatively influence the product outcomes for incumbents. Thus, ex ante, it is unclear whether redactions will help incumbents to sustain their product market competitiveness. We test three observable consequences: market share growth, market power and abnormal returns. Market share growth is approximated by industry-adjusted sales growth. It is a firm's sales growth minus the industry median sales growth measured at the end of year t+1. Market power is the profit margin measured at the end of year t+1. Abnormal return is aggregated average monthly abnormal returns measured over fiscal year t+1. Please see Appendix A for detailed variable definitions.

Table 7 Panel A reports the results for the overall sample. We find that redaction is positive and significantly associated with all three outcome variables. Next, we explore whether the effects differ in subsamples where product market threat is high versus low. Specifically, we label firms that have above- (below-) median value in both of our testing variables as incumbents that face high (low) product market threat due to product market dynamics. The results presented in Panel B indicate that the positive effects of redaction on performance outcomes are concentrated in subsamples where product market threat is high. In subsamples where the product market threat is low, the effect of redaction is either very weak or insignificant. Overall, these results suggest that

redaction helps incumbents to defend their product market competitiveness when the product market threat is high.

[INSERT TABLE 7 HERE]

Furthermore, we explore whether redactions from different types of contracts are all associated with greater performance. Given that R&D- and License-related information is a predominant factor in preserving firms' competitive advantage, redactions in these types of contracts might be particularly important in helping firms to generate better performance outcomes. To test this, we extend the performance outcome tests in Table 7 Panel A to our detailed contracts. The results from Table 8 Panels A.1-A.3 show that the positive associations between redaction and performance outcomes from Table 7 Panel A are concentrated in R&D/License-related contracts. Next, as in Table 7, we label firms that have above- (below-) median value in both of our testing variables as incumbents that face high (low) product market threat due to product market dynamics. We report the results in Panel B of Table 8. Again, the results show that the positive association is concentrated in the subsample of incumbent firms that face higher threat.

A few recent archival studies have started to explore the idea that disclosure decisions might be context specific (Heinle, Samuels, and Taylor 2018). For instance, Cao, Ma, Tucker, and Wan (2017) examine the impact of technological competition on managers' disclosure decisions. They find that technological competition is not associated with management guidance but is significantly associated with product disclosure. They interpret the results as indicating that alignment of competition and disclosure is important in finding the effects of competition on disclosures. On the other hand, Ettredge, Guo, Lisic, and Tseng (2016) find that technological competition is positively associated with both technological and non-technological redactions. Our

findings extend these studies and suggest that both disclosure decisions and the effect of the disclosure decisions can be context specific.

[INSERT TABLE 8 HERE]

Ideally, in the tests for the nature of withheld information using different types of contracts, we should match each type of contract with its own type in the control sample. This procedure, however, would require extensive hand collection and categorization of every contract from the control sample. Given that our results are concentrated in R&D/License-related redactions, we limit this type of analysis to R&D/License-related contracts. Table 9 reports the results.

[INSERT TABLE 9 HERE]

Overall, the results from Tables 7, 8 and 9 suggest that withholding information from R&D/License-related contracts is especially useful for incumbents to stay competitive when they encounter high product market threat from rivals. However, we warn readers to use caution in drawing conclusions about a causal relationship between redaction and performance outcomes. Redaction is likely a mechanism to help keep valuable information secret, and the unrevealed information itself may have the first-order effect on the performance outcomes.

5. Additional tests and robustness checks

5.1 Potential endogeneity

One concern about using product market *Fluidity* and *Product similarity_New rivals* to capture the level of product market dynamics is that these measures are constructed based on product descriptions from 10-K filings. Although these descriptions are required to be accurate, it is possible that managers may disguise product details by using boilerplate language. If incumbent managers' incentives to use boilerplate language coincide with their incentive to redact, then this

might bias in favor of finding a positive correlation as reported. Note that if the fundamental driver of both incentives is the product market threat, then our interpretation of the positive association still holds. However, if the coinciding incentives are due to other motives, then we may capture a spurious correlation. Changes in aggregate rivals' product descriptions and the product descriptions of new entrants are largely new information to the incumbents. In fact, most of these disclosures might not be observable to the incumbents as the incumbents generate their 10-K reports. Thus, it is unlikely that endogeneity drives the findings. Nonetheless, we try to mitigate the concern by using an instrumental variable approach and a propensity-score-matched control sample.

First, we use propensity score matching (PSM) to construct a control sample comparable to that of the redacting firms based on observed characteristics that potentially affect information redaction. PSM is useful to address the endogenity due to functional form misspecification by reducing the correlations between the treatment and control variables (Shipman, Swanquist, Whited 2017). This might be particularly relevant to our setting if incumbent firms' own product change, R&D or financing behavior might have affected our treatment. Following the guidance from Shipman et al. 2017, in the first stage, we estimate the likelihood of high versus low product market threat from *Fluidity* and *Product similarity _New rivals* by estimating a Probit model that includes our full set of control variables in equation (1) as right-hand-side variables. We perform the matches using a caliper distance of 0.01 and without replacement. Next, we check for the validity of our matches by testing for covariate balance and overlap of performance scores. Untabulated T-tests show that the differences between our treatment and control groups for both *Fluidity* and *Product similarity _New rivals* are not significantly different for any of the matched dimensions. Moreover, the performance scores between our treatment and control groups for

Fluidity and *Product similarity _New rivals* are not significantly different. In the second stage, we estimate equation (1) using the sample of redacting firms and their propensity-score-matched non-redacting peers. The results are presented in Appendix D Table D.1. Our results are robust to using the propensity-score-matched control group. Lastly, untabulated results indicate that our results are also robust if we restrict caliper distance to be 0.001 or using continuous treatment variables in the second stage.

Existing studies find that competition is associated with geographic distances between peer firms. The closer the peers, the higher the competition (Jiang et al., 2016). Applying this to our setting, we use the logged number of rivals within 100 miles as our instrument. Then we regress our testing variables on the instrument and industry/year fixed effects to obtain our instrumented testing variables. We report the results in Appendix D Table D.2. Regarding tests for whether geographic distances is a weak instrument, the F-test from the first-stage regression rejects the null hypothesis at the 1% level. Furthermore, the Kleinberg-Paap statistics rejects the null hypothesis of under-identification at the 1% level.[24] The instrumented testing variables cannot be tested in the same regression because the same instrument is used. Thus, we report the results for each instrumented testing variable in different columns. Again, our results show that our testing variables are still positive and significantly associated with the likelihood of redaction.

5.2 Will former rivals who just exited the product market affect redaction?

In a perfectly contestable market, costless exit is a necessary condition to create zero barriers to entry because entrants will evaluate the exit costs in their entry decisions to prepare for the scenarios in which the new product might not be a good fit (Baumol et al. 1982, Brock 1983).

[24] We used linear probability model so that we can generate these tests statistics for the instrument. Nonetheless, our results are robust if we use Probit in our instrument tests.

Prior literature predicts that exits may capture ex ante costs because exits can encourage future entries with released resources and market shares (Siegfried and Evans, 1994; Pe'er and Vertinsky, 2008). Archival findings demonstrate that entries and exits are positively correlated at both the firm level and product level. This significant correlation reflects product market instability, which give rise to changes in the competitive landscape (Hoberg et al., 2014; Bernard et al., 2010; Dunne et al., 1988; Siegfried and Evans, 1994). Overall, these lines of prior literature suggest that exits can also lead to product market rivalry and threat. However, this prediction is counterintuitive, as one would naturally expect product market threat to decrease as rivals exit.

We explore the effect of the product similarity of former rivals who just exited the market. Specifically, if a firm is not considered a peer firm in year t but is a peer firm in year t-1, then we categorize it as a former rival (exiting rival) in year t. We report the effect of former rivals on the likelihood of redaction in Table 10. The first column is for the likelihood of all types of redactions, and the rest of the columns are for redactions from different types of contracts. After controlling for the effect of product market *Fluidity* and *Product similarity _New rivals,* we find that the coefficient on *Product similarity _Former rivals* is positive and significant for the likelihood of all redactions and for redactions from R&D/License and Investment contracts. These results suggest that when rivals exit a product market, incumbents are also more likely to redact, and the redacting behaviors are concentrated in R&D/License and Investment contracts. This is consistent with the predictions from prior literature that exits may represent an ex ante threat.

[INSERT TABLE 10 HERE]

5.3 Different definitions for new and former rivals

In our tests, we use product peers from Hoberg and Phillips (2016) to determine new and former rivals. As we discuss in section 3.2, Hoberg and Phillips (2016) use similarity scores to

categorize firms into product peers based on proportions benchmarked to three-digit SIC codes. The firms in a random pair are considered peer firms if and only if their pairwise similarity score exceeds the benchmark threshold. This can create noise in our categorization of new versus former rivals if the categorization merely captures rivals with scores that vary slightly up and down around the threshold. In these cases, new rivals might not be true new rivals; they could be firms with similarity scores slightly below the threshold in year t-1 and scores slightly above the threshold in year t due to small product description modifications in their 10-K filings. To mitigate this concern, we re-run our test by requiring new rivals to be firms that are not peer firms in both year t-1 and year t-2. We also require former rivals to be firms that are peer firms in year t-1 but are not peer firms in both year t and year t+1. Under this categorization, the definition of new versus former rivals is more likely to reflect rivals' product strategies rather than small modifications in product description from 10-K filings. We expect our results to be stronger for new and former rivals with these additional requirements. Column (1) of Table 11 reports the results. Note that we do observe larger effects for new and former rivals than we do in column 1 of Table 10.

As a falsification test, we also identify cases where categorizations of new and former rivals are more likely to be affected by small changes in product descriptions in 10-K filings – we describe these as mock rivals. Specifically, we define mock new rivals as those who are peers in year t-2, are not peers in year t-1, and then become peers again in year t. Mock former rivals are defined as those who are peers in year t-1, are not peer in year t, and become peers again in year t+1. If the mock rivals drive our results, we should see significant impact from them. Column (2) of Table 11 reports the results. The coefficients for mock new and former rivals are both insignificant. This suggests that the noise from using peers defined in Hoberg and Phillips (2016) likely biases against us.

Lastly, we also check our results using the peers benchmarked to proportion cut off of two-digit SIC codes.[25] There are more peer firms in two-digit SIC codes. Applying this threshold results in a less stringent requirement for a random pair of firms to be considered product peers. We expect this fuzzy match to generate noisier categorization and results. Column (4) of Table 11 reports the results. As expected, the coefficient for new and former rivals remains significant but is smaller compare to the results in Column (1) of Table 10. Taken together, these results indicate that the findings for new versus former rivals are driven primarily by rivals' product changes.

[INSERT TABLE 11 HERE]

5.4 Additional robustness checks (untabulated)

Our treatment sample is restricted to redactions of material contracts. This restriction is valuable in our setting because firms are required to disclose material contracts. Thus, redaction clearly signals managers' intent to avoid mandatory disclosures. However, one concern about using redactions from material contracts is that managers can manipulate materiality thresholds. To try to mitigate this concern, we collect redacted disclosures from all types of agreements regardless of whether the agreement is filed as a material contract or not. This increases our treatment sample to 2,651. Our results are robust (untabulated).[26]

Product descriptions in 10-K filings are required to be accurate. Nonetheless, one may have concerns that managers try to hide their new products by using fuzzy language. In addition to addressing the endogeneity issues discussed in section 5.1 and using the different definitions of new versus former rivals discussed in section 5.3, we further restrict the sample to manufacturing

[25] http://hobergphillips.usc.edu/industryclass.htm
[26] All of our untabulated results are available upon request.

firms. The reasoning is that manufacturing firms might find it difficult to disguise their product changes. Untabulated results show that our findings are robust to this restriction.

Our detailed contract tests (e.g. Table 6) are based on observations that have only one type of redacted material contracts. We adopt this approach to sharpen our design and inferences. To check whether our results are robust to this restriction, we run the tests using all of the redacted contracts. Untabulated results show that competition from new rivals and product market instability are both significant drivers of R&D/License related redactions -- similar to tabulated results from Table 6.

6. Conclusion

Prior literature finds mixed evidence for proprietary cost of disclosure (Harris, 1998; Berger, 2011; Botosan and Stanford, 2005; Healy and Palepu, 2001). Most studies that examine the relation between product market competition and disclosure use relatively static market structures to capture competition, and the Herfindahl-Hirschman index (HHI) is widely used. This study focuses on a different aspect of product market threat: product market dynamics induced by rivals' repositioning in the product market.

Specifically, we first test for product market threat induced by the instability of the product market when rivals enter and exit shared product space. Second, we explore product market threat from new entrants. We find that incumbents' likelihood of redaction is positive and significantly associated with product market threat from both sources. Furthermore, we find that incumbents are more likely to redact when they face more capable new rivals: rivals with relatively higher cash holding and lower leverage. These results suggest that incumbent firms believe that withholding information will help them survive product market rivalry.

In the performance tests, we find that redacting firms experience higher market share growth, higher profit margin, and greater abnormal returns. The better performance outcomes are concentrated in redactions from R&D/License-related contracts and in firms that face high product market threat. These findings provide some preliminary evidence that withholding proprietary information can assist firms in defending their product market competitiveness against rivals.

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Appendix A

Variable Definitions

Redaction	= an indicator variable. It equals one if the firm files at least one redacted agreement for a given year, and zero otherwise.
Fluidity	= the fluidity measure from Hoberg, Phillips, and Prabhala (2014). Specifically, the product market fluidity for firm i at year t is a "cosine" similarity between a firm's own product word vector at year t and its counterpart's product word change vector from year t-1 to year t.
Product similarity _New rivals	= the sum of pairwise similarity scores for new entrants. New entrants are defined as firms that are categorized as peer firms by Hoberg and Phillips (2016) in year t, but not in year t-1. In other words, new entrants are those who share at least part of the same product space as the incumbent in year t.
Product similarity _Former rivals	= the sum of pairwise similarity scores for former rivals. Former rivals are defined as firms that are categorized as peer firms by Hoberg and Phillips (2016) in year t-1, but not in year t.
Size	= the natural logarithm of total book value of assets (AT) at the end of the year.
Market-to-book	= total assets minus book value of common equity (CEQ) plus market value of common equity (shares outstanding times fiscal year-end stock price (CSHO*PRCC_F)), all divided by total assets.
ROA	= net income (NI), scaled by the average of total assets ($(AT_t+AT_{t-1})/2$).
Market share growth	= sales growth for each firm, minus the median value of its peer firms, where peer firms are defined by Hoberg and Phillips (2016). Sales growth at year t is calculated as sales at year t, minus sales at year t-1, divided by sales at year t-1.
Debt issue	= long-term debt issuance (DLTIS) minus long-term debt reduction (DLTR), all divided by average of total assets. If DLTIS or DLTR is missing, we set it to zero.
Equity issue	= sale of common and preferred stock (SSTK), minus purchase of common and preferred stock (PRSTKC), all divided by the average of total assets. If SSTK or PRSTKC are missing, we set them to zero.
NewInvestment	= research and development, plus capital expenditures, plus acquisitions, minus sale of property, minus depreciation and amortization, all divided by lagged total assets.
Age	= natural logarithm of one plus firm age. Firm age is calculated as current year minus the first fiscal year of available accounting data in COMPUSTAT.
Num_Exhibits	= natural logarithm of number of exhibits.

Self_Product change	= one minus the cosine similarity between firm i's product description at year t and its own product description at year t − 1.
HHI	= sum of squared market share for each firm within the industry. Market share for firm i is computed as firm i's revenue over total industry revenue. Here, industry is classified by two-digit SIC code.
Profit margin	= sales, minus costs of goods sold, minus general selling and administrative expense, all divided by sales.
Abnormal Return	= average size- and book-to-market-adjusted monthly returns. Size- and book-to-market-adjusted return is the firm's return minus the size- and book-to-market-benchmark return downloaded from Kenneth French's website. Following Fama and French portfolio methodology, we form the size and book-to-market portfolio at the end of each June and assign the months during the period of July to June of the following year to this portfolio. After obtaining the monthly abnormal returns, we calculate average monthly abnormal returns over the fiscal year period.

Appendix B

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
March 9, 2012
ORDER GRANTING CONFIDENTIAL TREATMENT
UNDER THE SECURITIES EXCHANGE ACT OF 1934
Dole Food Company, Inc.
File No. 001-04455 - CF#27655

Dole Food Company, Inc. submitted an application under Rule 24b-2 requesting confidential treatment for information it excluded from the Exhibits to a Form 10-Q filed on November 17, 2011 and amended on February 24, 2012. Based on representations by Dole Food Company, Inc. that this information qualifies as confidential commercial or financial information under the Freedom of Information Act, 5 U.S.C. 552(b)(4), the Division of Corporation Finance has determined not to publicly disclose it. Accordingly, excluded information from the following exhibit(s) will not be released to the public for the time period(s) specified:

Exhibit 10.1 through July 8, 2018
Exhibit 10.2 through July 8, 2016

For the Commission, by the Division of Corporation Finance, pursuant to delegated authority:
John Reynolds
Assistant Director

Appendix C

Examples of Redacted Disclosures in Material Contracts

1, Facebook, Exhibit 10.4 on 10Q (7/31/2012)

A new limited exception is hereby added as Section 4.b(ii)(6) that reads as follows:

(a) "Subject to Sections 4.b(ii)(1) through (5) of the Developer Addendum (and as amended by Developer Addendum No. 2) and subject to the terms of the Amendment No. 2 to the Developer Addendum, you may use a Subscription Substitute Payment Method, provided that upon the Facebook Payment Method for Subscriptions Live Date, you will migrate all applicable New Subscribers and Legacy Subscribers (collectively, "Subscribers") from such Subscription Substitute Payment Method to the Facebook Payment Method for Subscription Services within the applicable Subscription Transition Period regardless of whether or not the feature set for the Facebook Payment Method for Subscription Services is on parity with the Subscription Substitute Payment Method feature set; accordingly, and without limiting the foregoing, you shall migrate all Subscribers over the Facebook Payment Method for Subscription Services even if (1) a Subscriber is using a Payment Method other than credit/debit cards, (2) the Payment Method for such a Subscriber is not supported, (3) a Subscriber is using a currency that is not supported or (4) the subscription period for a Subscriber is not supported (e.g., you must migrate Subscribers that are on a weekly subscription even if the Facebook Payment Method for Subscription Services can only support monthly subscriptions)**[*]**. Facebook will provide you thirty (30) days prior written notice of the Facebook Payment Method for Subscriptions Live Date. Except as otherwise set forth in Sections 4.b(ii)(1) through (5) of the Developer Addendum, your right to use a Subscription Substitute Payment Method shall automatically terminate at the end of the applicable Subscription Transition Period. At all times, any Zynga In-Game Currency that you make available as part of the Subscription Service(s) for a given Covered Zynga Service shall comply with Section 4.b(ii)(3)(d) of the Developer Addendum.

(b) Notwithstanding anything to the contrary in Section 4.b(ii)(4), prior to and during the Subscription Transition Period, for purchases by Subscribers through a Subscription Substitute Payment Method, you shall pay Facebook **[*]** thirty percent (30%) of all amounts received by you from Subscribers for the applicable Subscription Service(s) before any deductions ("Subscription Fees") **[*]**. Prior to and during the Subscription Transition Period, you shall provide Facebook, on the second calendar day of each month, with a written report detailing the Subscription Fees due for the immediately preceding month (regardless if the amount due is zero). The corresponding Subscription Fees for each month shall be due and payable within **[*]** calendar days at the end of each month. Facebook shall not be required to provide you with any invoices for the Subscription Fees. Upon written request by us, but no more than once every twelve (12) months, **[*]**."

2, Antares Pharma, Inc. Exhibit 10.1 on 8-K (5/23/2011)

PERFORMANCE GOALS

The number of Performance Stock Units that may become earned and vested shall be determined based on the actual performance level achieved with respect to the following performance measures during the Performance Period: 3-Year Net Revenue; 3-Year FDA Product Regulatory Approval; and commercial launch of [******] by [******] (collectively referred to as the "Performance Goals," and each individual measure, a "Performance Goal"). The chart below sets forth the applicable weighting and Performance Goals at each performance level for each performance measure for the Performance Period:

January 1, 2011-December 31, 2013 Performance Period*

Performance Measure	Weight	Performance Level	Performance Goals	Performance Stock Units Earned and Vested as a Percentage of Target (% of Target)
3-Year Net Revenue	33-1/3%	Threshold	3-Year Net Revenue of at least $[***] million but less than $[***] million	50%
		Median	3-Year Net Revenue of at least $[***] million but less than $[***] million	75%
		Target	3-Year Net Revenue of at least $[***] million but less than $[***] million	100%
		Maximum	3-Year Net Revenue of $[***] million or above	150%
3-Year FDA Product Regulatory Approval	33-1/3%	Threshold	FDA Regulatory Approval of [***] by [***]	50%
		Target	FDA Regulatory Approval of [***] by [***]	100%
		Maximum	FDA Regulatory Approval of [***] by [***]	150%
Commercial Launch of [***]	33-1/3%	Target	Launch by [***]	100%
		Maximum	Launch by [***]	150%

Appendix D Table D.1: The effects of product market dynamics using the propensity-score-matched controls

This table reports the results using propensity-score-matched (PS) control samples. To estimate propensity score, we dichotomize our treatment effect by using median value as the cut off points for both *Fluidity* and *Product similarity_ New rivals*. Thus, *High Fluidity* (*High Product similarity_New Rivals*) is equal to 1 if an observation' *Fluidity* (*Product similarity_New Rivals*) is above the median, and zero otherwise. We include the full set of control variables in our baseline regression. We perform the matches using a caliper distance of 0.01 and without replacement. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

	(1)	(2)
High Fluidity	0.350	
	(0.000)	
High Product similarity _New rivals		0.220
		(0.000)
Size	-0.036	-0.036
	(0.027)	(0.019)
Market-to-book	0.020	0.008
	(0.228)	(0.665)
ROA	-0.192	-0.043
	(0.143)	(0.737)
Market share growth	0.033	0.020
	(0.307)	(0.507)
Debt issue	-0.116	0.014
	(0.535)	(0.940)
Equity issue	0.062	0.133
	(0.601)	(0.243)
NewInvestment	0.229	0.350
	(0.176)	(0.047)
Age	-0.265	-0.293
	(0.000)	(0.000)
Num_Exhibits	0.443	0.464
	(0.000)	(0.000)
Self_Product change	-0.001	-0.003
	(0.364)	(0.085)
HHI	-0.049	-0.455
	(0.984)	(0.877)

Constant	-0.526	-0.968
	(0.553)	(0.374)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Firm cluster	Yes	Yes
Observations	8,262	8,536
Pseudo R-squared	0.143	0.124

Table D.2: The effects of product market dynamics using the instrumental variable approach

This table reports the two-stage regression results using the instrumental variable approach and linear probability model for each of our two testing variables. The first-stage estimation results are reported in columns (1)-(2). The instrument is the natural logarithm of one plus the number of peers located within 100 miles. Columns (3)-(4) report the results using each of the instrumented testing variables. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

	First Stage		Second Stage	
	Fluidity	Product similarity _New rivals	Redaction	Redaction
	(1)	(2)	(3)	(4)
Num_of_Peers	0.634	0.272		
	(0.000)	(0.000)		
Fluidity			0.036	
			(0.000)	
Product similarity _New rivals				0.084
				(0.000)
Size	0.199	0.011	-0.015	-0.008
	(0.000)	(0.119)	(0.000)	(0.000)
Market-to-book	0.071	0.082	0.006	0.001
	(0.003)	(0.000)	(0.055)	(0.675)
ROA	-1.916	-0.453	0.039	0.008
	(0.000)	(0.000)	(0.140)	(0.752)
Market share growth	0.104	0.102	0.003	-0.001
	(0.010)	(0.006)	(0.562)	(0.838)
Debt issue	-1.630	-0.375	0.021	-0.006
	(0.000)	(0.022)	(0.536)	(0.860)
Equity issue	-0.252	0.656	0.017	-0.047
	(0.068)	(0.000)	(0.427)	(0.070)
NewInvestment	2.282	0.660	0.027	0.054
	(0.000)	(0.000)	(0.432)	(0.119)
Age	-0.917	-0.159	-0.010	-0.029
	(0.000)	(0.000)	(0.283)	(0.000)
Num_Exhibits	0.121	0.008	0.075	0.078
	(0.000)	(0.516)	(0.000)	(0.000)
Self_Product change	0.006	0.012	0.000	-0.001

	(0.001)	(0.000)	(0.276)	(0.000)
HHI	-1.086	-1.968	0.217	0.343
	(0.487)	(0.002)	(0.396)	(0.197)
First-Stage F-test	384.66	330.80		
	(0.000)	(0.000)		
Kleibergen_Paap LM Stat	290.91	270.95		
	(0.000)	(0.000)		
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes
Observations	17,496	17,496	17,496	17,496

Table 1: Sample selection

This table presents the sample-selection procedure. CT order filings are available on the SEC's EDGAR website beginning in May 2008. We download all CT orders from May 2008 to December 2016 and require CT orders containing financial statements which have a reporting period from 2008 to 2015.

Panel A: Sample selection for the likelihood of overall redaction test		
Financial reports with redacted agreements		9,167
Exclude:		
Observations from utilities (4900 - 4999), financial (6000 - 6999) and public administration (9000 - 9999) industries	(838)	
Observations with redacted financial reports filed before 2008	(1,493)	
Duplicate observations at firm-year level	(2,352)	
Observations with missing data for our variables	(1,948)	
Firm-year observations with redacted agreements		2,536
Observations with one redacted agreement per firm-year		1,240
Observations with at least two redacted agreements per firm-year		1,296

Panel B: Sample selection for the likelihood of redaction in different types of redacted agreements		
Redacted agreements collected from 9,167 reports		14,568
Less:		
Utilities (4900 - 4999), financial (6000 - 6999) and public administration (9000 - 9999) industries	(1,267)	
Agreements from reports filed before 2008	(2,348)	
Duplicate agreement type at firm-year level	(4,440)	
Agreements from observations with missing data for our variables	(3,266)	
Total number of agreements		3,247
Firm-years with multiple agreement types / (number of agreements)		603/(1,314)
Firm-years with one agreement type		1,933

Table 2: Sample distribution

This table presents the sample distribution for our redacting sample. Panel A presents the top 10 industries with the most redacted observations. Industry classification is based on two-digit SIC codes. Panel B presents the distribution of different types of redacted agreements. We classify the redacted agreements into five broad categories: 1) Employment/Incentive includes contracts with a firm's employees regarding offers, severance, compensation, long- and short-term incentive plans, bonuses, and resignations. 2) Credit/Leasing includes contracts related to loans, credit, and lease/rental. 3) Research and Development /License includes contracts related to research, technology, patents, licenses, royalties and trademarks, R&D development/collaboration/alliance/cooperation on joint ventures, and partnerships. 4) Manufacturing/Purchase and Sale of inventory or services involves contracts for business activities related to the manufacturing and distribution process (i.e., purchase and sale of inventory and services). 5) Investment includes contracts for capital expenditures such as asset or equipment purchases, mergers and acquisitions, and financial asset investments such as security purchases. If the exhibits have insufficient information to classify them into any of the above categories, then we group them into the "Other" category. In some cases, a firm files multiple types of agreement over a given year. For a given firm-year, if it files two different types of redacted agreements, then both are counted in the distribution description in column (1) of Panel B. In column (2) of Panel B, we exclude firm-year observations for firms that file more than one type of redacted information in a given year. This column contains firm-years with only one type of redacted agreement.

Panel A: Top ten industries with redacted disclosures on a firm-year basis

Two-digit SIC Code (Top 10)	Industry Name	N
28	Chemicals and Allied Products	736
73	Business Services	336
38	Instruments & Related Products	219
36	Electronic & Other Electric Equipment	208
48	Communications	99
35	Industrial Machinery & Equipment	91
45	Transportation by Air	83
13	Oil & Gas Extraction	69
80	Health Services	60
20	Food & Kindred Products	52

Panel B: Distribution of types of redacted agreements

Type of agreement	All agreements	Firm-years with one agreement type
1) Employment/Incentive	260	186
2) Credit/Leasing	458	248
3) Research & Development/License	857	485
4) Manufacturing/Purchase and Sale/Service	1,387	906
5) Investment	240	95
6) Other	45	13
Total	3,247	1,933

Table 3: Firm characteristics for redacting sample and non-redacting sample

This table reports descriptive statistics of firm characteristics for both the redacting sample and the non-redacting sample over the fiscal period of 2008 through 2015 in Panel A. Panel B reports Spearman (Pearson) correlations in the lower (upper) panel. Correlations with at least ten percent significance are bolded. The variable definitions are detailed in Appendix A.

Panel A: Descriptive statistics

	Redacting sample						Non-redacting sample					
Variables	N	Mean	Median	Q1	Q3	Std.	N	Mean	Median	Q1	Q3	Std.
Fluidity	2536	8.305	7.413	5.183	10.863	4.009	14960	6.131	5.466	3.864	7.657	3.207
Product similarity_New rivals	2536	1.261	0.250	0.052	1.082	2.639	14960	0.425	0.108	0.030	0.335	1.173
Product similarity_Former rivals	2536	0.895	0.308	0.064	1.287	1.650	14960	0.382	0.123	0.032	0.401	0.784
Size	2536	5.892	5.807	4.480	7.213	1.914	14960	6.304	6.299	4.938	7.643	1.995
Market-to-book	2536	2.329	1.624	1.149	2.679	2.081	14960	1.841	1.449	1.092	2.085	1.374
ROA	2536	-0.085	0.005	-0.181	0.067	0.275	14960	-0.003	0.038	-0.029	0.083	0.188
Market share growth	2536	0.161	0.000	-0.130	0.160	0.862	14960	0.049	-0.005	-0.097	0.092	0.505
Debt issue	2536	0.032	0.000	-0.009	0.009	0.136	14960	0.022	0.000	-0.014	0.020	0.114
Equity issue	2536	0.103	0.002	-0.002	0.031	0.333	14960	0.023	0.000	-0.016	0.005	0.185
NewInvestment	2536	0.162	0.091	0.012	0.240	0.215	14960	0.090	0.041	0.001	0.121	0.159
Age	2536	2.733	2.708	2.303	3.091	0.602	14960	2.977	2.944	2.565	3.434	0.645
Num_Exhibits	2536	2.053	2.079	1.609	2.565	0.762	14960	1.548	1.609	1.099	2.197	0.860
Self_Product change	2536	18.030	14.914	9.662	22.360	13.028	14960	16.709	12.690	7.681	20.549	14.416
HHI	2536	0.051	0.030	0.025	0.050	0.051	14960	0.063	0.038	0.029	0.080	0.058
Profit margin	2536	-2.105	0.079	-0.143	0.190	11.428	14960	-0.689	0.113	0.043	0.197	7.644
Abnormal return	2204	0.370	0.215	-2.058	2.448	4.718	12838	0.169	0.144	-1.634	1.887	3.674

Panel B: Spearman \ Pearson correlations

	Redaction	*Fluidity*	*Product similarity_ New rivals*	*Product similarity_ Former rivals*	*Size*	*Market-to-book*	*ROA*	*Market share growth*	*Debt issue*	*Equity issue*	*NewInvestment*	*Age*	*Num_ Exhibits*	*Self_ Fluidity*	*HHI*
Redaction	**1**	**0.22**	**0.20**	**0.19**	**-0.07**	**0.11**	**-0.14**	**0.07**	**0.03**	**0.13**	**0.15**	**-0.13**	**0.21**	**0.03**	**-0.07**
Fluidity	**0.20**	**1**	**0.41**	**0.51**	-0.01	**0.15**	**-0.25**	**0.13**	**0.08**	**0.24**	**0.30**	**-0.28**	**0.11**	**0.10**	**-0.17**
Product similarity_New rivals	**0.15**	**0.48**	**1**	**0.37**	**-0.08**	**0.27**	**-0.28**	**0.16**	**0.09**	**0.33**	**0.33**	**-0.17**	**0.05**	**0.16**	**-0.15**
Product similarity_Former rivals	**0.16**	**0.53**	**0.72**	**1**	**-0.06**	**0.17**	**-0.25**	**0.13**	**0.06**	**0.23**	**0.31**	**-0.17**	**0.06**	**0.23**	**-0.16**
Size	**-0.07**	**-0.01**	**-0.02**	**-0.03**	**1**	**-0.12**	**0.40**	**-0.05**	**0.09**	**-0.24**	**-0.13**	**0.33**	**0.16**	**0.03**	**0.10**
Market-to-book	**0.08**	**0.09**	**0.21**	**0.15**	-0.01	**1**	**-0.13**	**0.13**	**0.01**	**0.25**	**0.28**	**-0.12**	**-0.04**	**0.02**	**-0.10**
ROA	**-0.12**	**-0.17**	**-0.14**	**-0.16**	**0.34**	**0.29**	**1**	**-0.08**	**-0.04**	**-0.58**	**-0.30**	**0.21**	**-0.08**	**-0.10**	**0.12**
Market share growth	**0.01**	**0.02**	**0.02**	0.01	**0.06**	**0.19**	**0.21**	**1**	**0.16**	**0.19**	**0.24**	**-0.14**	**0.04**	**0.04**	**-0.05**
Debt issue	**0.02**	**0.07**	**0.09**	**0.07**	**0.11**	**0.05**	**0.03**	**0.11**	**1**	**0.05**	**0.50**	**-0.07**	**0.06**	**0.08**	**-0.04**
Equity issue	**0.13**	**0.20**	**0.18**	**0.17**	**-0.32**	**0.08**	**-0.33**	**0.13**	**-0.04**	**1**	**0.44**	**-0.19**	**0.03**	**0.08**	**-0.10**
NewInvestment	**0.13**	**0.27**	**0.35**	**0.33**	**-0.10**	**0.32**	-0.01	**0.20**	**0.33**	**0.25**	**1**	**-0.19**	**0.03**	**0.11**	**-0.19**
Age	**-0.13**	**-0.30**	**-0.19**	**-0.19**	**0.31**	**-0.05**	**0.20**	**-0.09**	**-0.02**	**-0.25**	**-0.16**	**1**	**-0.03**	**-0.04**	**0.07**
Num_Exhibits	**0.21**	**0.11**	**0.07**	**0.07**	**0.17**	**-0.05**	**-0.10**	-0.01	**0.03**	**0.03**	0.00	**-0.04**	**1**	**0.10**	-0.01
Self_Product change	**0.07**	**0.17**	**0.25**	**0.22**	**0.03**	**0.03**	**-0.12**	0.00	**0.05**	**0.08**	**0.11**	**-0.06**	**0.13**	**1**	**-0.05**
HHI	**-0.15**	**-0.24**	**-0.30**	**-0.30**	**0.15**	**-0.19**	**0.14**	-0.01	**-0.04**	**-0.15**	**-0.32**	**0.13**	**-0.03**	**-0.11**	**1**

Table 4: The threat of product market dynamics on the likelihood of redaction

This table presents the Probit regression results for equation (1), which tests the threat of product market dynamics on the likelihood of redaction. We have two testing variables, product market *Fluidity* and *Product similarity _New rivals*. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

	(1)	(2)	(3)	(4)
Fluidity	0.085		0.094	0.079
	(0.000)		(0.000)	(0.000)
Product similarity _New rivals		0.075	0.051	0.039
		(0.000)	(0.000)	(0.000)
Size	-0.054	-0.035		-0.054
	(0.000)	(0.004)		(0.000)
Market-to-book	0.024	0.026		0.021
	(0.025)	(0.019)		(0.059)
ROA	0.138	-0.008		0.150
	(0.132)	(0.932)		(0.104)
Market share growth	0.010	0.011		0.006
	(0.625)	(0.579)		(0.753)
Debt issue	0.019	-0.125		0.036
	(0.882)	(0.342)		(0.785)
Equity issue	0.051	-0.033		0.029
	(0.477)	(0.660)		(0.698)
NewInvestment	0.269	0.465		0.241
	(0.022)	(0.000)		(0.042)
Age	-0.170	-0.233		-0.165
	(0.000)	(0.000)		(0.000)
Num_Exhibits	0.420	0.427		0.421
	(0.000)	(0.000)		(0.000)
Self_Fluidity	-0.001	-0.001		-0.001
	(0.608)	(0.240)		(0.312)
HHI	0.517	0.781		0.686
	(0.732)	(0.603)		(0.648)
Constant	-1.504	-1.000	-1.339	-1.512
	(0.007)	(0.076)	(0.000)	(0.007)

Industry & Year fixed effects	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes
Observations	17,496	17,496	17,496	17,496
Pseudo R-squared	0.178	0.163	0.124	0.179

Table 5: Does the likelihood of redaction vary with new rivals' financial capability?

This table presents the effects of product market dynamics on the likelihood of redactions conditional on two characteristics: new rivals' cash holdings and leverages relative to those of incumbent firms. *Product similarity _New rivals (High)* is the aggregate product similarity score for rivals that have higher cash holding (or leverage) than incumbent firms. *Product similarity _New rivals (Low)* is the aggregate product similarity score for rivals that have lower cash holding (or leverage) than incumbent firms. All other variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

	Cash Holding	Leverage
Fluidity	0.079	0.080
	(0.000)	(0.000)
Product similarity _New rivals (High)	0.062	-0.054
	(0.000)	(0.072)
Product similarity _New rivals (Low)	-0.012	0.083
	(0.633)	(0.000)
Size	-0.055	-0.056
	(0.000)	(0.000)
Market-to-book	0.020	0.021
	(0.063)	(0.058)
ROA	0.147	0.174
	(0.110)	(0.061)
Market share growth	0.004	0.004
	(0.851)	(0.830)
Debt issue	0.021	-0.061
	(0.874)	(0.644)
Equity issue	0.051	0.063
	(0.494)	(0.390)
NewInvestment	0.243	0.267
	(0.040)	(0.025)
Age	-0.168	-0.168
	(0.000)	(0.000)
Num_Exhibits	0.419	0.418
	(0.000)	(0.000)
Self_Product change	-0.001	-0.001
	(0.380)	(0.454)
HHI	0.671	0.672
	(0.656)	(0.655)
Constant	-1.486	-1.487
	(0.008)	(0.008)
Industry & Year fixed effects	Yes	Yes
Firm cluster	Yes	Yes
Observations	17,496	17,496
Pseudo R-squared	0.180	0.180

Table 6: The effects of product market dynamics for different types of contracts

This table presents the Probit regression results for five different types of contracts that have redacted disclosures. The five redacted agreement categories are 1) Employment/Incentive, 2) Credit/Leasing, 3) Research and Development/License, 4) Manufacturing/Purchase and Sale, and 5) Investment. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

	Employment/ Incentive	Credit/Leasing	R&D/License	Mfg./P&S	Investment
	(1)	(2)	(3)	(4)	(5)
Fluidity	0.029	0.029	0.092	0.050	0.069
	(0.033)	(0.016)	(0.000)	(0.000)	(0.000)
Product similarity _New rivals	0.051	-0.030	0.055	0.037	-0.042
	(0.021)	(0.323)	(0.000)	(0.008)	(0.186)
Size	0.010	0.014	-0.108	-0.061	0.024
	(0.708)	(0.430)	(0.000)	(0.000)	(0.440)
Market-to-book	0.030	-0.002	0.028	0.016	0.006
	(0.253)	(0.939)	(0.044)	(0.242)	(0.825)
ROA	0.768	-0.558	0.152	0.321	0.719
	(0.003)	(0.002)	(0.259)	(0.007)	(0.008)
Market share growth	-0.095	0.098	0.054	-0.062	-0.154
	(0.281)	(0.023)	(0.044)	(0.039)	(0.041)
Debt issue	0.109	0.022	-0.207	-0.065	0.531
	(0.765)	(0.936)	(0.391)	(0.715)	(0.136)
Equity issue	0.409	-0.376	-0.093	0.115	0.143
	(0.017)	(0.052)	(0.447)	(0.289)	(0.507)
NewInvestment	0.131	0.268	0.571	0.108	-0.138
	(0.663)	(0.248)	(0.004)	(0.526)	(0.664)
Age	0.023	-0.098	0.004	-0.221	-0.197
	(0.770)	(0.066)	(0.946)	(0.000)	(0.030)
Num_Exhibits	0.251	0.191	0.245	0.356	0.179
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Self_Product change	-0.001	-0.001	0.000	0.000	-0.004
	(0.575)	(0.613)	(0.968)	(0.934)	(0.179)
HHI	2.867	3.155	0.238	2.020	-4.251
	(0.446)	(0.283)	(0.938)	(0.292)	(0.362)
Constant	-3.575	-3.387	-2.073	-2.716	-4.648
	(0.005)	(0.000)	(0.032)	(0.000)	(0.002)
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes
Observations	15,146	15,208	15,445	15,866	15,055
Pseudo R-squared	0.080	0.075	0.286	0.125	0.099

Table 7: Information redaction and firm performance

This table presents the performance results. Panel A reports the test results of information redaction on market share growth, profit margin and average monthly abnormal returns. Panel B reports the results conditional on the degree of product market threat. Specifically, if a firm has above-median value for both of our testing variables, then we define it as a firm facing high product market threat due to product market dynamics. On the other hand, if a firm has below-median value for both of our testing variables, then we define it as a firm facing low product market threat. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

Panel A: Results for the overall sample

	Market share growth	Profit margin	Abnormal returns
	(1)	(2)	(3)
Redaction	0.067	0.644	0.248
	(0.000)	(0.005)	(0.024)
Size	0.006	0.056	-0.001
	(0.026)	(0.040)	(0.944)
Market-to-book	0.028	0.033	-0.110
	(0.000)	(0.660)	(0.000)
ROA	-0.097	-0.485	-0.430
	(0.126)	(0.455)	(0.185)
Market share growth	0.038	-0.065	-0.258
	(0.124)	(0.748)	(0.002)
Debt issue	0.329	1.448	-0.944
	(0.002)	(0.069)	(0.015)
Equity issue	0.160	-3.880	-0.648
	(0.037)	(0.001)	(0.023)
NewInvestment	0.168	0.013	0.225
	(0.028)	(0.987)	(0.475)
Age	-0.021	0.166	0.058
	(0.007)	(0.098)	(0.308)
Num_Exhibits	0.006	0.024	-0.073
	(0.241)	(0.669)	(0.063)
Self_Product change	0.001	-0.004	-0.003
	(0.013)	(0.214)	(0.224)
HHI	0.337	-0.025	1.208
	(0.279)	(0.987)	(0.732)
Profit margin	-0.017	0.805	0.002
	(0.000)	(0.000)	(0.796)
Constant	-0.089	-0.886	1.668

	(0.008)	(0.016)	(0.000)
Industry & Year fixed effects	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes
Observations	13,920	16,142	15,042
Adjusted R-squared	0.134	0.591	0.036

Panel B: Results for firms facing high versus low product market threat due to product market dynamics

	Market share growth		Profit margin		Abnormal returns	
	(1)	(2)	(3)	(4)	(5)	(6)
	High	Low	High	Low	High	Low
Redaction	0.189	-0.017	2.056	-0.060	0.675	0.257
	(0.000)	(0.159)	(0.001)	(0.150)	(0.001)	(0.199)
Size	0.016	0.002	0.202	0.002	-0.016	-0.041
	(0.045)	(0.467)	(0.030)	(0.764)	(0.719)	(0.171)
Market-to-book	0.034	0.016	0.113	-0.051	-0.065	-0.232
	(0.009)	(0.011)	(0.458)	(0.092)	(0.152)	(0.000)
ROA	-0.257	0.031	-2.071	0.161	-0.109	-0.626
	(0.022)	(0.630)	(0.123)	(0.489)	(0.808)	(0.383)
Market share growth	0.038	0.020	-0.035	-0.040	-0.265	-0.245
	(0.289)	(0.337)	(0.909)	(0.647)	(0.013)	(0.086)
Debt issue	0.443	0.140	2.976	0.156	-0.549	-0.688
	(0.026)	(0.076)	(0.080)	(0.486)	(0.398)	(0.277)
Equity issue	0.046	0.333	-5.355	-0.062	-0.273	-2.015
	(0.682)	(0.003)	(0.002)	(0.893)	(0.446)	(0.002)
NewInvestment	0.124	0.248	0.363	-0.052	-0.099	0.483
	(0.383)	(0.002)	(0.826)	(0.849)	(0.849)	(0.402)
Age	-0.066	-0.009	0.607	-0.000	0.008	0.063
	(0.016)	(0.145)	(0.124)	(0.996)	(0.956)	(0.392)
Num_Exhibits	0.017	0.008	0.096	0.027	-0.189	0.015
	(0.254)	(0.085)	(0.651)	(0.059)	(0.036)	(0.789)
Self_Product change	0.001	0.001	-0.016	-0.001	0.005	-0.006
	(0.113)	(0.108)	(0.055)	(0.293)	(0.299)	(0.110)
HHI	-0.449	0.593	-12.262	0.794	3.189	5.368
	(0.755)	(0.034)	(0.283)	(0.019)	(0.832)	(0.215)
Profit margin	-0.015	-0.005	0.798	1.034	0.000	-0.061
	(0.000)	(0.313)	(0.000)	(0.000)	(0.997)	(0.030)
Constant	-0.091	-0.091	-2.844	-0.040	1.846	1.837
	(0.384)	(0.003)	(0.022)	(0.513)	(0.019)	(0.000)
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,568	6,412	4,085	7,533	3,667	7,164
Adjusted R-squared	0.132	0.068	0.590	0.898	0.034	0.044

Table 8: Information redaction categories and firm performance

This table presents the performance results for each type of redaction. Panel A reports the test results of information redaction on market share growth, profit margin and average monthly abnormal returns. Panel B reports the results conditional on the degree of product market threat for R&D/License contracts. Specifically, if a firm has above-median value for both of our testing variables, then we define it as a firm facing high product market threat due to product market dynamics. On the other hand, if a firm has below-median value for both of our testing variables, then we define it as a firm facing low product market threat. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

Panel A Information redaction and firm performance for different types of contracts

Panel A.1 Market share growth

	Employment/ Incentive	Credit/Leasing	R&D/License	Mfg./P&S	Investment
	(1)	(2)	(3)	(4)	(5)
Redaction	-0.041	0.028	0.278	0.008	-0.012
	(0.030)	(0.399)	(0.000)	(0.674)	(0.706)
Controls	Yes	Yes	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes
Observations	12,030	12,088	12,262	12,610	11,961
Adjusted R-squared	0.112	0.113	0.140	0.111	0.113

Panel A.2 Profit margin

	Employment/ Incentive	Credit/Leasing	R&D/License	Mfg./P&S	Investment
	(6)	(7)	(8)	(9)	(10)
Redaction	0.140	0.341	1.801	0.381	0.233
	(0.269)	(0.007)	(0.033)	(0.164)	(0.612)
Controls	Yes	Yes	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes
Observations	13,985	14,044	14,247	14,641	13,901
Adjusted R-squared	0.615	0.615	0.593	0.599	0.616

Panel A.3 Abnormal returns

	Employment/ Incentive	Credit/Leasing	R&D/License	Mfg./P&S	Investment
	(11)	(12)	(13)	(14)	(15)
Redaction	0.348	-0.402	0.778	0.053	0.744
	(0.339)	(0.087)	(0.016)	(0.722)	(0.055)
Controls	Yes	Yes	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes
Observations	13,006	13,062	13,259	13,601	12,926
Adjusted R-squared	0.042	0.043	0.039	0.041	0.042

Panel B Information redaction and firm performance for R&D/License contracts conditional on the degree of product market threat

	Market share growth		Profit margin		Abnormal returns	
	(1)	(2)	(3)	(4)	(5)	(6)
	High	Low	High	Low	High	Low
Redaction	0.478	-0.046	3.751	-0.135	0.987	1.622
	(0.000)	(0.212)	(0.009)	(0.559)	(0.003)	(0.196)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,921	5,869	3,352	6,905	3,006	6,557
Adjusted R-squared	0.146	0.0762	0.593	0.900	0.035	0.048

Table 9: Robustness checks using matched R&D/License contracts

This table presents the likelihood of information redaction for R&D/License contracts and firm performance when firms redact disclosures from R&D/License contracts. In these tests, we require non-redacting control firms to have at least one R&D/License agreement based on their 10-K, 10-Q or 8-K filings, but with no information redacted in these agreements. Panel A reports the test results for the likelihood of information redaction for R&D/License contracts. Panel B reports the effects of R&D/License contracts redaction on market share growth, profit margin and average monthly abnormal returns, and the results conditional on the degree of product market threat for the R&D/License contracts sample. Specifically, if a firm has above-median value for both of our testing variables, then we define it as a firm facing high product market threat due to product market dynamics. On the other hand, if a firm has below-median value for both of our testing variables, then we define it as a firm facing low product market threat. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

Panel A The likelihood of redaction for R&D/License contracts

	Redaction
	(1)
Fluidity	0.095
	(0.000)
Product similarity _New rivals	0.060
	(0.000)
Controls	Yes
Industry & Year fixed effects	Yes
Firm cluster	Yes
Observations	13,843
Pseudo R-squared	0.282

Panel B.1 Firm performance for R&D/License contracts information redaction

	Market share growth	Profit margin	Abnormal returns
	(1)	(2)	(3)
Redaction	0.284	1.192	0.640
	(0.000)	(0.128)	(0.074)
Controls	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes
Observations	12,089	12,809	11,930
Adjusted R-squared	0.136	0.606	0.047

Panel B.2 Firm performance for R&D/License contracts conditional on the degree of product market threat

	Market share growth		Profit margin		Abnormal returns	
	(1)	(2)	(3)	(4)	(5)	(6)
	High	Low	High	Low	High	Low
Redaction	0.487	-0.051	2.733	-0.237	0.797	1.425
	(0.000)	(0.176)	(0.041)	(0.334)	(0.033)	(0.289)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,863	5,801	2,950	6,252	2,666	5,939
Adjusted R-squared	0.143	0.077	0.604	0.908	0.051	0.051

Table 10: Rivals that are exiting the market and the likelihood of redaction

This table presents the Probit regression results testing the incremental threat of former rivals on the likelihood of redaction. We have three testing variables, product market *Fluidity, Product similarity _New rivals*, and *Product similarity _Former rivals*. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

Variable	All Redactions	Employment/ Incentive	Credit/Leasing	R&D/ License	Mfg./P&S	Investments
Fluidity	0.072	0.032	0.038	0.077	0.048	0.057
	(0.000)	(0.033)	(0.005)	(0.000)	(0.000)	(0.000)
Product similarity_New rivals	0.038	0.053	-0.018	0.055	0.037	-0.046
	(0.000)	(0.014)	(0.523)	(0.000)	(0.009)	(0.158)
Product similarity_Former rivals	0.065	-0.035	-0.109	0.112	0.019	0.091
	(0.000)	(0.591)	(0.141)	(0.000)	(0.498)	(0.024)
Size	-0.054	0.010	0.013	-0.106	-0.061	0.026
	(0.000)	(0.701)	(0.443)	(0.000)	(0.000)	(0.394)
Market-to-book	0.020	0.030	0.001	0.028	0.016	0.002
	(0.074)	(0.240)	(0.962)	(0.049)	(0.255)	(0.944)
ROA	0.160	0.760	-0.590	0.139	0.326	0.763
	(0.081)	(0.003)	(0.001)	(0.299)	(0.006)	(0.005)
Market share growth	0.004	-0.096	0.102	0.048	-0.063	-0.152
	(0.841)	(0.281)	(0.018)	(0.070)	(0.039)	(0.038)
Debt issue	0.075	0.097	-0.026	-0.120	-0.053	0.578
	(0.570)	(0.791)	(0.925)	(0.618)	(0.765)	(0.099)
Equity issue	0.037	0.404	-0.411	-0.100	0.121	0.174
	(0.617)	(0.018)	(0.033)	(0.419)	(0.270)	(0.410)
NewInvestment	0.197	0.148	0.328	0.473	0.096	-0.202
	(0.098)	(0.619)	(0.166)	(0.021)	(0.574)	(0.528)
Age	-0.164	0.022	-0.097	0.012	-0.221	-0.194
	(0.000)	(0.782)	(0.066)	(0.824)	(0.000)	(0.033)
Num_Exhibits	0.423	0.250	0.189	0.253	0.356	0.182
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Self_Product change	-0.002	-0.001	-0.000	-0.002	-0.000	-0.006
	(0.080)	(0.635)	(0.833)	(0.197)	(0.935)	(0.097)
HHI	0.761	2.787	3.169	0.394	2.047	-4.093
	(0.614)	(0.458)	(0.281)	(0.898)	(0.286)	(0.384)
Constant	-1.536	-3.545	-3.384	-2.179	-2.733	-5.079
	(0.007)	(0.005)	(0.000)	(0.027)	(0.000)	(0.001)
Industry & Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,496	15,146	15,208	15,445	15,866	15,055
Pseudo R-squared	0.181	0.080	0.077	0.292	0.125	0.102

Table 11: Different definitions for new and former rivals

This table reports the Probit regression results using different definitions for new and former rivals. *Product similarity _New rivals_True* reflects aggregated product similarity for all new rivals. New rivals are those that are peer firms in year t but are not peers in year t-1 or t-2. *Product similarity _Former rivals_True* reflects aggregated product similarity for all former rivals. Former rivals are those that are peer firms in year t-1 but are not peers in year t or t+1. *Product similarity _New rivals_Mock* reflects aggregated product similarity for all temporary new rivals. Mock new rivals are those that are peer firms in year t-2, are not peer firms in year t-1, and then become peer firms again in year t. *Product similarity _Former rivals_Mock* reflects aggregated product similarity for all mock former rivals. Mock former rivals are those that are peer firms in year t-1, are not peer firms in year t, and then become peer firms again in year t+1. Lastly, in Column (4), we report results for peer classifications benchmarked to proportion using two-digit SIC codes. Specifically, a random pair of firms are considered peers if they pass a minimum similarity score threshold. This threshold is set by using the same proportion of peers as one would have obtained using the two-digit SIC codes to categorize all of the random pair firms into peers. All variable definitions are detailed in Appendix A. In all specifications, we control for year fixed effects and industry fixed effects. P-values based on firm-clustered robust standard errors are reported in parentheses below the coefficients.

	1	2	3	4
Fluidity	0.075	0.090	0.075	0.073
	(0.000)	(0.000)	(0.000)	(0.000)
Product similarity _New rivals_True	0.054		0.054	
	(0.000)		(0.000)	
Product similarity _Former rivals_True	0.092		0.091	
	(0.003)		(0.004)	
Product similarity _New rivals_Mock		0.021	0.003	
		(0.633)	(0.955)	
Product similarity _Former rivals_Mock		0.028	0.016	
		(0.439)	(0.657)	
Product similarity _New rivals_TNIC2				0.028
				(0.000)
Product similarity _Former rivals_TNIC2				0.036
				(0.002)
Size	-0.056	-0.058	-0.057	-0.054
	(0.000)	(0.000)	(0.000)	(0.000)
Market-to-book	0.003	0.009	0.003	0.019
	(0.804)	(0.472)	(0.804)	(0.076)
ROA	0.100	0.063	0.100	0.156
	(0.345)	(0.549)	(0.345)	(0.090)
Market share growth	0.006	0.015	0.006	0.006

	(0.825)	(0.552)	(0.817)	(0.778)
Debt issue	0.045	-0.020	0.046	0.062
	(0.769)	(0.895)	(0.764)	(0.639)
Equity issue	0.114	0.111	0.113	0.038
	(0.186)	(0.190)	(0.190)	(0.608)
NewInvestment	0.199	0.287	0.198	0.210
	(0.152)	(0.035)	(0.153)	(0.075)
Age	-0.200	-0.201	-0.200	-0.164
	(0.000)	(0.000)	(0.000)	(0.000)
Num_Exhibits	0.420	0.419	0.420	0.422
	(0.000)	(0.000)	(0.000)	(0.000)
Self_Product change	-0.002	-0.001	-0.002	-0.002
	(0.126)	(0.334)	(0.128)	(0.040)
HHI	1.281	1.122	1.290	0.730
	(0.448)	(0.507)	(0.445)	(0.628)
Constant	-1.471	-1.478	-1.473	-1.523
	(0.024)	(0.022)	(0.024)	(0.007)
Industry & Year fixed effects	Yes	Yes	Yes	Yes
Firm cluster	Yes	Yes	Yes	Yes
Observations	13,734	13,734	13,734	17,496
Pseudo R-squared	0.184	0.181	0.184	0.180