

Corporate Disclosure as a Tacit Coordination Mechanism: Evidence from Cartel Enforcement Regulations*

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Abstract

We empirically study how collusion in product markets affects firms' financial disclosure strategies. We find that after a rise in cartel enforcement, U.S. firms start sharing more detailed information in their financial disclosure about their customers, contracts, and products. This new information potentially benefits peers by helping to tacitly coordinate actions in product markets. Indeed, changes in disclosure are associated with higher future profitability. Our findings suggest that transparency in financial statements can come at the expense of consumer welfare.

Keywords: Financial Disclosure, Antitrust Enforcement, Collusion, Tacit Coordination

JEL Classification: D43, G38, M41, L15, L41

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1 Introduction

Financial market regulation has been strengthening over time. The legislation such as Regulation FD and the Sarbannes-Oxley Act has mandated that publicly listed firms increase transparency by disclosing more information in their financial statements. Such disclosure reduces the cost of capital, levels the information playing field for different investors, and allows them to monitor managers more efficiently through reduced information asymmetry (Goldstein and Yang [2017], Leuz and Wysocki [2016]). However, increased transparency can come at a cost to consumers in product markets. Indeed, regulators have been expressing concerns about unintended product-market consequences of increasing transparency in financial markets, as doing so could provide firms with ways to coordinate product market actions.¹

In this paper, we aim to shed light on this unexplored cost of transparency in financial markets by examining empirically whether firms use the disclosure that is targeted at investors in order to coordinate actions in product markets. Since firms have imperfect information about rival behavior (Green and Porter [1984]), the observability of each other’s past, current and expected future actions, expressed through public financial disclosure, can help them stabilize the cartels. For instance, such disclosure can suggest a collusive price and help monitor whether colluding peer firms have deviated from that price. Such publicly verifiable information is even more important when there is no direct communication between firms, i.e. when firms are engaged in tacit collusion arrangements.²

¹In its report, the Organisation for Economic Co-operation and Development (OECD) writes that “*greater transparency in the market is generally efficiency enhancing and, as such, welcome by competition agencies. However, it can also produce anticompetitive effects by facilitating collusion or providing firms with focal points around which to align their behaviour*” (OECD [2012]).

²In line with the earlier literature, throughout the paper we refer to explicit collusion as situations where firms communicate directly with each other, which represents a violation of antitrust law. In contrast, tacit coordination involves situations where firms do not communicate privately to exchange information. From a legal perspective, tacit collusion cases are much harder to prosecute. For instance, in the decision *Text Messaging Antitrust Litigation* (No 14-2301, April 9, 2015), Judge Richard Posner stated that it is “difficult to prove illegal collusion without witnesses to an agreement” and that circumstantial evidence “consistent with an inference of collusion, but [...] equally consistent with independent parallel behavior” is not sufficient.

Discerning causality between collusion and disclosure targeted at investors³ is challenging, given that both product market and disclosure choices are likely to be endogenously determined. Moreover, it is difficult, if not impossible, to directly observe colluding firms. For instance, comparing convicted and non-convicted firms would not constitute conclusive evidence as non-convicted firms might be engaging in the most profitable and stable cartels. Our identification strategy thus relies on exogenously varying *incentives* to tacitly collude. In particular, we investigate a setting where antitrust authorities gain more power to detect price-fixing activities. We argue that this leads to higher explicit collusion costs and, thus, for some firms tacit collusion becomes a more profitable strategy than explicit collusion.⁴ In other words, higher costs of private communication, which is likely to be the firms' first choice given the potential antitrust action, make public communication more appealing. This allows us to study whether higher incentives to tacitly coordinate actions in product markets push firms to start unilaterally providing more information on product market strategies in their financial disclosure documents.

We consider a sample of U.S. publicly listed companies from 1994-2012 and develop a measure meant to capture exogenous increase in explicit collusion costs at the industry level. Specifically, given the rise in the prominence of international cartels and the focus of U.S. antitrust authorities on investigations involving non-U.S. conspirators ([Ghosal and Sokol \[2014\]](#)), we rely on the passage of antitrust laws in the countries with which the firm's industry trades. In particular, we study leniency laws, which have been passed or strengthened in a staggered manner around the world starting in 1993. A leniency law allows the cartel member, who provides crucial evidence to the cartel prosecutors, to obtain amnesty and thus reduce legal exposure. Our analysis requires a measure that has variation

³For the sake of brevity, in the paper we refer to the disclosure targeted at investors as *financial disclosure*.

⁴Such preferred order between these product market strategies – i.e., that stronger antitrust leads firms to switch from more explicit to more tacit collusion – is our main identifying assumption. We base it on theoretical work, e.g., [McAfee and McMillan \[1992\]](#), who show that strong explicit cartels that allow redistribution of spoils are preferred over weak implicit cartels, but the latter can become more advantageous when antitrust enforcement is higher. Our claim is also in line with the argument that when it is harder to collude explicitly on prices, firms switch to the forms of collusion that are harder for antitrust authorities to catch, e.g., to partial collusion ([Block et al. \[1981\]](#)).

in cartel incentives to collude that varies across firms. In order to construct this measure, we take a weighted average of the passage of such laws in foreign countries, where weights are determined by the share of U.S. industry trade links with that particular country. Our treatment variable thus captures changes in behavior for firms that belong to industries that trade relatively more with the countries adopting a leniency law, as compared to those that belong to industries that trade less with those countries at a given point in time. We argue that when more countries with which U.S. industries trade pass such laws, antitrust authorities find it easier to cooperate with each other and convict members of international cartels, which increases the industry's costs of collusion. To ascertain the validity of our identification strategy, we start our empirical analyses by documenting that foreign leniency laws predict the dissolution of known cartels involving U.S. firms. We also document a decline in the profit margins, equity returns, and product prices of the affected U.S. firms, in line with the theoretical prediction that increased costs of collusion should lead to stronger product-market competition.

We next turn our investigation to how firms communicate their product-market strategies in their financial disclosure documents in order to sustain a tacit coordination equilibrium. To do so, we examine two distinct communication channels. First, we focus on the material contracts with customers where firms face strong disclosure requirements. While financial disclosure is a unique information exchange mechanism in that it is regulated by the SEC, managers have some flexibility in the depth and details of the information that they choose to make public ([Verrecchia and Weber \[2006\]](#)). We thus look at how managers use this flexibility to credibly and unilaterally signal information about their product-market strategies to industry members. In particular, we look at whether firms request confidential treatment in filing material contracts with customers.⁵ To the extent that such contracts contain a substantial amount of proprietary information, including product prices, transaction volumes, geographical location, and product quality, international or domestic rivals might use that

⁵Our Internet Appendix A1 provides two excerpts from such contracts. In one case, the firm redacts product prices, while in the other case the firm does not redact and thus shares its product prices publicly.

information to form their product strategies.

Second, motivated by recent legal cases where antitrust agencies claimed that firms were using earnings conference calls with equity analysts to alter competition in product markets⁶, we examine the transcripts of these conference calls. Prior studies have established that the information content of the calls helps to predict firm’s future performance (Davis et al. [2015]) as they contain significant forward-looking qualitative and quantitative disclosure, such as expected product releases, price movements, and marketing strategies (Brochet et al. [2018]). Such information could be used to engage into and sustain tacit collusion arrangements. While compared to the sales contracts, the conference calls contain less precise focal points on which firms can collude, they allow us study a larger sample of firms. Specifically, we focus on the conference calls of 1,605 unique firms, and count the frequency of product-market-related words.

We find robust evidence that after foreign leniency laws are passed and thus the costs of explicit collusion rise, firms are less likely to redact information from their publicly disclosed customer contracts. For instance, following Canada’s 1999 passage of its leniency program, to which the pharmaceutical industry was exposed, three U.S. pharmaceutical companies stopped redacting sales contracts. Similarly, following Japan’s 2005 passage of leniency program, to which the storage device industry was exposed, two U.S. manufacturers of storage devices stopped redacting sales contracts. To understand the magnitude of our estimate, we select the industry that is the most exposed to each foreign law in our sample. Focusing on these most-exposed industries, we find that each adoption of a leniency law explains, on average, 19% of within-firm variance of redaction. We next concentrate on our sample of earnings conference calls and find that managers reveal more about their product-market strategies during the calls with equity analysts after foreign leniency laws

⁶For instance, in Valassis Communications (FTC File No 051-0008), and Matter of U-Haul Int and AMERCO (FTC File No 081-0157), the Federal Trade Commission (FTC) presented evidence that firms unilaterally signaled to their competitors their willingness to increase prices in their public conference call with stock analysts. Such invitations to collude may violate Section 5 of the FTC Act. In July 2015, the Department of Justice (DoJ) started an investigation on the collusion between airlines regarding flight capacity and requested among other documents relevant communication between airlines and stock analysts.

are adopted. In this case, each foreign law explains, on average, 5% of within-firm variance of the product discussion.

These results are robust to controlling for industry and firm characteristics such as import penetration, industry concentration, firm size, and operating performance that could affect both market structures and disclosure choices. We also control for time-invariant unobservable differences between firms using firm-fixed effects, as well as aggregate economic trends using year-fixed effects. Importantly, we show that the passage of leniency laws does not proxy for a general strengthening of the rule of law in foreign countries, but the results are stronger if we consider only countries with a higher degree of legal enforcement.

We further study whether these disclosure changes have economic consequences. We find that firms that adapt their disclosure strategies by increasing their product-market-related communication do not experience a drop in profitability following the passage of foreign leniency laws, while the profitability of the firms that do not change their disclosure suffers. This finding is consistent with the change in disclosure allowing firms to coordinate and maintain a level of profitability higher than that of a more competitive market equilibrium.

Finally, we explore alternative motives why firms change disclosure strategies. For instance, firms could be switching to stronger competition and thus increasing disclosure to raise more capital that would help them compete in the product markets. Alternatively, they might increase their disclosure to reduce their litigation risk. However, we find that firms do not increase all types of disclosure on competition. First, we find that firms do not increase their disclosure on purchase contracts. Moreover, we look at the disclosure from which potential tacit coordination peers are unlikely to benefit but which could be useful for antitrust authorities to understand which industries are more likely to show signs of collusive behavior. The SEC recommends that the management discussion and analysis (MD&A) section of a firm's 10-K filing includes a discussion of the firm's competitive position. We find that as explicit collusion costs rise, the firms reduce the extent to which they communicate about their competitive position and provide such disclosure in a more dispersed fashion,

even though such information may benefit investors. These results do not support the alternative explanations that firms disclose more to raise capital to compete more aggressively with their industry peers or to reduce their litigation risk by signaling their type through a systematic increase in transparency.

2 Related Literature

Our paper relates to a few strands of literature. First, it speaks to the literature on information exchange with the intention to stabilize cartels (see [Kühn and Vives \[1995\]](#) for an extensive review). The empirical literature on the information exchange mechanisms has largely found that trade associations and similar voluntary organizational arrangements have facilitated collusion ([Bertomeu et al. \[2015\]](#), [Doyle and Snyder \[1999\]](#), [Genesove and Mullin \[2001\]](#), [Harrington and Skrzypacz \[2007; 2011\]](#), [Kirby \[1988\]](#), [Page \[2009\]](#)). Meanwhile, the findings on whether mandated price disclosure helps or harms collusion have been mixed. While in some contexts transparency disciplines firms ([Ater and Rigbi \[2017\]](#), [Rossi and Chintagunta \[2016\]](#)), in others it facilitates collusion ([Albaek et al. \[1997\]](#), [Luco \[2017\]](#)). We explore an alternative regulated information exchange mechanism: financial disclosure by listed firms. In line with the latter set of studies, we find that SEC-regulated disclosure could help firms to coordinate in product markets. Overall, our results highlight the potential conflict between securities and antitrust regulations. While transparency aims at protecting investors, it may also foster negative externalities in product markets by helping to sustain collusive arrangements, partially explaining the observed decline in competition in the U.S. economy ([Gutierrez and Philippon \[2017\]](#)).

Financial disclosure differs from previously studied information mechanisms in several ways. First, such disclosure is more credible than other mechanisms since it is regularly verified by external audit teams, and managers are largely legally liable for their statements. Credibility constitutes a necessary condition to sustain tacit coordination, as information has

to be perceived as more than “cheap talk” and not be discounted by peer firms (Baliga and Morris [2002]). Second, disclosure is targeted at investors and mandated by stock exchange regulators, so antitrust authorities have limited capacity to limit such behavior.⁷ Moreover, we study unilateral information announcements rather than quid pro quo agreements such as trade associations. Finally, while the financial disclosure is regulated, compared to other mandated disclosure firms still have considerable leeway in how much to disclose.

We believe that these differences make financial disclosure an important mechanism to study from the antitrust perspective. In a related paper, Goncharov and Peter [2018] find that when firms switch to international accounting standards and thus increase the transparency of their statements, cartel members can more easily identify deviating peers, and the stability of the cartels that are eventually convicted drops. Instead, we ask how firms change their financial disclosure following the need to sustain coordination in product markets.

Second, our study relates to the broad accounting literature on the role of disclosure. One strand of this literature examines the capital markets benefits of disclosure that translates into lower adverse selection (higher liquidity and lower cost of capital) and better monitoring ability of management by investors (see Leuz and Wysocki [2016] for a comprehensive discussion). Within the accounting disclosure literature, our paper is more closely related to another set of studies that focus on how product-market considerations affect firms’ disclosure choices (see Beyer et al. [2010] for a thorough review). The common intuition behind those studies is that public financial information disclosure might be costly as rivals could learn a firm’s innovative capabilities and its demand or cost components and adjust their strategies accordingly. Moreover, disclosing information such as product prices could harm the firm when it bargains with its customers (e.g., if different customer groups are charged different prices). This means that it might be optimal to disclose less rather than full infor-

⁷The FTC cases cited in footnote (6) provoked legal discussion on whether SEC regulations that facilitate public disclosure are at odds with antitrust regulation (see, e.g., Steuer et al. [2011] for an extensive discussion and a related ruling by the Supreme Court in *Credit Suisse v. Billing* where the Supreme Court has ruled that where antitrust and securities laws regulate the same conduct and the application of antitrust law is “clearly incompatible” with the securities laws, the latter dominate and there should be no antitrust liability).

mation. This is known as the proprietary cost hypothesis derived from the seminal studies by Jovanovic [1982] and Verrecchia [1983].

Most of the empirical literature in this area looks at cross-sectional variations in disclosure based on various industry characteristics (e.g., Li [2010] and Ali et al. [2014]). Recent studies have used identification strategies based on industry deregulation (e.g., Burks et al. [2018]) or increased import penetration (e.g., Huang et al. [2016]) that result in a new entry or in increased competition from existing foreign exporters. In both cases, the incumbent local players have incentives to reduce truthful disclosure. They could either increase the provision of negative or misleading information to deter potential entrants, or decrease overall voluntary provision of information. Similarly, Li et al. [2018] exploits the adoption of the inevitable disclosure doctrine across U.S. states, which increased the costs of public disclosure, and shows that this had led to less disclosure on major customers' identities.

In this paper, we argue that when explicit collusion costs increase, instead of switching to competition and reducing truthful disclosure, incumbents could mitigate the antitrust shock by sharing more information that helps tacit coordination in product markets.⁸ Thus, the benefits of disclosing proprietary information to industry peers increase, thereby reducing the net disclosure costs. As a result, firms switch to a second-best equilibrium where the optimal level of disclosure of proprietary information is higher. This refines our understanding of the link between product-market structures and disclosure and highlights that the sources of the changes in competition among existing rivals may lead to contrasting predictions.

Third, our paper relates to the literature that looks at the impact of product-market collusion on various corporate policies. Dasgupta and Žaldokas [2018] and Dong et al. [2014] find that increases in collusion costs lead to changes in capital structure and acquisition

⁸Firms use a mix of private and public communication. The stability in the collusive arrangements is thus likely achieved with some combination of both of them. For example, in the *U-Haul* case (referenced in footnote 6), the FTC's complaint stated that regional managers of the competing firms communicated directly but also that the intentions to enter in a collusive agreement were discussed in the public conference calls. We argue that when the costs of explicit collusion increase firms rely relatively more on public information to sustain collusive agreements. In other words, "the need for cartel members to communicate intensifies precisely when collusion is harder to sustain" (Grout and Sonderegger [2005]).

activity. [Gilo et al. \[2006\]](#) study how partial cross-ownership stabilizes collusion, while [Azar et al. \[2017\]](#) and [Azar et al. \[2016\]](#) document that common ownership of firms by large asset managers increases product prices in the airline and banking industries.

Finally, our results also speak to the literature on the real effects of the financial disclosure. Empirical studies have generally found positive real effects of increased transparency, e.g., in food hygiene ([Jin and Leslie \[2003\]](#)), corporate investment ([Biddle et al. \[2009\]](#), [Shroff et al. \[2014\]](#)), and social responsibility ([Christensen et al. \[2017a;b\]](#)). Our results instead document a source of negative real consequences to more transparent financial statements and suggest that policy makers should take into account the potential adverse effects of financial statement transparency on consumer welfare when setting the level of mandatory disclosure.

3 Identification Strategy

Our identification strategy relies on varying incentives to tacitly collude that we measure by the passage of leniency laws in the foreign countries with which industry trades. We first describe leniency laws in general and then present our identification strategy.

3.1 Background of Leniency Laws

Given the importance of cartels and their anti-welfare implications⁹, governments have devoted considerable resources to tackling them. One of the most effective tools has been the introduction of leniency programs, or leniency laws (see [Marvão and Spagnolo \[2016\]](#) for a recent survey of the empirical, theoretical, and experimental evidence of the leniency law effects). Leniency programs allow market regulators (or the courts) to grant full or partial amnesty to those firms that, despite being a part of a collusive agreement, cooperate in providing information about it. In particular, a typical leniency law stipulates that the first firm that provides substantial evidence to the regulators (if the latter do not yet have

⁹[Connor \[2014\]](#) estimates that worldwide consumer welfare loss due to discovered cartels has amounted to least \$797 billion since 1990.

sufficient evidence to prosecute the cartel) gets automatic amnesty. In countries where the firm’s managers, employees, and directors face criminal liability for participating in a collusive agreement, amnesty also extends to waiving such criminal liability. As [Hammond \[2005\]](#) suggests, U.S. leniency law, which was strengthened in 1993, proved successful in destabilizing existing cartels and deterring the formation of new ones and has thus inspired other countries to pass similar laws. In a difference-in-differences setting, [Dong et al. \[2014\]](#) show that the global wave of leniency law passage significantly harmed collusion. In particular, leniency laws increased conviction rates and generally lowered gross margins of affected firms. Internet Appendix A2 reports the list of leniency law passage years around the world.

Some countries passed the leniency program after prominent collusion cases. For instance, Hungary did so after it faced significant criticism concerning its competition investigation against mobile telephone operators, while Switzerland made its competition law stronger in 2003, in part by passing leniency laws, after it failed to prosecute firms involved in the vitamin cartel. Taiwan passed the law as a response to general concerns about rising consumer prices, while Korea passed it after the financial crisis.

Other countries passed leniency laws after significant pressures from outside parties ([Lipsky \[2009\]](#)). For instance, Mexico passed the law in 2006 following the general recommendations of an OECD Peers Review in 2004 on Competition Law and Policy, which reported that its antitrust authority needed better investigative tools, including the ability to give leniency to a whistleblower revealing secret cartel conduct. Similarly, the U.S. pushed Singapore to strengthen its antitrust law in negotiations for a bilateral free trade agreement,¹⁰ while the EU has encouraged its member states to adopt leniency laws. The IMF and the World Bank regularly ask for the overhaul of antitrust laws as a condition for funding ([Bradford \[2012\]](#)).

Even if not explicitly pressured, some countries passed the law after noticing its success

¹⁰We are not aware of any other case apart from Singapore where a leniency law was passed as an outcome of a trade deal. Also, in all our regressions we control for the industry’s import penetration, so it is unlikely that our results are driven by rising trade. Moreover, we perform a robustness check in which we consider only those countries for which we could find a clear reason for the law’s passage and such reason does not include external pressure from the U.S.

in other countries. As more countries passed leniency laws, firms from non-passing countries could have been left at a disadvantage. For instance, Japanese companies involved in international cartels that also affected the Japanese market faced a significant risk of an investigation in Japan even if they applied for leniency in the foreign jurisdiction. That hampered the Japanese antitrust authority's cooperation with authorities in other countries.

In summary, leniency laws have been shown to be an effective tool in combating cartels, and many countries have passed such programs. That said, the timing of their passage in different countries is unlikely to have been driven by one particular economic trend that could correlate with the U.S. firm behavior that we study in this paper.¹¹

3.2 Increase in Explicit Collusion Costs

Against this background, we create a treatment variable based on a U.S. firm's exposure to the passage of leniency laws in those countries from which the U.S. firm's industry gets a significant fraction of its imports. Similarly, as in the above-mentioned example of Japanese firms, the passage of more leniency programs makes the coordination between the antitrust authorities easier, and firms that could consider colluding in multiple foreign markets might find it more difficult to form international cartels with industry peers. Even if the antitrust authority promises a leniency applicant that the information it provides will not be shared with other antitrust authorities, often the knowledge about the cartel becomes public, and other antitrust authorities may initiate prosecution if they have observed similar market behavior in their own jurisdictions. Moreover, even if U.S. antitrust authorities cannot bring actions against the suspected cartel in the U.S., the conviction of cartels in foreign jurisdictions can help to bring private civil action by affected parties within the U.S.

All in all, this means that if cartels are international, the passage of leniency laws in another country increases the costs of collusion even in the U.S. as it becomes easier for rivals

¹¹We estimate a Cox proportional hazard model, trying to predict foreign leniency law passage by the characteristics of the U.S. industries that are exposed to those countries. Except for the country size, we fail to find other consistent predictors.

to apply for leniency in foreign markets. And many cartels are indeed international: at least 1,014 price-fixing cartels, involving members from multiple countries, were either convicted or under investigation during 1990-2013 (Connor [2014]). At the same time, U.S. antitrust authorities are also shifting their focus to investigations involving non-U.S. conspirators, as these tend to have a larger impact on consumer welfare (Ghosal and Sokol [2014]).¹²

We therefore argue that foreign leniency laws increase the costs of explicit collusion for U.S. firms. We construct a continuous variable that we call *Foreign Leniency* and estimate it as the weighted average of the passage of laws in all other countries, excluding the U.S.:

$$\text{Foreign Leniency}_{jt} = \sum_k w_{kj} L_{kt}$$

where k denotes a foreign country, j denotes a two-digit SIC industry, and t denotes year. w_{kj} is the share of two-digit SIC industry j 's imports from country k out of all industry j 's output in 1990. L_{kt} is an indicator variable that takes a value of 1 if country k has passed a leniency law by year t , and zero otherwise. To avoid spurious correlation due to changes in industry structure or industry classification, we remove the time variation and base the weights on the data in year 1990. The variable ranges from 0 when leniency laws are not passed in any country with any market share in the firm's industry to, theoretically, 1 when all foreign countries with any share in the firm's industry have passed the leniency law and the industry imports all its output. Unless no country from which a firm's industry is importing has passed a leniency law, a firm is considered as *treated*, and the intensity of treatment changes as more countries from which this industry imports adopt leniency laws.¹³

¹²This has been also recognized by the U.S. authorities, as suggested by the DoJ's statement in the Flat Glass case (No 08-180, Oct. 6, 2009): "*The DoJ recognizes that the interconnected nature of modern cartels is such that the viability of foreign leniency programs is also critical to U.S. anti-cartel enforcement efforts: the emergence of leniency policies of different governments with similar requirements has made it much easier and far more attractive for companies to develop a global strategy for reporting international cartel offenses and had led leniency applicants to report their conduct to multiple jurisdictions simultaneously. For instance, the European Commission has been one of the Division's closest partners in the fight against international cartels and over ninety percent of the international cartels that have been prosecuted by the Division were active in Europe as well as in the United States.*"

¹³In Section 5.6.3, we use alternative weighting schemes, for instance, by weighting according to the export shares; adopting a binary treatment based on the foreign country to which the industry is most exposed; or

As it is based on political decisions made outside of the U.S., *Foreign Leniency* should be largely exogenous to the domestic political and economic conditions surrounding U.S. firms.

3.3 Empirical Strategy

We use *Foreign Leniency* to identify a causal impact of increases in explicit collusion costs on firms' disclosure choices. We argue that the passage of foreign leniency laws makes tacit collusion the next-best alternative for some of the firms. Our empirical tests will thus be a joint test of this identifying assumption and our hypothesis that higher incentives to tacitly coordinate actions in product markets change firm disclosure strategies. We estimate the following model, reminiscent of the difference-in-differences specification:

$$Disclosure_{ijt} = \beta_0 + \beta_1 Foreign\ Leniency_{jt} + \theta X_{ijt} + \alpha_i + \gamma_t + \epsilon_{ijt} \quad (1)$$

where i indexes the firm, j denotes a two-digit SIC industry, and t denotes year. Equation (1) essentially represents a difference-in-differences specification where the estimate on *Foreign Leniency* captures the effect on increased exposure to foreign leniency laws on various firms' disclosure choices relative to a set of control firms that do not have an exposure to these foreign laws since their industries have less trade with these law-passing countries. In this baseline model, α_i denotes firm-fixed effects, which deal with firm-level time-invariant omitted variables, while γ_t captures year-fixed effects, which account for unobserved aggregate shocks across time. X_{ijt} corresponds to a vector of firm-level and industry-level control variables, described in the next section. Since our treatment variable is defined at the industry level, we cluster standard errors by industry (Bertrand et al. [2004]).¹⁴

Figure 1 shows how the measure develops over time for different industries that we include in the analysis. We now conduct two tests to assess the validity of our identification strategy

using only the weights based on the imports of final goods. The latter scheme should minimize concerns that imports might be intermediate goods used for the production of the final goods of U.S. firms in the same two-digit SIC industry, in which case importing U.S. firms might benefit from less horizontal collusion.

¹⁴Our results are robust to clustering standard errors by industry and year, or by firm.

and specifically to test whether our measure captures the increase in collusion costs. We first examine whether *Foreign Leniency* is associated with more cartel convictions in future years. We obtain information on convicted cartels from the Private International Cartel database on cartel sanctions (Connor [2014]), which covers all major international cartels discovered, disclosed and sanctioned by regulators since 1986. We conduct our tests based on the two-digit SIC industry-year panel data, where the industry is defined according to the cartel market specified by the antitrust authorities. In performing the analysis at the industry level, we also capture privately held firms. Specifically, we calculate the number of international cartels or firms involved in international cartels that are convicted in each industry-year, and estimate the relationship of the number of convictions with the increase in the collusion costs, controlling for year- and industry-fixed effects. The control variables are based on the sample average of the publicly listed firms for each industry-year. Results, reported in Panel A of Table 1, show that *Foreign Leniency* is positively associated with the conviction and dissolution of cartels, in line with the expectation that the leniency laws help antitrust authorities uncover the cartel.

We further motivate our identification strategy by investigating the impact on firms' performance of the increase in collusion costs caused by the passage of leniency laws in other countries. We estimate our empirical model, Equation (1), on the U.S. Compustat firm-year panel data over the 1994-2012 period and report results in Panel B of Table 1. We use firm-level gross profit margins as the dependent variable in columns (1)-(2), firm-level size-adjusted stock returns in columns (3)-(4), and NAICS¹⁵ industry-level producer price index (PPI) in columns (5)-(6). We find that profit margins, equity returns, and product prices drop, which suggests that increased cost of collusion led to an increase in competition, and a decrease in product prices, and thus adversely affected firm performance.¹⁶

¹⁵We use NAICS classification in these tests due to data availability.

¹⁶Indeed, theoretically, the effect of leniency laws on the collusion is uncertain. On the one hand, leniency laws destabilize cartels as they reduce a firm's costs of defection and potentially increase the costs of the rivals if the antitrust authority imposes fines on them (Ellis and Wilson [2003], Harrington [2008]). On the other hand, if the firm expects to be the first one to apply for leniency and thus it expects to pay lower fines than it would have otherwise, the costs of collusion would be lower, stabilizing existing cartels or even inducing the

4 Sample Selection and Main Measures

4.1 Sample Selection

Our initial sample on firm disclosure strategies is based on all Compustat firms incorporated in the U.S. from 1994 to 2012. We exclude financial firms (SIC codes 6000-6999), utilities (SIC codes 4900-4999), and firms with total assets smaller than 0.5 million dollars.

4.2 Disclosure Measures

We use two main measures in our analysis: whether the firms redact information in the material contracts with the customers and whether the firms discuss product market information in the conference calls with equity analysts. While the redaction of contract data, especially such information as the product price, is a direct measure of what we want to capture in our study, conference call data is useful insofar as it validates the evidence on a larger sample. Moreover, conference calls cover different aspects of tacit coordination. While sales contracts include actual price and quantity data that could become focal points in coordination, it might take time to establish trust between peers. In contrast, conference calls might involve invitations to collude, which could facilitate such coordination.¹⁷

4.2.1 Material Contracts

We start with the type of disclosure that might benefit rivals the most by looking at how firms disclose their material sales contracts (Boone et al. [2016], Verrecchia and Weber [2006]). To

formation of new ones (Chen and Rey [2013], Motta and Polo [2003], Spagnolo [2000]). The results in Table 1, coupled with the previous empirical evidence (e.g., Dong et al. [2014]) and the wide adoption of leniency laws around the world, suggest that these laws were in fact effective. For instance, according to DoJ's Deputy Assistant Attorney General Brent Snyder, *"the Corporate Leniency Program revolutionized cartel enforcement, led to the successful prosecution of many long-running and egregious international cartels, and served as a model for leniency programs subsequently adopted in dozens of jurisdictions around the world"* and *"leniency is more valuable than it has ever been because the consequences of participating in a cartel and not securing leniency are increasing: more jurisdictions than ever before are effectively investigating and seriously punishing cartel offenses"* (Jun 8, 2015).

¹⁷See Cao et al. [2018] for a discussion on aligning the empirical disclosure variable with the tested theory, rather than using management forecasts that are perceived as conveying little proprietary information.

the extent that such contracts contain a substantial amount of proprietary information, including transaction prices, transaction volumes, and product quality, we test whether firms plausibly communicate with their cartel peers by revealing more information. The material contract is filed as Exhibit 10 and could be identified in a current report or period report by searching for EX-10(.XXX). We extract all the material contracts from SEC filings and exclude contracts that are identified as contracts not related to product sales (e.g., employment contracts, stock purchase, purchase of accounts receivable, purchase of assets). We then search for *confidential treatment*, *confidential request* and *confidential...redacted* in the file to identify the confidential request by the firm. We identify 414 unique firm-year filing material sales contracts with required information over 2000-2012. *Redacted Contracts* is then defined as a binary variable capturing whether requests for confidential treatment of at least one material sales contract in the particular year. We also provide results for *%Redacted Contracts*, which is the ratio of the number of requests for confidential treatment in the particular year over the total number of filed material sales contracts. In both cases, we exclude the firms that do not disclose material contracts. In Internet Appendix A3, we explain our data collection methods in detail. We show how the average of this measure develops over time in Figure A1, suggesting that there is no significant time trend.

4.2.2 Conference Calls

We also examine firms' earnings conference calls with equity analysts. Recent studies have established that earnings conference calls are associated with large intra-industry information transfers (Brochet et al. [2018], Kimbrough and Louis [2011]). During those calls, managers strategically interact with participants to manage the flow of information (Hollander et al. [2010], Mayew [2008]). Motivated by the FTC cases cited in footnote (6) we introduce a new measure, *%Product Conference Calls*, where we count the frequency of product-market-related words in the presentation by the CEO and CFO during earnings conference calls. Our main product-market-related word list includes: *product*, *service*, *customer*, *consumer*, *user*,

and *client*. We exclude scripts with less than 150 words, and we scale product-market-related words by the total number of words in the script. We focus on the opening statements as we expect that managers are more likely to have the control over the choice of topics than rather than during Q&A sessions. When a firm has multiple conference calls in a given year, we take the average value of the measure over the period.

We further construct three alternative measures based on variations of our word dictionary. First, we add *price*, *pricing*, *prices*, *priced*, and *discount* to the word list. These additions are meant to capture firms' discussion about product pricing strategy. We remove any instance where *share*, *stock*, or *security* is mentioned in the five words around these words, in order to avoid including the discussion on firm's share price. Second, we develop a word dictionary based on the two FTC cases cited in footnote (6). We first extract the sections that are suspected of collusion from these two conference call scripts (namely 2008 Q3 Amerco Earnings Conference Call and 2004 Q2 Valassis Communications Earnings Conference Call), and count the frequency of each word used in these sections after stemming words and removing stop words. The word dictionary is defined as the 20 most frequently used words.¹⁸ Third, also motivated by the above-mentioned FTC cases we investigate whether firms quote their competitors during conference calls. For instance, Valassis Communications mentioned its competitor *News America* 13 times during the 2004 Q2 conference call. We first identify a firm's competitors using the Factset Revere relationships database, which collects information from SEC filings, investor presentations, corporate action announcements, and press releases. We use the relationships identified by Factset Revere from April 2003, when the Factset Revere database started, to December 2012, when our sample period ends. We next define a binary variable *Quote Competitor* and code it as one if the CEO or the CFO mention at least one of its competitors during the earnings conference call presentations in the year. We exclude conference calls of the firms that are not covered by Factset Revere.

¹⁸These words include *market share*, *customer*, *floor*, *time*, *news*, *industry*, *goal*, *need*, *budget*, *invest*, *client*, *standpoint*, *opportunity*, and *create*. We exclude *price*, *quote*, and *return* from the list due to the possible relations with the stock price.

4.3 Other Variables

We control for time-varying firm and industry characteristics. We use the returns on assets (ROA) to proxy for profitability, and the size of assets to proxy for firm size. We also control for the industry concentration ratio, as proxied by the Herfindahl-Hirschman Index of the two-digit SIC industry. We also control for the import penetration at the industry level to address the possibility that the results are driven by trade policy changes rather than the passage of leniency laws. Appendix A lists all variable definitions. We report summary statistics in Table 2.

5 Empirical Findings

5.1 Main Results

We now turn to our main research question on how firms change their disclosure choices when costs of explicit collusion rise. The passage of leniency laws makes explicit collusion more costly, and, as we have demonstrated in Section 3.3, leads to the dissolution of cartels. One could argue that firms now face a more competitive environment and are less likely to disclose proprietary information. Alternatively, as we posit in this paper, they might shift from costly explicit collusion to tacit coordination in product markets. Under this scenario, firms then have an incentive to disclose more proprietary information to communicate with their cartel peers and facilitate tacit coordination.¹⁹

Our first main measure of information sharing about customers is based on how much firms redact information in their material sales contracts with customers in their regulatory filings. These contracts contain substantial information on firm relationships with customers,

¹⁹Thus, our estimates are identified on the subpopulation of firms for which explicit collusion dominates tacit coordination, which dominates competition. The presence of such firms is based on two assumptions. First, we assume that if explicit collusion were legal, because of direct information exchange it would be easier to implement and monitor than tacit coordination without direct information exchange (Awaya and Krishna [2016], Fonseca and Normann [2012]). Also, as McAfee and McMillan [1992] point out, explicit collusion allows firms to split the spoils and thus leads to more efficient cartels. Second, if firms could previously sustain explicit collusion, it is likely that they would prefer tacit coordination over competition.

including the price, quality, and quantity of products to be provided, as well as the identity of the customers. Such information can be helpful for rivals in coordinating product market strategies. While firms have to file their *material* sales contracts with the SEC, they have considerable discretionary power in determining the threshold of what constitutes a material contract, and this makes the disclosure of these contracts somewhat voluntary. We follow [Verrecchia and Weber \[2006\]](#) and examine how often firms request confidential treatment in filing material sales contracts.

We check whether *Foreign Leniency* is associated with fewer requests for confidential treatment. Our findings are tabulated in Table 3. In columns (1)-(2) we use *Redacted Contracts*, which is a binary variable capturing a firm's request for confidential treatment in any sales contract in the year, and in columns (3)-(4) we use *%Redacted Contracts*, the proportion of contracts that request confidential treatment in the year, as the dependent variable. Columns (1) and (3) present the tests where we control only for year- and firm-fixed effects. We find that firms conceal less information about the product market through sales contracts. Columns (2) and (4) further include a set of covariates to control for firm and industry characteristics. Our results are robust. To understand the magnitude of our estimate, we select the industry that is the most exposed to each foreign law in our sample. Focusing on these most exposed industries, we find that each adoption of leniency law explains, on average, 19% of within-firm variance.

Our second main measure *%Product Conference Calls* captures how much CEOs and CFOs discuss about product market related topics during earnings conference calls. We use the same empirical model as with our previous dependent variable. The results are displayed in columns (5) and (6) of Table 3. We find that managers increase their communication about product market topics when explicit collusion becomes more costly. Focusing on these most exposed industries, we find that each adoption of leniency law explains, on average, 5% of within-firm variance. While the magnitude may appear low in terms of absolute number of words, we note that just one or two words in a sentence are sufficient to send a signal to

sustain a tacit agreement with industry peers.

Overall, these results of increased information exchange following increased costs of explicit collusion can be explained by the firms moving from explicit collusion to tacit coordination. Since the firms do not want to risk conducting private meetings, they continue communicating via public disclosure or use such disclosure as the verification mechanism.²⁰

5.2 Heterogeneity

If our hypotheses are correct, we should observe that the impact of the passage of leniency laws differs across affected firms in predictable ways (Angrist and Krueger [2001]). We expect our results to be stronger when a firm finds it easier to coordinate product prices or quantities with its peers. We develop five partitions meant to capture such variations across firms. We present our results separately in two panels in Table 4 for our measures of redacted contracts (Panel A) and discussions in conference calls (Panel B).

Our first cross-sectional characteristic is the stability of an industry. We posit that firms in stable industries are more ready to collude with their peers. For instance, collusion is harder to sustain in periods of high demand, because in such periods firms are more tempted to deviate as the deviation gain is the highest (e.g., Kandori [1991], Rotemberg and Saloner [1986]). We use the industry average of sales growth as the proxy for maturity of an industry, and define a binary variable, *Growth Industry*, equal to one if the industry sales growth falls in the highest quartile of the sample distribution. The results are presented in Table 4, column (1). As predicted, the impact of increased collusion costs on firms' decisions to redact information in their sales contracts and to discuss about product market topics in

²⁰We do not necessarily claim that firms collude on the product prices revealed in these particular contracts. In fact, they do not even need to collude in this product market for this information to be helpful in coordinating product actions. The firms might compete in multiple market segments. For instance, one segment could deal with large customers and the other with atomistic small customers. If the firm wants to collude with the rival in the atomistic customer market, it could signal this intent by revealing contracts with the large customer. This signaling is costly, as the rival can now undercut the firm on the large customer segment if the firm deviates from the collusive price. The tacit collusion in the atomistic customer market is then sustained by the firm's knowledge that it will be undercut in the large customer market, and this costly additional punishment in the large customer market stabilizes collusion in the atomistic customer market.

conference calls is more pronounced in stable industries.

Second, we look at whether our results vary by the homogeneity of a firm’s products. Indeed, Raith [1996] argues that the ability of firms to collude in restricting output or raising prices in repeated games is harder to achieve in non-transparent markets when product differentiation is higher. To test this prediction, we first obtain the product similarity score for each firm pair from Hoberg and Phillips [2010]. We then define a binary variable, *Heterogeneity*, which equals one if the number of the firm’s peers with similar products falls in the lowest quartile of the sample distribution. A peer is defined as having similar products with the firm if the product similarity score between the peer and the firm is larger than 0.046, which is the median product similarity score across all pairs in the sample. As column (2) shows, the results are weaker for firms with relatively more differentiated products.

Third, we examine whether our results vary by the market structure. We posit that concentration facilitates either explicit collusion or tacit coordination. We use the four-digit NAICS industry concentration measure calculated by U.S. census as the proxy for industry concentration level. As column (3) shows, the results are stronger for firms in concentrated industries, consistent with the claim that it is easier to collude in concentrated markets.

Fourth, the collusive activities should be driven by the firms with a larger power in the product markets. We create a binary variable that equals one if the firm size falls in the highest quartile of the sample distribution, and zero otherwise. We find that results are stronger for larger firms.

Next, we look at whether the results are stronger in the industries with a higher prevalence of publicly listed (as opposed to privately held) firms. In an industry that has more publicly listed firms that disclose information via material contracts, it is easier to coordinate actions than in an industry that has a higher prevalence of privately held firms.²¹ We thus construct

²¹However, the fact that not all industry participants are public helps to avoid the attention of antitrust authorities as they do not observe the whole product market behavior. Meanwhile, publicly listed firms are likely to have a better sense of privately held firms’ reaction curves than the antitrust authorities do. Knowing the reaction curves can substitute the observability of the full product market behavior, so publicly listed firms can act as coordination leaders, anticipate privately held firms to act rationally to such unilateral coordination, and internalize the externalities from the actions taken by the private firms, even if they do

a binary variable that equals one if the proportion of private firms in the NAICS industry falls in the highest quartile of the sample distribution, and zero otherwise, and we find that the effect is stronger for industries with more public firms.

Finally, we posit that our results should be weaker when previous collusive arrangements are less likely. If the firms restrict quantities or coordinate prices, their resulting industry markups are higher than if they were to compete in the oligopoly (irrespective of whether such competition would be Cournot or Bertrand). We define industry mark-ups as the average gross margins of all firms in the same two-digit SIC industry. We then create a binary variable *Low Industry Gross Margins* that equals one if the industry mark-ups falls in the lowest quartile of the sample distribution, and zero otherwise. In column (6) of Table 4 we find that our results are stronger in industries with higher mark-ups.

5.3 Pre-Trends and Dynamics of the Effect

We further perform the robustness tests by assigning a binary treatment instead of the continuous measure. This allows us to implement a more standard difference-in-difference estimation of staggered assignment of treatment, examine pre-trends, and study the dynamics of the effect.

For each three-digit SIC code, we select the country that is the most important in terms of import volume from the country to that industry. In this set of analyses, each industry starts to be treated just once over the sample period. In particular, an industry is categorized as a *treated industry* starting with the year when the country most important to that industry adopted the law. We then define a binary variable, *Binary Foreign Leniency*, that is set to one for the treated industry after the adoption of the law, and zero otherwise. We then replicate our previous findings of the measure of *Redact Contracts*, and tabulate the results in column (1) of Table 5. In line with our previous findings, the coefficient on *Binary Foreign Leniency* is negative and statistically significant at the 5% level.

not observe their sales contracts.

Next, we perform two additional falsification tests. We first define a pseudo adoption year as four years before the actual adoption year and re-run our estimation. As expected, the results displayed in column (2) of Table 5 show that the pseudo adoption of the foreign leniency law has a statistically insignificant effect on the contract redaction. These results give confidence that our main estimates are not driven by long-term industry trends. Second, we change the definition of *Binary Foreign Leniency* by replacing the main country in terms of imports with the least important country in terms of imports. Specifically, each three-digit SIC industry is categorized as treated starting from the year when the country least important to the industry adopted the law. If there is limited trade between the industry and a country, a leniency law in this country should have little impact on U.S. firms' collusion costs. As column (3) shows, we do not find significant changes in disclosure behavior.

Furthermore, we explore the dynamics of the effect. For each industry, we create binary dummies of *Binary Leniency (T-3)*, *Binary Leniency (T-2)*, *Binary Leniency (T-1)*, *Binary Leniency (T)*, *Binary Leniency (T+1)*, *Binary Leniency (T+2)*, *Binary Leniency (T+3)*, and *Binary Leniency (4+)*, which are equal to one in, respectively, three years before, two years before, one year before, on, one year after, two years after, three years after, and at least three years after the year when the country most important to that industry adopted the law. Results in column (4) of Table 5 show a quick adjustment effect.

Lastly, in column (5) we report the dynamic effects for *%Product Conference Calls*. We find that firms' product-market-related disclosure during conference calls does not change significantly prior to the adoption of foreign leniency,²² and it increases quickly after the adoption of foreign leniency. The estimates of the specifications in columns (1)-(3) where we use *%Product Conference Calls* as the dependent variable also give consistent results.

²²We also conducted a joint test of the sum of *Binary Leniency (T-2)* and *Binary Leniency (T-1)*. The F-statistics of the joint test are 0.68 and 1.60 when the dependent variables are *Redact Contracts* and *%Product Conference Calls*, respectively.

5.4 Economic Consequences

We further look at whether the changes in disclosure have any economic consequences. First, we look at firm profitability. For ease of exposition, we again use binary treatment. In Figure 2, we show that firms that increase their discussion about product market topics during conference calls after significant increases in our *Foreign Leniency* measure do not experience changes in profitability over three years after the foreign leniency law.²³ On the other hand, firms that did not change their communication strategy experience a decline in profitability. The difference between the two groups is statistically significant. While this figure does not establish causality, it reveals an important correlation: firms that adjusted their disclosure have experienced better outcomes in product markets. We show that the firms that disclosed more (and presumably switched to tacit coordination) did not experience a decrease in profits, while those that did not change their disclosure saw their profits drop as explicit collusion became less sustainable.

We find corresponding results in the regression setting in Table 6, where we show that profits fared better when explicit collusion costs increase in the cases where firms adjust their disclosure strategies. We test this by creating a dummy *High Disclosure*, capturing whether the industry-level product market discussions in conference calls falls in the highest quartile of the sample distribution. Our estimates with and without control variables suggest that the effect of *Foreign Leniency* is fully mitigated in industries with increased disclosure. Indeed, the sum of the coefficients on *Foreign* and *Foreign*×*High Disclosure* is not statistically different from zero with an associated *p-value* of 0.14.

5.5 Coordination

Finally, we study whether firms coordinate public disclosure on the product-market strategies within industries. If our hypothesis is correct, firms within the industry should exhibit reciprocal behavior and adjust the disclosure strategies at the same time. We again rely on

²³We use conference call data here as the sample is much larger than that of the redacted contracts.

the conference calls due to a larger sample. First, in Panel A of Table 7, we check whether peer average *%Product Conference Call* within an industry is correlated with the firm’s own measure. While we do not claim the presence of peer effects and indeed unobservable factors might be driving the correlation between the average industry trend and the product-market-related disclosure during conference calls (Gormley and Matsa [2014]), we find that such within-industry correlation is indeed present and becomes stronger when *Foreign Leniency* increases. This finding suggests not only that firms move together in their disclosure of individual product market data, but also that such tendencies are facilitated by *Foreign Leniency*, in line with the tacit coordination interpretation.

Next, we examine the comparability between a firm’s financial statement and its peers’ financial statements based on the measure in De Franco et al. [2011]. Conceptually, financial statement comparability (*Comparability*) refers to the similarity of a firm’s and its peers’ financial reporting systems that map from economic events to reported earnings. Specifically, the pairwise financial statement comparability between firm i and firm j is defined as the similarity of the accounting systems that maps from economic events (proxied by stock returns) to earnings between the two firms. We define a firm i ’s overall financial statement comparability *Comparability* as the average pairwise financial statement comparability of all firms j in the same industry as firm i . Firms with a higher value of *Comparability* have financial statements that are more comparable to their group of industry peers.

As shown in columns (1)-(2) of Table 7, Panel B, we find that *Foreign Leniency* is positively associated with *Comparability*, suggesting that a firm’s financial statement becomes more comparable to its peers’ when the costs of explicit collusion increase.

5.6 Robustness Tests

5.6.1 Contract Types

In Internet Appendix Table A1, we perform a more detailed analysis by manually reading all contracts and identifying the type of redacted information. First, we look at the contracts

where firms explicitly specify product price but either disclose or redact such information. In columns (1)-(2), we find that firms redact less information on prices when *Foreign Leniency* increases. Further, we look at the contracts that explicitly specify quantity obligation, and we study whether they disclose or redact the quantity. We find that there is also a reduction in the quantity redaction. Finally, we find that firms also redact less information on contract duration. These tests also address a possible concern that the firms could have switched to more vague contracts in which they do not mention the price, quantity, or duration, and thus they did not need to redact this information as the contracts became less informative. Indeed, even if we focus on the cases where this information is explicitly mentioned, we find that they redact less information when the cost of explicit collusion increases.

Second, we perform a falsification test where instead of looking at the material contracts with *customers*, we look at the material contracts with *suppliers*. We construct the variable in the same way as *Redacted Contracts* by looking at whether firms redact information in their purchase (rather than sales) contracts. Such contracts should be less helpful in assisting collusion, but a potential alternative hypothesis (that we explore in detail in Section 6) is that firms increased disclosure in general. We report results in Internet Appendix Table A2. We do not find that firms disclose more information in the material contracts with *suppliers*, so they do not increase *all* information on product market strategies.

5.6.2 Conference Call Measures

We next show that our finding that managers increase their communication about product market topics during conference calls when explicit collusion becomes more costly is robust to different ways to construct our *%Product Conference Calls* measure. We present results in Internet Appendix Table A3, Panel A. First, we augment the word dictionary in Table 3 with *price*, *pricing*, *prices*, *priced*, and *discount* to capture managers' discussion about pricing strategy. Results are tabulated in column (1) of Internet Appendix Table A3, Panel A. We find consistent result that product-market-related disclosure increases when explicit

collusion becomes more costly. Second, we construct a word dictionary based on the two FTC cases cited in footnote (6). We extract the sections that are suspected of collusion and define the 20 most frequently used terms as the word dictionary. Results, tabulated in columns (3)-(4), are consistent our previous findings. Lastly, we investigate whether firms quote their competitors during conference calls, inspired by the observation that the convicted firms in these two FTC cases frequently mention their competitors during their conference calls. We identify a firm’s competitors using the Factset Revere relationships database. Since the Fatcset Revere database is available only after April 2003, we limit our analysis to the sample period of 2004-2012. Results are tabulated in columns (5)-(6). We find managers quote their competitors more frequently when the costs of explicit collusion increase.

Another concern is that our findings are driven by a general trend that managers provide more information in conference calls. To mitigate this concern, we conduct another falsification test by documenting that our *Foreign Leniency* measure is not associated with management discussion of topics unrelated to product market concerns. To perform this test, we first construct a dictionary of words (*Falsification Words*) that are unlikely to be related to product markets based on the cosine similarity of each word in our base dictionary (product, service, customer, consumer, user, client). For instance, in the case of “product”, we use the *word2vec* approach to calculate the cosine similarity between each word appears in conference calls and “product”.²⁴ Higher cosine similarity indicates that the two words are more likely to be associated in similar contexts. We then retain the list of the least similar words (*Least_Product*), i.e., words for which the cosine similarity is negative and falls in the lowest decile of the distribution. We repeat this process for the remaining five words in our base dictionary and obtain the five lists of the least similar words. *Falsification Words* is defined as the intersection of these six lists²⁵, consisting of 24 stemwords (e.g., preannouncement, pension, settle, immaterial).

²⁴See Mikolov et al. [2013] for a more detailed description of the *word2vec* approach.

²⁵We remove from *Falsification Words* 35 stemwords that appear in less than 5% of scripts, and 10 stemwords that are too general (e.g., Monday, take, when, etc.).

We randomly draw six words without replacement from the *Falsification Words* and conduct the analysis in column (6) of Table 3 using the proportion of these six words in a conference call as the dependent variable. We repeat this process 1000 times and plot the coefficients in Figure 3. Results show that all the coefficients are smaller than the actual value. Also, in 919 out of 1000 cases we cannot reject the null hypothesis that the passage of foreign leniency laws is not associated with the word frequency. In sum, the falsification test suggests that we are not simply capturing the fact that managers provide more information in general.

Throughout the paper we focus on the opening statements by CEOs and CFOs. We do so because CEOs and CFOs are the most common participants in conference calls and are the most knowledgeable about the firm (Chen et al. [2017], Davis et al. [2015], Larcker and Zakolyukina [2012]). In columns (7) and (8), we show that our results are robust when we take into account opening statements by other executives. We find that including all executives' statements to the sample leads to an increase in their discussion about product market topics when the costs of explicit collusion increase.

Furthermore, we incorporate the Q&A section of the conference calls into our analysis. Specifically, we repeat our analysis using all executives' statements during both the opening presentation section and the Q&A section after removing the statements by analysts and other members of the audience (e.g., operator and moderator). In columns (9) and (10), we show that the association between *Foreign Leniency* and the combined discussion on product market topics in the opening statement and the Q&A sections remains significantly positive, although the economic and statistical significance is reduced compared to the results in columns (7) and (8). This is consistent with the argument that managers have less control over the topics during the Q&A.

One could argue that one of the reasons firms changed their discussions in the conference calls is that their product-market strategies, e.g., towards acquiring new customers, changed beyond what can be captured by the *HHI* or *Import Penetration* measures of industry

competition. In Internet Appendix Table A3, Panel B, we control for this explicitly by using the data on new customer announcements from Capital IQ Key Development database, which gathers information from more than 20,000 public news sources, press releases, regulatory filings, call transcripts, and investor presentations. While we find that a lagged number of new customer announcements is indeed associated with more discussion of product market strategies, *Foreign Leniency* remains statistically significant.

5.6.3 Weighting Schemes

Our binary treatment test in Table 5 already considers an alternative weighting scheme used to construct *Foreign Leniency* where the most important country gets 100% of the weight. We further explore the robustness with respect to alternative weighting schemes. In Internet Appendix Table A4, Panel A, column (1), we re-estimate *Foreign Leniency* by setting the weight as the share of the *three-digit* SIC industry’s imports from other countries in 1990. Second, in columns (2) and (3), we report the results based on the *Export-based Foreign Leniency* by using as the weight the share of exports of each two-digit or three-digit SIC industry from the U.S. to other countries. If a firm’s industry exports a lot to a certain country, it is likely that this country is an important product market for the firm.²⁶ Third, one could worry that our default weighting scheme is capturing vertical rather than horizontal collusion,²⁷ since imports might be intermediate goods whereas U.S. products in the same two-digit SIC industry might be final goods. In column (4), *Foreign Leniency* is

²⁶However, we believe that import-based measures provide several important advantages and that is the reason why we primarily rely on them rather than export-based measures. Focusing on an import-based measure allows us to consider the competition in the U.S. *domestic* product market. That is, all domestic firms are exposed to the import competition and might decide to collude with the foreign importers. Meanwhile, only the exporting firms are exposed to the foreign laws through their exports, thus using an industry-wide export-based measure and applying to all U.S. firms – those that export and those that do not – might add additional noise to the measure. While firm-level export weights could provide a solution, such data is not available to us at the firm/country level. Moreover, trade literature has established a high selection effect in the decision to export and the success of this decision (e.g., Melitz [2003] and the literature that followed it). If these selection factors correlate with firms’ willingness to enter in collusive arrangements, we might be capturing those unobservable characteristics rather than exposure to the costs of collusion. We provide the robustness tests for a smaller sample of firms based on firm-level international operations in Section 5.6.5.

²⁷In fact, this concern is limited as our arguments should equally hold for vertical collusion cases.

recalculated according to the weights based on the imports of only the *final* goods.²⁸

In Internet Appendix Table A4, Panel B, columns (1) and (3), we further abstract from the industry effects by constructing our measure of collusion costs at the three-digit SIC industry level, adjusted by the two-digit SIC industry level. Specifically, we construct the measure *Adj. Foreign Leniency*, which is the difference between the measure based on the weights of the industry’s imports (exports) from (to) other countries defined at the three-digit SIC level and the respective measure based on the weights at the two-digit SIC level. In columns (2) and (4), we further construct the measure $\sum_k(w_{SIC3} - w_{SIC2})L_{kt}$ by setting the weight as the share of the three-digit SIC industry’s imports (exports) from a country minus the share of the two-digit SIC industry’s imports (exports) from (to) the country.

5.6.4 Rule of Law and Enforcement

The enforcement of leniency laws can differ across countries. While we are not able to measure which leniency laws will be more successful *ex ante* at the time of their implementation, we can focus on the countries that are known to have a judicial system that is relatively more efficient. In Internet Appendix Table A4, Panel C, columns (1)-(2) we thus reconstruct *Foreign Leniency* where we consider only leniency laws from countries whose score on the efficiency of the judicial system (based on the measure in La Porta et al. [1998]) is larger than the sample median. We find that our result holds if we limit the sample to countries with a higher degree of efficiency of the judicial system.

Second, one potential concern is that leniency law passage is correlated with a general increase in a country’s rule of law and we are thus capturing some other correlated legal change. To address this concern, we construct a *Foreign Rule of Law* measure, which is the weighted average of the rule of law index of other countries. As with *Foreign Leniency*, the weight to estimate *Foreign Rule of Law* is based on the imports of the two-digit SIC industry

²⁸We gather the information about the imports of final goods from the World Input-Output Database, available at http://www.wiod.org/database/int_suts13. We use the import data in 1995 to compute the weights. We convert the International SIC to U.S. SIC using the concordance table provided by Jon Haveman.

from other countries, while individual rule of law indices are based on World Bank data. In column (3), we show that an increase in rule of law is not driving our results. In column (4), we also show that *Foreign Leniency* is significant after controlling for *Foreign Rule of Law*.

5.6.5 Other Robustness Tests

One concern with our study is that leniency laws might have been anticipated and the change in disclosure behavior might have started before the actual country adoption of laws. In addition, if stringent laws were anticipated while weaker laws were ultimately passed, focusing on the actual adoption year might even reverse the sign of the estimates (Hennessy and Strebulaev [2015]). The binary adoption treatment such as the one adopted in our case mitigates the latter concern but we perform additional test to rule out this possibility. Specifically, for each country we collect data on when the first discussion about leniency laws by policy makers took place. To collect this information, we use Factiva News Database and search for the news in local language about the leniency program adoption. Out of 54 countries that have the laws in our sample, we have found leniency programs discussed in the media of 35 countries. Some smaller, especially Central and Eastern European countries, are not covered by Factiva and for a handful of those that are even covered we were not able to establish media discussion about leniency laws before the adoption year. Out of 35 countries, we found that 26 had discussion about leniency laws at least a year before the law passage. For the countries for which we have not found the discussion, we instead use the actual year of leniency law passage. We then reconstruct our measure *Foreign Leniency* based on this updated year. Results tabulated in columns (1) and (2) in Internet Appendix Table A5 show that our effect is not materially affected.

Next, we reconstruct our treatment variable at the firm level. Specifically, while *Foreign Leniency* measures firm's exposure to the leniency laws in other countries based on the industry's trade with that country, for a subset of firms we collect data on their actual international operations. We then measure *Foreign Leniency* by looking at the distribution of

the firm's operations around the world in terms of sales as recorded in Lexis-Nexis Corporate Affiliations database. So, we construct a measure of exposure to leniency law changes based on the proportion of firm activity that takes place in the country that experiences the law change. As shown in columns (3) and (4), we find consistent results that firms redact less information in material contracts and discuss more about product market topics when the costs of explicit collusion are measured at the firm-level.

Our results also hold if we exclude the industries one by one, which means that the results are not driven by one particular industry, and also when we exclude countries one by one, which means that the results are not driven by one particular country. Moreover, we check that our results are consistent if we limit the sample to the firms that do not change CEOs over the sample period. If *Foreign Leniency* was somehow correlated with CEO change and the new CEO prefers different disclosure policies, we might be capturing these preferences rather than an independent effect on disclosure. Further, our results remain unaffected if we cluster standard errors by firm instead of industry, or by industry and year. Finally, all of our results hold if we control for geographic trends by adding headquarter state times year-fixed effects.

Our identification strategy would be undermined if the changes in regulation across countries were driven by lobbying from the U.S. for reasons related to market structures or industry performance. To rule out this concern, we check if the news articles discussing the reasons for the laws' passage in different countries mention a clear driver that could be influenced by U.S. lobbying. We then re-estimate our main specifications by forming our treatment variable based only on the countries for which we could find a clear driver for the law passage and we are certain that U.S. lobbying was not among these drivers.

Given that the EU has a supranational competition policy, in addition to the member countries, we perform a robustness check where we treat all EU member states as one country. We then focus on the European Commission's strengthening of its antitrust enforcement in 2002 instead of the implementation of individual laws in EU countries and consider the

later of this year or the year the country joined the EU as the relevant year for each EU country. Using this revised definition of our treatment variable, we still find that an increase in *Foreign Leniency* leads to less redaction of information in material contracts and more product-market-related discussions during conference calls. All these additional results are available on request.

6 Alternative Explanations

The finding that firms increase information provision on their product-market strategies following increased costs of explicit collusion can also be explained by them releasing information for alternative audiences such as investors or antitrust authorities.

First, after the passage of leniency laws, firms raise more equity capital ([Dasgupta and Žaldokas \[2018\]](#)) and thus aim to provide more precise information to investors. We have already shown in Table 6 that firm’s profitability does not depend negatively but rather positively on its industry peers redacting little information from their customer contracts. Indeed, if industry peers redacted little to raise externally raised capital, it is likely this would have negatively affected firm profitability as external capital would have allowed peers to pursue more aggressive competitive strategies. Instead, we find that while in general the effect of *High Disclosure* is negative, the coefficient of the interaction term with *Foreign Leniency* is positively significant, which does not support this explanation. These findings rather suggest that the redaction helps to sustain collusion by maintaining average industry profits at a higher level than in the industries that redact more.

Moreover, the firms could be hedging their litigation risk and disclosing more information on product markets, thus signaling good behavior, and hoping that this would stop antitrust authorities from investigating past cartels. Non-colluding firms might also increase disclosure to avoid being mistaken for colluding firms and thus also to reduce the risk of litigation.

We thus address these alternative explanations by investigating whether the firms in-

crease *all* information on their competitive environment and their product market strategies after explicit collusion costs increase. If the increased disclosure is an outcome of signaling attempts to provide antitrust authorities with more information, the firms should also provide more information on the competitive environment.²⁹

In particular, to rule out the explanation that firms increase information on competition on all dimensions, we look for the type of disclosure that is less useful in coordinating product market strategies and could be useful for investors (Li et al. [2013]) but could also have an additional cost in that antitrust authorities could use it to understand which industries are more likely to show signs of collusive behavior. Assuming that the antitrust authorities operate under budgetary constraints and cannot continuously screen all product markets, precise self-reported information on the product markets coming from financial disclosure documents might bring some firms into the spotlight and contribute to initiating more serious antitrust investigations. So when antitrust authorities gain better investigative tools to convict cartels through leniency programs, if firms want to signal good behavior, they should increase discussion on competition, thus sharing information with antitrust authorities. Otherwise, if they plan to continue (tacit) coordination, they should start reducing the precision of such information disclosure.

We explore management’s references to the firm’s competition in its 10-K filings. First, we show that antitrust authorities indeed pay attention to the 10-K filings, and second, we show that *Foreign Leniency* is negatively associated with both references to competition in 10-Ks and how dispersed such discussion on competition is throughout the 10-K filings.

6.1 Antitrust Authorities and 10-K Documents

We start by investigating whether antitrust regulators use firms’ publicly disclosed financial information by looking at how frequently they access firms’ 10-K filings through EDGAR. We obtain the server request records from the EDGAR Log File Data Set available on the

²⁹We have already discussed the results in Internet Appendix Table A2, showing that firms do not disclose more information in their material contracts with *suppliers*.

SEC’s Web servers. The EDGAR Log File Data Set is available from 2003 and contains such information as the client IP address, timestamp of the request, and page request. We link the log file to the EDGAR Master File and gather the information about the form type and filing date of the files that a user accesses.³⁰ We then define a binary variable, *Regulator Viewing*, which equals one if the 10-K filing filed during the year is accessed through the IP associated with the DoJ or FTC within one year following the filing date.³¹

As presented in Internet Appendix Table A6, columns (1)-(2), we find consistent results that internet traffic to 10-K filings that could be associated with antitrust regulators increases following higher antitrust powers. In columns (3)-(4), we repeat our analysis by including 10-Q and 8-K filings as such filings may contain product-market information. Our results are robust. Finally, we perform a placebo test by examining the effect of increased collusion costs on other filings (i.e., filings with the SEC excluding 10-K, 10-Q and 8-K filings) that are unlikely to contain product-market information. In this case, we fail to document a change in viewing behavior for those filings by the DoJ and FTC (see columns (5)-(6)).

6.2 Competitive Environment

We now examine how firms change their disclosure about their overall competition environment when the explicit collusion costs rise. In particular, inspired by [Li et al. \[2013\]](#) and [Bushman et al. \[2016\]](#), we study management’s reference to competition in the MD&A section of the 10-K filing. Our measure, *%Competition*, counts the frequency of occurrences of positive and negative competition-related words and scale them by the total number of words in the 10-K filing. We assume that the number of mentions of the competition-related words is positively correlated with the overall discussion of the competitive environment in

³⁰We exclude years 2005 and 2006, as the daily EDGAR log files from September 24, 2005 to May 10, 2006 are labeled by SEC as “lost or damaged” ([Loughran and McDonald \[2017\]](#)). Our results are not affected materially if we include these two years.

³¹We use 149.101.0.0 - 149.101.255.255 IP range to proxy for the queries from the DoJ and 164.62.0.0 - 164.62.255.255 IP range to proxy for the queries from the FTC.

firms' 10-K filings.³²

Columns (1)-(2) in Table 8 display results based on our first measure of competition disclosure. We start with the specification without any controls, and then continue with the specification that controls for firm characteristics. We find that *Foreign Leniency* is negatively associated with references to competition in the 10-K. As before, for each foreign law, we select the industry that is the most exposed in terms of trade. We find that for each such foreign law the increase in collusion costs explains, on average, 3.40% of within-firm variance of disclosure for those firms.

We next investigate whether firms disclose information about their competitive environment in a more dispersed fashion. In some cases, manager discusses the firm's competitive environment predominantly in separate subsections (e.g., "Section X. Competition"), while in other cases the competition-related words are dispersed across the text. We posit that a separate subsection on competitive environment more effectively helps outsiders to understand the competitive environment that the firm faces than the same number of words dispersed across the text. For each paragraph of the 10-K filing's MD&A section, we calculate the proportion of competition-related words over the total number of words in the paragraph. Next, across all paragraphs, we pick the maximum value of this proportion of competition-related words. We require that the MD&A section has at least 150 words, and also require that the paragraph itself has at least 15 words, in order to exclude the cases that correspond to the titles (e.g., "Section X. Competition"), as this would inflate the value substantially. We then define a binary variable, *Competition Noise*, which equals one if this maximum value of the proportion of competition-related words is larger than 2.7%, which corresponds to 80% in the sample distribution. Our results are robust if we use 5% as the cutoff. As shown in columns (3)-(4), we find consistent results that *Foreign Leniency* is significantly negatively related to the concentration of references to competition in the MD&A

³²Li et al. [2013] find that the disclosed amount of competition in financial statements is related to firms' market structure. In line with our results, they also suggest that in certain industries managers might strategically distort their disclosure about competition.

section of the 10-K filing, which indicates that firms start spreading out the information about their competitive environment.³³

One could ask whether antitrust authorities benefit from disclosure on firms' competitive environment in convicting cartel activities. Using data on actual convicted cartel activity from Connor [2014], in Internet Appendix Table A7, we show that firms' disclosure policies during the cartel period were indeed associated with a higher probability that antitrust agencies uncovered these price-fixing activities in their industries.

Taken together, these findings provide evidence inconsistent with the alternative explanation that after the costs of explicit collusion increase firms disclose more information to investors or antitrust authorities. That is, when we look at the disclosure which antitrust authorities might find helpful to discern the degree of competition when they seek to fight anticompetitive activities, we find that firms adjust their disclosure accordingly to minimize the chances of an investigation. They conceal their true perceived competition position and make the disclosure about their competitive environment more fuzzy. Both of these disclosure components provide little new information to the rivals who observe each other in the product markets, but they can be useful to antitrust regulators and investors. This goes against the two alternative explanations of our earlier findings that firms increase disclosure primarily to raise more capital or reduce the litigation risk.

7 Conclusion

Despite its benefits, greater transparency in the financial markets might also produce anti-competitive effects by facilitating collusion in the product markets. This paper presents empirical evidence that changing incentives to form illegal price-fixing cartels alter how firms talk about their product-market strategies in their disclosure documents targeted at investors. We suggest that in addition to benefiting financial market participants, such financial disclosure also benefits other audiences; in particular, some information helps firms

³³These results are not driven by MD&As without any reference to competition-related words.

tacitly coordinate product market behavior with their rivals.

Our identification strategy exploits the wave of leniency law adoption around the world. These laws made it easier for firms to get amnesty if they submit evidence about their complicity in the cartels and thus had a strong effect on cartel convictions and breakups. We study the effect of foreign leniency law passage on U.S. firms and first confirm that such foreign laws reduced U.S. firms' gross margins, equity returns, and product prices, and also increased cartel convictions, thereby arguably increasing the costs of explicit collusion.

We find that the higher cartel enforcement induced firms to communicate differently about their customers and product pricing in their financial disclosure documents. Firms were less inclined to request confidential treatment in filing the material sales contracts they sign with customers. Also, they included more discussion about their product-market strategies during their earnings' conference calls with equity analysts. Thus, facing higher costs of explicit collusion, firms shifted from a more explicit collusion to a more tacit coordination equilibrium, where some coordination among peers is implemented through public information disclosure.

Given legal and policy debates on the possible conflict between antitrust and securities legislation, these results have important policy implications, suggesting that financial disclosure rules should take into account potential externalities to antitrust enforcement, and calling for more regulatory cooperation.

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Table 1: Validating the Measure of Increased Collusion Costs

This table presents the validity tests for *Foreign Leniency* as our measure of increased collusion costs. Panel A investigates the relation between the exposure to foreign leniency laws and the convictions of cartels, based on the two-digit SIC industry-year panel data over 1994-2012. The dependent variable in column (1) is the logarithm of one plus the number of convicted cartels in the two-digit SIC industry, and in column (2) it is logarithm of one plus the number of convicted firms in the two-digit SIC industry. Panel B presents the OLS regression relating firm and industry performance to the exposure to foreign leniency law. In columns (1) to (4), the sample consists of U.S. Compustat firms over 1994-2012. In columns (5) and (6), the sample is based on the NAICS industry-year panel data over 1998-2012. The dependent variable is the gross profit margin in columns (1) and (2), the size-adjusted stock returns in columns (3) and (4), and the producer price index (PPI) at the NAICS industry level in columns (5) and (6). Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All the columns report results controlling for industry- (or firm-) and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level (except in columns (5) and (6) of Panel B, where standard errors are clustered at the NAICS industry level) and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Cartel Dissolution

| | <i>Convicted Cartels</i> (1) | <i>Convicted Firms</i> (2) |
|--------------------|---------------------------------|-------------------------------|
| Foreign Leniency | 1.129** (0.537) | 2.245* (1.090) |
| Industry FE | Yes | Yes |
| Year FE | Yes | Yes |
| Adjusted R-squared | 0.226 | 0.175 |
| Observations | 380 | 380 |

Panel B: Firm and Industry Performance

| | <i>Gross Margin</i> | | <i>Size Adjusted Returns</i> | | <i>Producer Price Index</i> | |
|--------------------|---------------------|----------|------------------------------|-----------|-----------------------------|-----------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Foreign Leniency | -0.656* | -0.596* | -0.452 | -0.684** | -1.402*** | -1.265*** |
| | (0.345) | (0.300) | (0.285) | (0.276) | (0.345) | (0.315) |
| Lagged ROA | | 0.110*** | | 0.019 | | -0.234* |
| | | (0.008) | | (0.018) | | (0.133) |
| Lagged Size | | 0.032 | | -0.246*** | | -0.038* |
| | | (0.020) | | (0.012) | | (0.023) |
| HHI | | -0.048 | | -0.099 | | 0.027 |
| | | (0.177) | | (0.415) | | (0.150) |
| Import Penetration | | 0.119 | | -0.134 | | 0.000 |
| | | (0.090) | | (0.095) | | (0.000) |
| Firm FE | Yes | Yes | Yes | Yes | No | No |
| NAICS FE | No | No | No | No | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R2 | 0.728 | 0.736 | 0.009 | 0.055 | 0.041 | 0.041 |
| Observations | 25,256 | 25,256 | 25,256 | 25,256 | 4,034 | 4,034 |

Table 2: Summary Statistics

This table displays the summary statistics for the variables employed in the main specifications. We report the number of observations, mean, standard deviation, 10th, 25th, 50th, 75th and 90th percentiles for each variable. The variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels.

| Variables | N | Mean | SD | P10 | P25 | P50 | P75 | P90 |
|---------------------------|--------|--------|-------|--------|--------|--------|--------|--------|
| Foreign Leniency | 25,256 | 0.067 | 0.072 | 0.000 | 0.007 | 0.047 | 0.082 | 0.203 |
| Gross Margin | 25,256 | 0.276 | 0.439 | -0.167 | 0.208 | 0.355 | 0.525 | 0.671 |
| Size-Adjusted Return | 25,256 | 0.008 | 0.598 | -0.585 | -0.364 | -0.092 | 0.203 | 0.662 |
| ROA | 25,256 | -0.093 | 0.439 | -0.469 | -0.119 | 0.030 | 0.093 | 0.164 |
| Size | 25,256 | 5.101 | 2.076 | 2.590 | 3.573 | 4.820 | 6.453 | 8.046 |
| HHI | 25,256 | 0.060 | 0.049 | 0.031 | 0.035 | 0.045 | 0.062 | 0.107 |
| Import Penetration | 25,256 | 0.296 | 0.210 | 0.065 | 0.142 | 0.248 | 0.423 | 0.583 |
| Redacted Contracts | 414 | 0.599 | 0.491 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| %Redacted Contracts | 414 | 0.581 | 0.484 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 |
| %Product Conference Calls | 9,713 | 12.967 | 7.685 | 3.728 | 7.197 | 12.015 | 17.579 | 23.436 |
| Avg. CompAcc | 16,648 | -3.675 | 2.140 | -6.070 | -4.220 | -3.130 | -2.330 | -1.800 |
| Median CompAcc | 16,648 | -2.967 | 2.500 | -6.100 | -3.610 | -2.100 | -1.360 | -1.000 |
| %Competition | 23,981 | 0.995 | 0.544 | 0.374 | 0.604 | 0.917 | 1.288 | 1.703 |
| Competition Noise | 20,139 | 0.199 | 0.399 | 0.000 | 0.000 | 0.000 | 0.000 | 1.000 |
| NAICS PPI | 4,034 | 1.566 | 0.516 | 1.055 | 1.238 | 1.470 | 1.787 | 2.143 |

Table 3: Foreign Leniency Law and Public Disclosure

This table presents results from the OLS regression relating redaction of information in material contracts and the product-market-related disclosure during conference calls to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 2000-2012. The dependent variable is *Redacted Contracts*, *%Redacted Contracts* and *%Product Conference Calls* in columns (1) and (2), (3) and (4) and (5) and (6), respectively. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>Redacted Contracts</i> | | <i>%Redacted Contracts</i> | | <i>%Product Conference Calls</i> | |
|--------------------|---------------------------|----------------------|----------------------------|----------------------|----------------------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Foreign Leniency | -4.043*** (1.202) | -3.655*** (1.007) | -3.984*** (1.253) | -3.688*** (1.011) | 10.705** (4.854) | 11.889** (5.155) |
| Lagged ROA | | -0.204*** (0.058) | | -0.208*** (0.056) | | 0.075 (0.119) |
| Lagged Size | | 0.040 (0.039) | | 0.027 (0.044) | | -0.055 (0.377) |
| HHI | | -4.267* (2.081) | | -4.038* (2.246) | | -6.667* (3.336) |
| Import Penetration | | -0.236 (0.786) | | -0.654 (0.685) | | 0.203 (1.140) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.587 | 0.612 | 0.582 | 0.609 | 0.674 | 0.674 |
| Observations | 414 | 414 | 414 | 414 | 9,713 | 9,713 |

Table 4: Heterogeneity in Public Disclosure

This table presents results from the OLS regression relating redaction of information in material contracts to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 2000-2012. The dependent variable is *Redacted Contracts* in Panel A and it is *%Product Conference Calls* in Panel B. *Growth Industry* is a binary variable that equals one if the sales growth at the industry level falls in the highest quartile of the sample distribution, and zero otherwise. *Heterogeneity* is a binary variable that equals one if the number of the firm's peers with similar products falls in the lowest quartile of the sample distribution, and zero otherwise. *HHI Census* is the four-digit census HHI ratio. *Large Firm* is a binary variable that equals one if the firm size falls in the highest quartile of the sample distribution, and zero otherwise. *High %Private* is a binary variable that equals one if the proportion of private firms in the three-digit NAICS industry falls in the highest quartile of the sample distribution, and zero otherwise. *Low Industry Gross Margin* is a binary variable that equals one if the industry average profit margin is in the lowest quartile of the sample distribution, and zero otherwise. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All the columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, **, and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Heterogeneity in Redacting Information in Contracts

| | Redacted Contracts | | | | | |
|--|----------------------|----------------------|--------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Foreign Leniency | -4.970*** (0.655) | -4.133*** (1.050) | -1.282 (1.495) | -2.183 (1.441) | -4.539*** (1.173) | -2.824*** (0.897) |
| Growth Industry | -0.479 (0.382) | | | | | |
| Growth Industry×Foreign Leniency | 4.309* (2.037) | | | | | |
| Heterogeneity | | -0.511** (0.218) | | | | |
| Heterogeneity×Foreign Leniency | | 6.672* (3.470) | | | | |
| HHI Census | | | 0.001** (0.000) | | | |
| HHI Census×Foreign Leniency | | | -0.004* (0.002) | | | |
| Large Firm | | | | 0.323*** (0.079) | | |
| Large Firm×Foreign Leniency | | | | -2.726*** (0.870) | | |
| High %Private | | | | | -0.181 (0.161) | |
| High %Private×Foreign Leniency | | | | | 2.672** (1.105) | |
| Low Industry Gross Margin | | | | | | -1.251** (0.411) |
| Low Industry Gross Margin×Foreign Leniency | | | | | | 5.128* (2.839) |
| Firm and Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.621 | 0.606 | 0.605 | 0.616 | 0.618 | 0.608 |
| Observations | 414 | 354 | 402 | 414 | 414 | 414 |

Panel B: Heterogeneity in Disclosure during Conference Calls

| | <i>%Product Conference Calls</i> | | | | | |
|--|----------------------------------|---------------------|-------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Foreign Leniency | 8.340** (3.553) | 12.499** (4.978) | 8.044 (5.587) | 10.885** (4.940) | 12.278** (4.967) | 5.974* (3.399) |
| Growth Industry | 2.065*** (0.602) | | | | | |
| Growth Industry×Foreign Leniency | -14.756* (7.575) | | | | | |
| Heterogeneity | | 0.519** (0.188) | | | | |
| Heterogeneity×Foreign Leniency | | -2.475* (1.262) | | | | |
| HHI Census | | | -0.001 (0.001) | | | |
| HHI Census×Foreign Leniency | | | 0.008* (0.004) | | | |
| Large Firm | | | | -0.667 (0.467) | | |
| Large Firm×Foreign Leniency | | | | 4.012* (2.304) | | |
| High %Private | | | | | 0.636 (0.661) | |
| High %Private×Foreign Leniency | | | | | -3.144 (3.934) | |
| Low Industry Gross Margin | | | | | | 2.207** (0.816) |
| Low Industry Gross Margin×Foreign Leniency | | | | | | -17.150* (9.268) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 9,713 | 9,279 | 9,516 | 9,713 | 9,713 | 9,713 |
| Observations | 0.675 | 0.679 | 0.674 | 0.675 | 0.674 | 0.675 |

Table 5: Alternative Identification Strategies

The table presents results from the OLS regression relating redaction of information in material contracts and product-market-related disclosing during conference calls to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 2000-2012. The dependent variable is *Redacted Contracts* in columns (1) to (4) and it is *%Product Conference Calls* in column (5). We modify our identification strategy. For each three-digit SIC code, we select the country that is the most important to that industry in terms of import volume. For each industry, *Binary Foreign Leniency* is equal to one starting with the year when the country most important to that industry adopted the law. In Column (2), we redefine *Binary Foreign Leniency* by anticipating adoption year by four years before the actual adoption. In Column (3), *Binary Foreign Leniency* is redefined by replacing the main country in terms of imports with the least important country in terms of the imports. In columns (4) and (5), *Binary Leniency (T-3)*, *Binary Leniency (T-2)*, *Binary Leniency (T-1)*, *Binary Leniency (T)*, *Binary Leniency (T+1)*, *Binary Leniency (T+2)*, *Binary Leniency (T+3)*, and *Binary Leniency (4+)* are equal to one in, respectively, three years before, two years before, one year before, the year, one year after, two years after, three years after and at least four years after the year when the country most important to the industry adopted the law. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All columns report results controlling for industry- (or firm-) and year-fixed effects. Standard errors are clustered at the three-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>Redacted Contracts</i> | | | | <i>%Product Conference Calls</i> |
|--|---------------------------|------------------|------------------|----------------------|----------------------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Binary Foreign Leniency | -0.336** (0.136) | | | | |
| Binary Foreign Leniency (T-4) | | 0.233 (0.273) | | | |
| Binary Foreign Leniency(Least Exposed) | | | 0.118 (0.077) | | |
| Binary Foreign Leniency (T-3) | | | | -0.034 (0.149) | -0.174 (1.078) |
| Binary Foreign Leniency (T-2) | | | | -0.366 (0.253) | 1.002 (1.129) |
| Binary Foreign Leniency (T-1) | | | | 0.099 (0.203) | 1.933 (1.224) |
| Binary Foreign Leniency (T) | | | | -0.292** (0.143) | 2.211* (1.188) |
| Binary Foreign Leniency (T+1) | | | | -0.190 (0.183) | 1.908 (1.376) |
| Binary Foreign Leniency (T+2) | | | | -0.550*** (0.076) | 2.554* (1.377) |
| Binary Foreign Leniency (T+3) | | | | -0.492*** (0.157) | 2.875** (1.372) |
| Binary Foreign Leniency (4+) | | | | -0.448** (0.200) | 3.269** (1.457) |
| Firm FE | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.618 | 0.600 | 0.600 | 0.624 | 0.675 |
| Observations | 414 | 414 | 414 | 414 | 9,713 |

Table 6: Public Disclosure and Firm Performance

The table presents results from the OLS regression relating profitability to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 1994-2012. The dependent variable is the gross profit margin. *High Disclosure* is a binary variable that equals one if the industry-level product-market-related disclosure during conference calls falls in the highest quartile of the sample distribution, and zero otherwise. Industry-level product-market-related disclosure during conference calls refers to the mean of *%Product Conference Calls* excluding the firm itself. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>Gross Margin</i> | |
|----------------------------------|----------------------|---------------------|
| | (1) | (2) |
| Foreign Leniency | -0.823* (0.457) | -0.807* (0.439) |
| High Disclosure | -0.069*** (0.023) | -0.061** (0.022) |
| High Disclosure×Foreign Leniency | 0.368** (0.163) | 0.325* (0.155) |
| Lagged ROA | | 0.061*** (0.009) |
| Lagged Size | | 0.007 (0.010) |
| HHI | | 0.240 (0.189) |
| Import Penetration | | 0.034 (0.046) |
| Firm FE | Yes | Yes |
| Year FE | Yes | Yes |
| Adjusted R-squared | 0.756 | 0.759 |
| Observations | 16,023 | 16,023 |

Table 7: Coordination of Public Disclosure

The table presents results from the OLS regression relating peer effects of public disclosure to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. In Panel A, the dependent variable is *%Product Conference Calls*. *Peer Disclosure* is the mean of *%Product Conference Calls* excluding the firm itself. *High Exposure to Foreign Leniency* is a binary variable that equals one if the collusion costs fall in the highest quartile of the sample distribution. Panel B presents results from the OLS regression relating financial statement comparability to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 1994-2012. The dependent variable is *Coordination*. The sample period in columns (1) and (2) is from 1994 to 2012, and the sample period in columns (3) and (4) is from from 2002 to 2012. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Peer Disclosure

| | <i>%Product Conference Calls</i> | |
|---|----------------------------------|--------------------|
| | (1) | (2) |
| Peer Disclosure | 0.179 (0.178) | 0.108 (0.142) |
| High Exposure to Foreign Leniency | | -1.249 (0.826) |
| Peer Disclosure×High Exposure to Foreign Leniency | | 0.130** (0.051) |
| Lagged ROA | 0.097 (0.108) | 0.075 (0.115) |
| Lagged Size | -0.099 (0.381) | -0.083 (0.373) |
| HHI | -2.235 (2.834) | -3.382 (2.900) |
| Import Penetration | 0.117 (1.165) | 0.450 (1.119) |
| Firm FE | Yes | Yes |
| Year FE | Yes | Yes |
| Adjusted R-squared | 0.674 | 0.674 |
| Observations | 9,704 | 9,704 |

Panel B: Financial Statement Comparability

| | <i>Comparability</i> | | | |
|--------------------|----------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Foreign Leniency | 2.893* (1.568) | 3.644** (1.566) | 8.610*** (1.649) | 9.381*** (1.339) |
| Lagged ROA | | 1.089*** (0.291) | | 0.966*** (0.308) |
| Lagged Size | | 0.476*** (0.034) | | 0.627*** (0.066) |
| HHI | | -1.248 (3.295) | | -2.345 (3.124) |
| Import Penetration | | 0.384 (0.406) | | 1.060 (0.910) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.589 | 0.618 | 0.654 | 0.677 |
| Observations | 16,648 | 16,648 | 8,954 | 8,954 |

Table 8: Foreign Leniency Law and Competition Disclosure

This table presents results from the OLS regressions relating discussion on competition to the exposure to foreign leniency laws and to the probability of being investigated by antitrust authorities for U.S. Compustat firms over 1994-2012. The dependent variable is *%Competition* in columns (1) and (2) and *Competition Noise* in columns (3) and (4). All columns report results controlling for firm- and year-fixed effects. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>%Competition</i> | | <i>Competition Noise</i> | |
|--------------------|---------------------|---------------------|--------------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Foreign Leniency | -0.361** (0.128) | -0.367** (0.135) | -0.607*** (0.194) | -0.566** (0.203) |
| Lagged ROA | | 0.027* (0.015) | | -0.005 (0.007) |
| Lagged Size | | 0.000 (0.009) | | 0.021*** (0.005) |
| HHI | | 0.078 (0.231) | | -0.240 (0.339) |
| Import Penetration | | 0.052 (0.057) | | -0.059 (0.097) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.501 | 0.501 | 0.308 | 0.309 |
| Observations | 23,981 | 23,981 | 20,139 | 20,139 |

Figure 1: Foreign Leniency across Years

We plot *Foreign Leniency* across industries for the sample period.

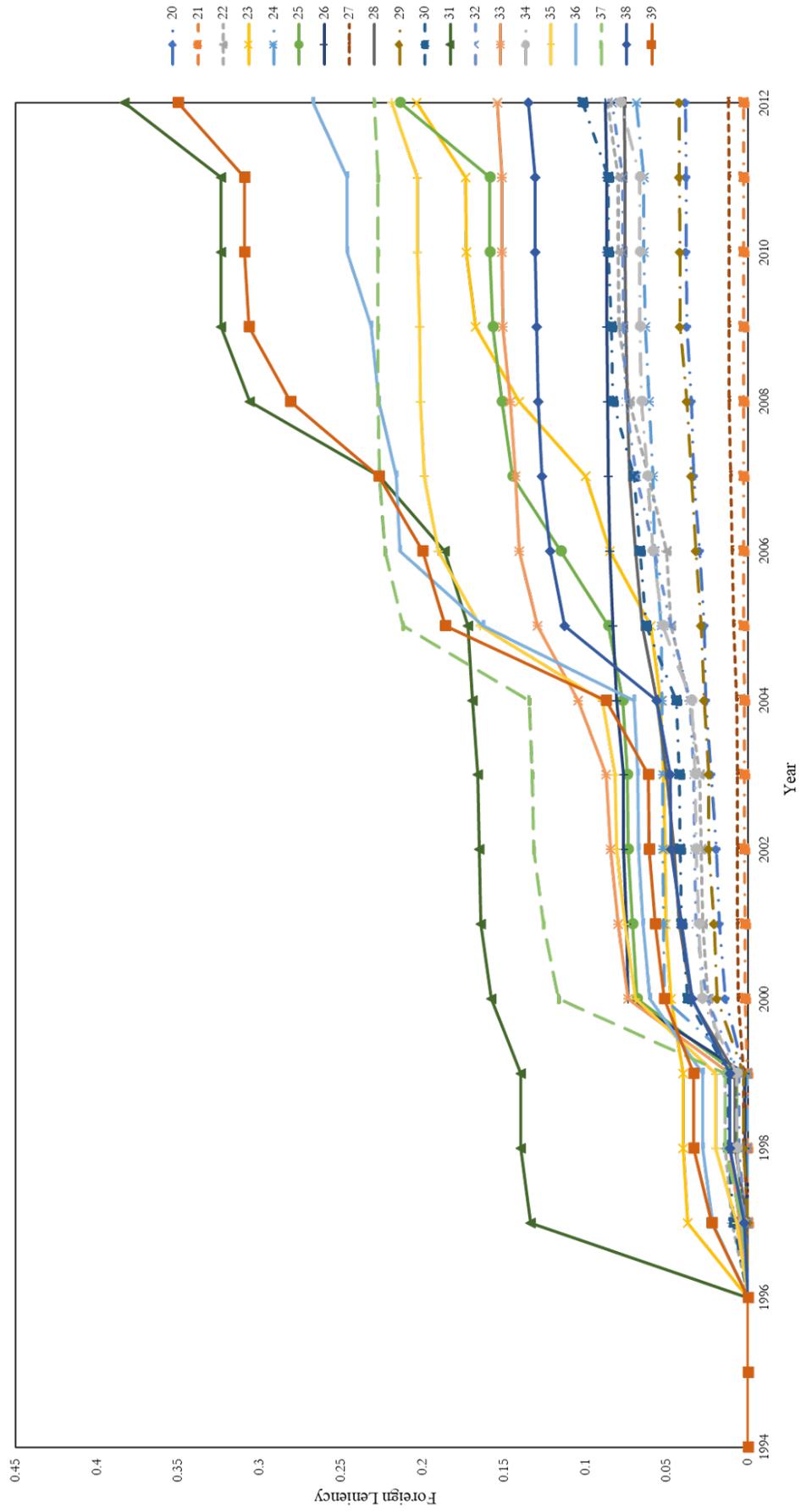


Figure 2: Conference Call Disclosure and Profit Margins Around Leniency Laws

We plot the average *Profit Margins* for the period of 2 years before to 3 years after the leniency law passed in the country that is a major trading partner of the industry. The solid line presents the firms with increasing of product-market-related disclosure during conference calls, whereas the dashed line presents the firms with non-increasing product-market-related disclosure during conference calls over the period of one years after the leniency law passed in the country that is a major trading partner of the industry. The table presents the averages and the 10% confidence intervals.

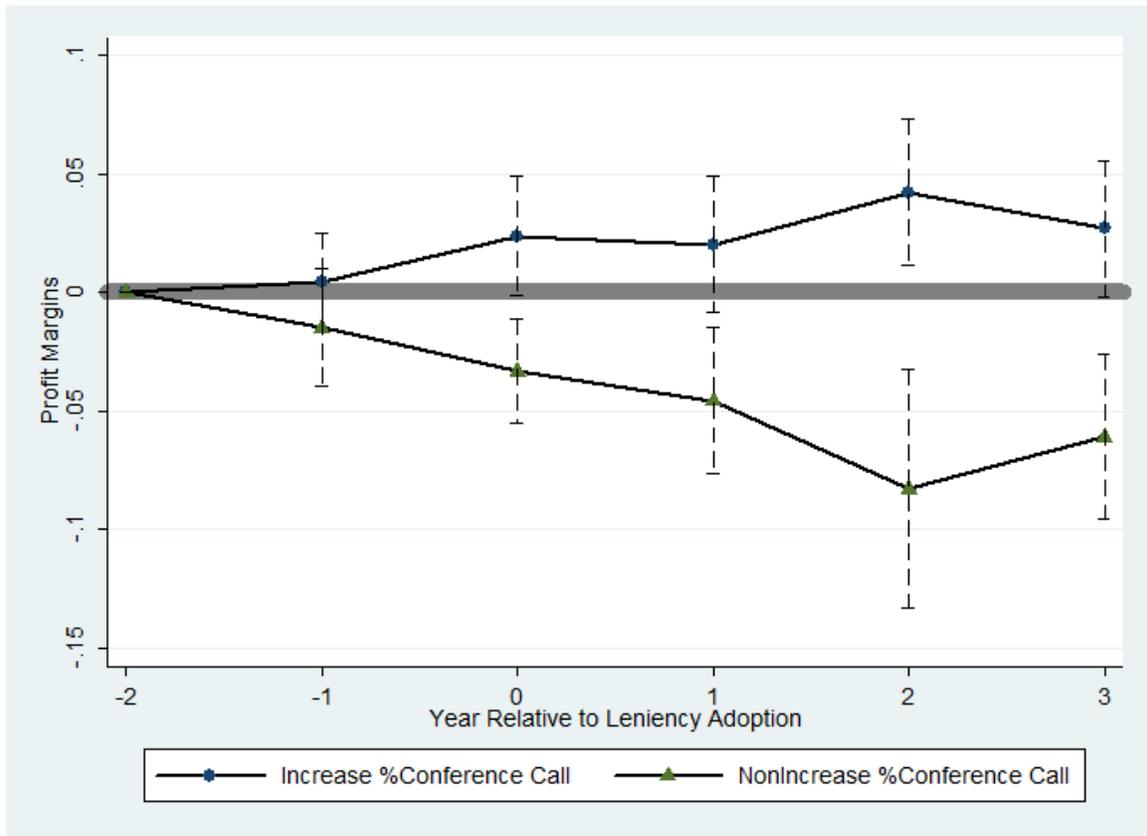
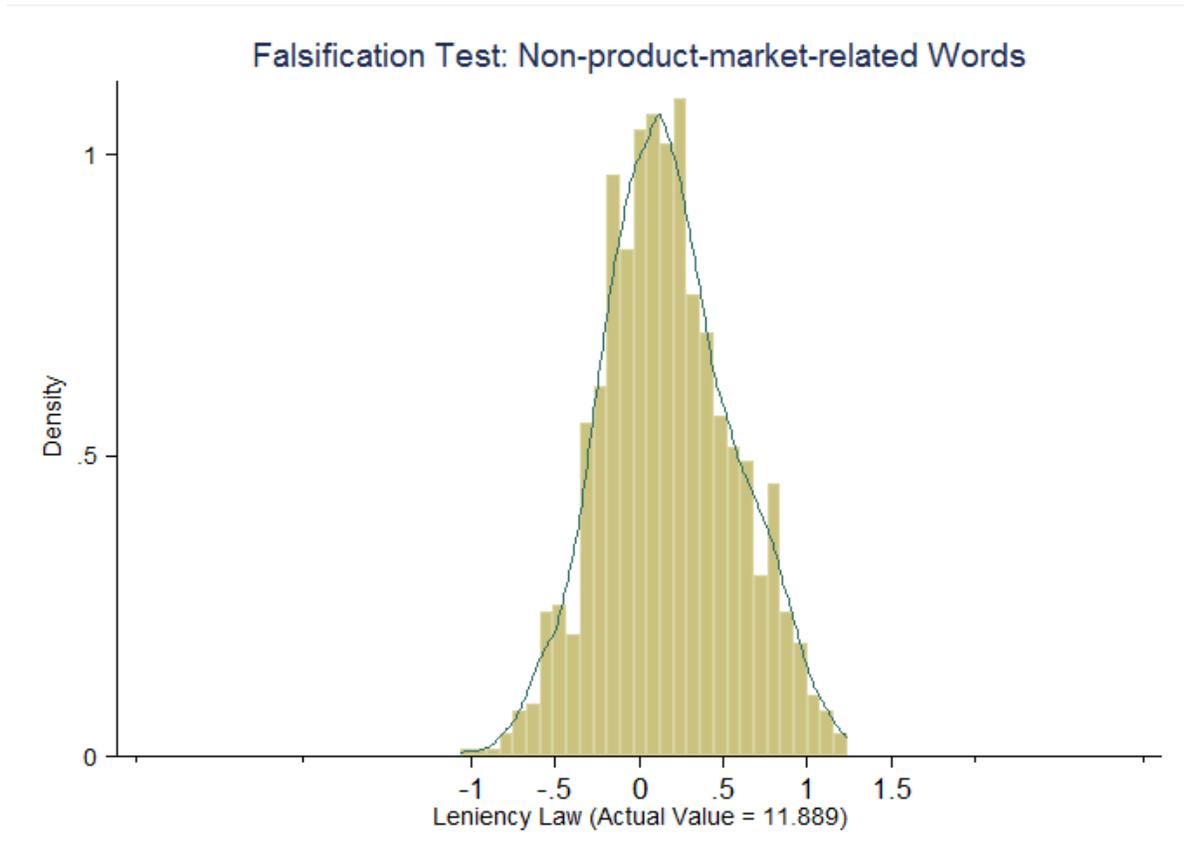


Figure 3: Falsification of Conference Call Disclosure

We plot the coefficient of *Foreign Leniency*. Each time we randomly draw six words without replacement from the falsification word list and conduct the regression analysis in column (6) of Table 3 using the proportion of these six words in a conference call as the dependent variable. The process is repeated 1,000 times.



Appendix A: Variable Definitions

| Variable | Definition | Data Source |
|---------------------------------------|---|--|
| Foreign Leniency | The weighted average of the passage of laws in all other countries, where the weight is equal to the share of the two-digit SIC industry's imports from a particular country. | <i>Cartel Regulation 2013, Schott's Data Library</i> |
| Adj. Foreign Leniency | The weighted average of the passage of laws in all other countries, where the weight is equal to the share of the three-digit SIC industry's imports from a particular country, minus the weighted average of the passage of laws in all other countries, where the weight is equal to the share of the two-digit SIC industry's imports from a particular country. | <i>Cartel Regulation 2013, Schott's Data Library</i> |
| $\sum_k (w_{SIC3} - w_{SIC2}) L_{kt}$ | The weighted average of the passage of laws in all other countries, where the weight is equal to the share of the three-digit SIC industry's imports (exports) from a country minus the share of the two-digit SIC industry's imports (exports) from (to) the country. | <i>Cartel Regulation 2013, Schott's Data Library</i> |
| Binary Foreign Leniency | A binary variable that is equal to one starting with the year when the country most important to that industry adopted the law. We define the most important country for each three-digit SIC code based on the import volume from the country to that industry. | <i>Cartel Regulation 2013, Schott's Data Library</i> |
| Foreign Rule of Law | The weighted average of the rule of law of all countries, where the weight is equal to the share of the two-digit SIC industry's imports from a particular country. | <i>World Bank Data</i> |
| Foreign Leniency (High Enforcement) | The weighted average of the passage of laws in high-enforcement countries, where the weight is equal to the share of the two-digit SIC industry's imports from a particular country. A country is categorized as a high-enforcement country if its score on the efficiency of the judicial system is larger than the sample median. | <i>Cartel Regulation 2013, Schott's Data Library</i> |
| Convicted Cartels | The logarithm of one plus the number of cartels in the industry that were convicted during the year. | <i>Connor [2014]</i> |
| Convicted Firms | The logarithm of one plus the number of cartel firms in the industry that were convicted during the year. | <i>Connor [2014]</i> |
| %Competition | The ratio of competition-related words (<i>competition, competitor, competitive, compete, competing</i>) to the total number of words in the 10-K. | <i>SEC Edgar</i> |
| Competition Noise | A binary variable that equals one if the maximum value of the proportion of competition-related words in each paragraph of the MD&A section of 10-K filing is more than 3%. | <i>SEC Edgar</i> |
| Redacted Contract | A binary variable that equals one if the firm files material sales contracts during the year and requests confidential treatment in the contract. We search for <i>confidential treatment, confidential request</i> and <i>confidential...redacted</i> in the file to identify the confidential request by the firm. | <i>SEC Edgar</i> |
| %Redacted Contracts | The ratio of sales contracts that redact information to the total number of sales contracts the firm files with the SEC during the year. | <i>SEC Edgar</i> |
| %Product Conference Calls | The ratio of product-market-related words divided to the total number of words in the CEO / CFO presentation during earnings conference calls multiplied by 1,000. The list of words includes <i>price, pricing, priced, discount, product, service, offering, offer, customers</i> and <i>client</i> . | <i>StreetEvents</i> |
| Comparability Regulator IP Access | The mean value of accounting comparability score between the firm and all of its industry peers. A binary variable that equals one if a firm's SEC filing is accessed through the IP address associated with the Department of Justice or FTC, within one year following the filing date. | <i>De Franco et al. [2011]</i> |
| Redacted Price | A binary variable that equals one if the firm files a material sales contract that explicitly specifies product price but request confidential treatment of the product price in the contract. | <i>SEC Edgar</i> |

| Variable | Definition | Data Source |
|-----------------------------------|--|--|
| Redacted Quantity | A binary variable that equals one if the firm files a material sales contract that explicitly specifies purchase/procure quantity but requests confidential treatment of the purchase/procure quantity in the contract. | <i>SEC Edgar</i> |
| Redacted Duration | A binary variable that equals one if the firm files a material sales contract that explicitly specifies contract duration but requests confidential treatment of the contract duration in the contract. | <i>SEC Edgar</i> |
| Redacted Purchase Contracts | A binary variable that equals one if the firm files a material purchase contracts (the firm is the customer of the agreement) during the year and requests confidential treatment upon the contract duration in the contract. | <i>SEC Edgar</i> |
| New Clients | The logarithm of one plus the number of new customer announcements in corporate press releases during the year. | <i>CapitalIQ Key Development Data</i> |
| HHI | Herfindahl-Hirschman Index of the two-digit industry. | <i>Compustat</i> |
| Import Penetration | Four-digit SIC industry-level import penetration, which is defined as the value of imports scaled by the sum of the value of imports and the shipment value minus value of exports. | <i>Schott's Data Library</i> |
| Gross Margin | Gross profit scaled by net sales. | <i>Compustat</i> |
| Size-Adjusted Return | The 12-month buy-and-hold stock return in the year, adjusted by the return in the same capitalization decile. | <i>CRSP</i> |
| NAICS PPI | The producer price index at the NAICS industry level, scaled by 100. | <i>Bureau of Labor Statistics</i> |
| Bid-Ask Spread | The value-weighted average of all firms' annual average bid-ask spread in the same two-digit SIC industry, with weight relative to the market capitalization at the beginning of the year. A firm's bid-ask spread is defined as the absolute value of spread between bid and ask. | <i>CRSP</i> |
| Turnover | The value-weighted average of all firms' turnover in the same two-digit SIC industry, with weight relative to the market capitalization at the beginning of the year. A firm's turnover is defined as the trading volume scaled by the total number of shares outstanding. | <i>CRSP</i> |
| ROA | Operating earnings before extraordinary items scaled by lagged total assets. | <i>Compustat</i> |
| Size | The logarithm of total assets. | <i>Compustat</i> |
| Growth Industry | A binary variable that equals one if the sales growth at the industry level falls in the highest quartile of the sample distribution. | <i>Compustat</i> |
| Heterogeneity | A binary variable that equals one if the number of the firm's peers with similar products falls in the lowest quartile of the sample distribution. | Hoberg and Phillips [2010] |
| HHI Census | The four-digit NAICS census HHI ratio. | <i>U.S. Census Bureau</i> |
| Large Firm | A binary variable that equals one if the firm size falls in the highest quartile of the sample distribution. | <i>Compustat</i> |
| High %Private | A binary variable that equals one if the proportion of private firms in the NAICS industry falls in the highest quartile of the sample distribution. | <i>U.S. Census Bureau</i> |
| Low Industry Margin | A binary variable that equals one if the industry mark-ups fall in the lowest quartile of the sample distribution. | <i>Compustat</i> |
| High Exposure to Foreign Leniency | A binary variable that equals one if the collusion costs are higher than the sample median. | <i>Cartel Regulation 2013, Schott's Data Library</i> |
| High Disclosure | A binary variable that equals one if the industry-level product-market-related disclosure during conference calls falls in the highest quartile of the sample distribution, and zero otherwise. | <i>StreetEvents</i> |

Internet Appendix (Not for Publication)

Table A1: Types of Redacted Information

This table presents results from the OLS regression relating redaction of information in material contracts to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 2000-2012. The dependent variable is *Redacted Price* in columns (1) and (2), *Redacted Quantity* in columns (3) and (4), and *Redacted Duration* in columns (5) and (6). Columns (1) and (2) are based on contracts that explicitly specify product price and either disclose or redact product price. Columns (3) and (4) are based on contracts that explicitly specify purchase/procure quantity obligation and either disclose or redact the obligation. Columns (5) and (6) are based on contracts that explicitly specify the contract duration and either disclose or redact the contract duration. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All the columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>Redacted Price</i> | | <i>Redacted Quantity</i> | | <i>Redacted Duration</i> | |
|--------------------|-----------------------|----------------------|--------------------------|--------------------|--------------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Foreign Leniency | -4.787*** (1.132) | -4.419*** (0.903) | -2.920** (1.186) | -2.274* (1.034) | -2.201** (0.814) | -1.753* (0.871) |
| Lagged ROA | | -0.196*** (0.035) | | -0.011 (0.087) | | 0.034 (0.031) |
| Lagged Size | | 0.009 (0.035) | | -0.000 (0.125) | | 0.085*** (0.027) |
| HHI | | -3.564** (1.450) | | 3.361 (1.972) | | -2.830 (1.746) |
| Import Penetration | | -0.551 (0.844) | | 1.854** (0.686) | | 0.846 (0.643) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.59 | 0.609 | 0.623 | 0.621 | 0.087 | 0.092 |
| Observations | 320 | 320 | 307 | 307 | 414 | 414 |

Table A2: Redacting Information in Purchase Contracts

This table presents results from OLS regressions relating redaction of information in material contracts to the exposure to the rule of law. The sample consists of U.S. Compustat firms that filed purchase material contracts (the firm is the customer of the agreement) with the SEC over 2000-2012. The dependent variable is *Redacted Purchase Contracts* in columns (1) and (2) and it is *%Redacted Purchase Contracts* in columns (3) and (4). Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>Redacted Purchase Contracts</i> | | <i>%Redacted Purchase Contracts</i> | |
|--------------------|------------------------------------|-------------------|-------------------------------------|-------------------|
| | (1) | (2) | (3) | (4) |
| Foreign Leniency | -1.716 (1.950) | -1.224 (2.837) | -1.649 (1.789) | -1.715 (2.936) |
| Lagged ROA | | -0.046 (0.053) | | -0.058 (0.061) |
| Lagged Size | | 0.034 (0.145) | | 0.034 (0.142) |
| HHI | | 1.569 (0.891) | | 1.621* (0.858) |
| Import Penetration | | -2.796 (2.018) | | -1.285 (2.315) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.515 | 0.513 | 0.516 | 0.506 |
| Observations | 302 | 302 | 302 | 302 |

Table A3: Robustness Tests for Disclosure during Conference Calls

This table presents results from OLS regressions relating product-market-related disclosure during conference calls to the exposure to foreign leniency law for U.S. Compustat firms over 2002-2012. In Panel A, the dependent variable is the disclosure during conference calls based on various dictionaries. The dictionary in columns (1) and (2) adds *price* to the dictionary in Table 3. The dictionary in columns (3) and (4) is constructed based on the Amerco cases and Valassis Cases. In columns (5) and (6), we construct a binary variable (Quote Competitor) that equals one if the firm mention any of its competitors during conference calls, and zero otherwise. The list of competitors is obtained from Factset Revere relationships database over 2003 to 2012. Since the Factset Revere relationships database starts from April 2003, we exclude conference calls that were initiated prior to 2003. In column (7) and (8), we repeat our analysis using all executives' disclosure during the presentation section. In column (9) and (10), we repeat our analysis using all executives' disclosure during both the presentation and Q&A section. In Panel B, the dependent variable is %Product Conference Calls. New Clients is the logarithm of the number of clients announced by the firm during the year, and Lagged New Clients is the logarithm of the number of clients announced by the firm during the previous year. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All the columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Various Dictionaries for Disclosure during Conference Calls

| | %Conference Call Dic2 | | %Conference Call Dic3 | | Quote Competitor | | All Executives | | All Executives Incl. Q&A | |
|--------------------|-----------------------|--------------------|-----------------------|---------------------|--------------------|---------------------|-------------------|----------------------|--------------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Foreign Leniency | 9.396* (5.042) | 10.274* (5.459) | 13.439*** (4.597) | 10.977** (4.504) | 0.479** (0.178) | 0.336** (0.139) | 7.147* (3.939) | 9.122** (3.522) | 4.959 (3.938) | 6.447* (3.593) |
| Lagged ROA | | 0.068 (0.124) | | -0.245 (0.217) | | 0.056*** (0.015) | | -0.138 (0.143) | | -0.043 (0.194) |
| Lagged Size | | 0.001 (0.358) | | 0.281 (0.173) | | -0.005 (0.016) | | 0.225 (0.187) | | 0.145 (0.125) |
| HHI | | -4.696 (3.369) | | 14.660** (5.699) | | 0.625*** (0.176) | | -8.786*** (2.860) | | -6.725** (3.126) |
| Import Penetration | | 0.181 (0.806) | | -3.270** (1.542) | | 0.550 (0.364) | | 0.990 (2.102) | | 1.547 (1.341) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.659 | 0.659 | 0.500 | 0.501 | 0.446 | 0.448 | 9,734 | 9,734 | 9,734 | 9,734 |
| Observations | 9,713 | 9,713 | 9,713 | 9,713 | 7,795 | 7,795 | 0.732 | 0.733 | 0.779 | 0.779 |

Panel B: New Clients and Disclosure during Conference Calls

| | <i>%Product Conference Calls</i> | | | |
|--------------------|----------------------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Foreign Leniency | 10.693** (4.822) | 11.878** (5.128) | 10.557** (4.808) | 11.722** (5.127) |
| New Clients | 0.060 (0.152) | 0.066 (0.144) | | |
| Lagged New Clients | | | 0.160* (0.092) | 0.164* (0.083) |
| Lagged ROA | | 0.075 (0.120) | | 0.069 (0.119) |
| Lagged Size | | -0.058 (0.374) | | -0.070 (0.376) |
| HHI | | -6.700* (3.343) | | -6.700* (3.329) |
| Import Penetration | | 0.182 (1.136) | | 0.010 (1.154) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.674 | 0.674 | 0.674 | 0.675 |
| Observations | 9,713 | 9,713 | 9,713 | 9,713 |

Table A4: Further Robustness Tests

This table presents results from the OLS regression relating redaction of information in material contracts to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 2000-2012. The dependent variable is *Redacted Contracts* across all panels. In Panel A, we repeat the analysis in Table 3 using various alternative weights to estimate industry-level exposures to foreign leniency laws. *Foreign Leniency* in columns (1) to (4) is estimated based on, respectively, the imports of the three-digit SIC industry from any other countries, the exports of the two-digit SIC industry to any other countries, the exports of the three-digit SIC industry to any other countries, and the imports of final goods of the two-digit SIC industry from any other countries. In Panel B, we repeat the analysis in Table 3 using various refinements of *Foreign Leniency* to control for industry-level trends. *Adj. Foreign Leniency* is calculated using *Foreign Leniency* estimated based on three-digit weights minus *Foreign Leniency* estimated based on two-digit weights. $\sum_k (w_{SIC3} - w_{SIC2}) L_{kt}$ is an alternative finer industry-adjusted measure, estimated by replacing two-digit SIC industry weights in section 3.2 with three-digit SIC weights minus two-digit SIC weights. The weights are based on the imports from any other countries in columns (1) and (2), and are based on the exports to any other countries in columns (3) and (4). In Panel C, we investigate the variation in enforcement level and the rule of law. *Foreign Leniency (High Enforcement)* is the weighted average of the passage of laws in high-enforcement countries, where the weight is equal to the share of the two-digit SIC industry's imports from a particular country. A country is categorized as a high-enforcement country if its score on the efficiency of the judicial system (La Porta et al. [1998]) is larger than the sample median. *Rule of Law* is the weighted average of the rule of law of all countries, where the weight is equal to the share of the two-digit SIC industry's imports from a particular country. The score of the rule of law for each country is obtained from the World Bank Data. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All the columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Alternative Weighting Schemes of Foreign Leniency

| | <i>Redacted Contracts</i> | | | |
|--------------------|-------------------------------|-------------------------------|-------------------------------|----------------------|
| | 3-digit SIC, Import (1) | 2-digit SIC, Export (2) | 3-digit SIC, Export (3) | Final Goods (4) |
| Foreign Leniency | -3.134*** (0.575) | -7.086** (3.102) | -3.590*** (1.130) | -2.936* (1.383) |
| Lagged ROA | -0.200*** (0.054) | -0.207*** (0.060) | -0.205*** (0.053) | -0.213*** (0.055) |
| Lagged Size | 0.033 (0.034) | 0.044 (0.039) | 0.038 (0.032) | 0.031 (0.047) |
| HHI | -3.132 (2.456) | -4.811** (2.040) | -3.948* (2.124) | -4.698** (1.967) |
| Import Penetration | 0.142 (0.689) | 0.280 (0.777) | 0.425 (0.767) | -0.068 (0.944) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.622 | 0.600 | 0.605 | 0.602 |
| Observations | 414 | 414 | 414 | 414 |

Panel B: Industry Trends

| | <i>Redacted Contracts</i> | | | |
|---|---------------------------|----------------------|------------------------|----------------------|
| | Import-based Weighting | | Export-based Weighting | |
| | (1) | (2) | (3) | (4) |
| Adj. Foreign Leniency | -5.218*** (0.915) | | -4.773** (1.823) | |
| $\Sigma_k(\omega_{SIC3} - \omega_{SIC2})L_{kt}$ | | -5.218*** (0.915) | | -4.773** (1.823) |
| Lagged ROA | -0.201*** (0.054) | -0.201*** (0.054) | -0.206*** (0.052) | -0.206*** (0.052) |
| Lagged Size | 0.035 (0.036) | 0.035 (0.036) | 0.038 (0.033) | 0.038 (0.033) |
| HHI | -3.471 (2.103) | -3.471 (2.103) | -3.970* (2.139) | -3.970* (2.139) |
| Import Penetration | 0.558 (1.047) | 0.558 (1.047) | 0.370 (0.768) | 0.370 (0.768) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.613 | 0.613 | 0.604 | 0.604 |
| Observations | 414 | 414 | 414 | 414 |

Panel C: Enforcement and Rule of Law

| | <i>Enforcement</i> | | <i>Rule of Law</i> | |
|-------------------------------------|---------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) |
| Foreign Leniency (High Enforcement) | -4.881** (1.585) | -4.413*** (1.294) | | |
| Foreign Rule of Law | | | -9.131 (6.794) | -0.687 (6.071) |
| Foreign Leniency | | | | -3.613*** (1.077) |
| Lagged ROA | | -0.205*** (0.058) | 0.039 (0.040) | 0.039 (0.036) |
| Lagged Size | | 0.039 (0.040) | -0.200*** (0.058) | -0.204*** (0.055) |
| HHI | | -4.456** (1.932) | -5.458** (2.400) | -4.265* (2.098) |
| Import Penetration | | -0.102 (0.758) | -0.023 (1.029) | -0.234 (0.779) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.586 | 0.612 | 0.594 | 0.609 |
| Observations | 414 | 414 | 414 | 414 |

Table A5: Alternative Measures of Foreign Leniency

This table presents results from the OLS regression relating redaction of information in material contracts and the product-market-related disclosure during conference calls to the exposure to foreign leniency laws for Compustat firms incorporated in the U.S. over 2000-2012. The dependent variable is *Redacted Contracts* in Panel A, and it is *%Product Conference Calls* in Panel B, respectively. In columns (1) and (2), for each country, instead of defining the event year as the year when a country adopted the leniency law, we define the event year when the first discussion on leniency laws has been started by policy makers (*Foreign Leniency (Anticipated)*). In columns (3) and (4), we reconstruct our measure *Foreign Leniency (Firm-level)* at the firm level based on where firms have their subsidiaries in different countries according to LexisNexis data. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

Panel A: Redacted Contracts

| | <i>Redacted Contracts</i> | | | |
|--------------------------------|---------------------------|----------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Foreign Leniency (Anticipated) | -4.639*** (1.066) | -4.167*** (0.800) | | |
| Foreign Leniency (Firm-level) | | | -0.400** (0.137) | -0.366** (0.123) |
| Lagged ROA | | -0.198** (0.064) | | -0.030 (0.097) |
| Lagged Size | | 0.039 (0.038) | | 0.036 (0.039) |
| HHI | | -3.646* (1.747) | | -5.002 (4.500) |
| Import Penetration | | -0.136 (0.605) | | 0.339 (1.197) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.601 | 0.623 | 0.604 | 0.588 |
| Observations | 414 | 414 | 231 | 231 |

Panel B: %Product Conference Calls

| | <i>%Product Conference Calls</i> | | | |
|--------------------------------|----------------------------------|---------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) |
| Foreign Leniency (Anticipated) | 11.861** (5.234) | 12.914** (5.720) | | |
| Foreign Leniency (Firm-level) | | | 1.592* (0.844) | 1.566* (0.885) |
| Lagged ROA | | 0.063 (0.117) | | 0.164 (0.147) |
| Lagged Size | | -0.035 (0.384) | | -0.136 (0.502) |
| HHI | | -6.456* (3.344) | | -3.378 (2.079) |
| Import Penetration | | 0.261 (1.141) | | 0.017 (0.932) |
| Firm FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.675 | 0.675 | 0.684 | 0.684 |
| Observations | 9,713 | 9,713 | 7,696 | 7,696 |

Table A6: Antitrust Regulators' Access to 10-K Filings

This table presents results from the OLS regressions relating access to SEC filing servers by antitrust regulators to the U.S. Compustat firms' exposure to foreign leniency laws over 2003-2012. The dependent variable, *Regulator IP Access*, is a binary variable that equals one if a firm's SEC filing is accessed through the IP address associated with the Department of Justice or FTC, within one year following the filing date. In columns (1) and (2), we limit our analysis to 10-K filings, in columns (3) and (4), we limit our analysis to 10-K, 10-Q, and 8-K filings, and in columns (5) and (6), we limit our analysis to public filings with the SEC, other than 10-K, 10-Q, and 8-K filings. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. All columns report results controlling for firm- and year-fixed effects. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>Regulator IP Access</i> | | | | | |
|--------------------|----------------------------|---------------------|---------------------------|---------------------|----------------------|-------------------|
| | <i>10-K Filings</i> | | <i>10-K, 10-Q and 8-K</i> | | <i>Other Filings</i> | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Foreign Leniency | 0.166** (0.079) | 0.201** (0.075) | 0.191* (0.109) | 0.264** (0.111) | 0.073 (0.059) | 0.012 (0.070) |
| Lagged ROA | | -0.007** (0.003) | | -0.008** (0.004) | | -0.002 (0.003) |
| Lagged Size | | 0.033*** (0.005) | | 0.041*** (0.005) | | -0.002 (0.003) |
| HHI | | -0.029 (0.176) | | -0.238 (0.221) | | 0.360 (0.248) |
| Import Penetration | | -0.148 (0.169) | | -0.181 (0.240) | | 0.083 (0.131) |
| Firm FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.238 | 0.240 | 0.284 | 0.287 | 0.153 | 0.154 |
| Observations | 11,670 | 11,670 | 11,670 | 11,670 | 11,670 | 11,670 |

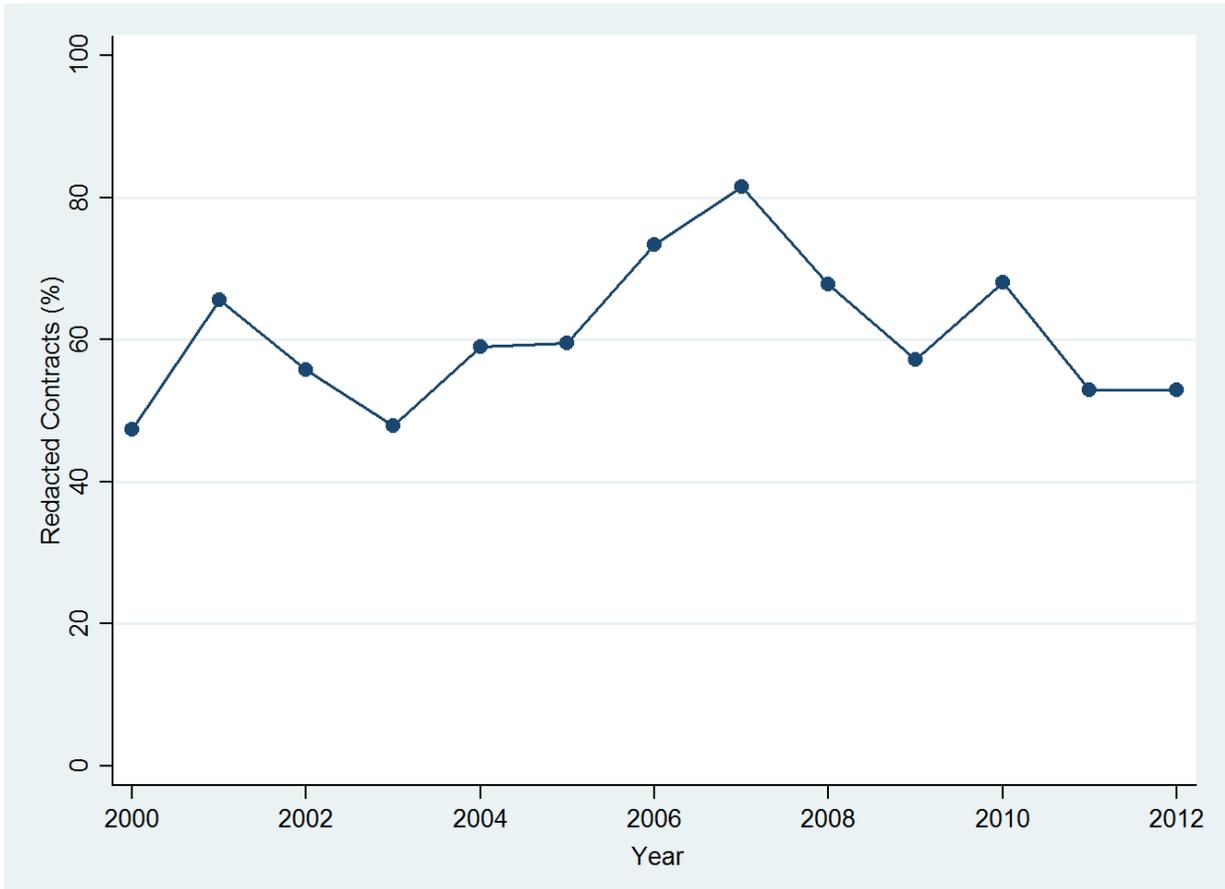
Table A7: Competition Disclosure and Investigation by Antitrust Authorities

This table presents results from the OLS regressions relating discussion on competition to the exposure to foreign leniency laws and to the probability of being investigated by antitrust authorities for U.S. Compustat firms over 1994-2012. The tests are based on two-digit SIC industry-year panel data. The dependent variable is *Convicted Cartels* in columns (1) and (2) and *Convicted Firms* in columns (3) and (4). *Lagged %Competition* is the lagged-one-period of the median of *%Competition* for each industry-year. The control variables include industry-level *Size*, *ROA* and *Leverage*. All the columns report results controlling for industry- and year-fixed effects. Variable definitions appear in Appendix A. All continuous variables are winsorized at the 1% and 99% levels. Standard errors are clustered at the two-digit SIC industry level and are displayed in parentheses. *, ** and *** indicate significance levels of 10%, 5%, and 1%, respectively.

| | <i>Convicted Cartels</i> | | <i>Convicted Firms</i> | |
|---------------------|--------------------------|---------------------|------------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Lagged %Competition | 0.175* (0.091) | 0.266** (0.098) | 0.450* (0.220) | 0.636** (0.238) |
| Foreign Leniency | | 2.220*** (0.662) | | 4.580*** (1.337) |
| Industry FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.232 | 0.264 | 0.182 | 0.208 |
| Observations | 339 | 339 | 339 | 339 |

Figure A1: *Redacted Contracts* across Years

We plot the average *Redacted Contracts* across years for the sample period.



Appendix A1: Examples of Sales Contracts with Redacted and Non-redacted Information

Example 1: Redacted Disclosure

The document is from a sales agreement in *Molecular Insight Pharmaceuticals, Inc.*'s 10-Q filing on 2009-11-06 with redacted information.

EX-10.5 5 dex105.htm SUPPLY AGREEMENT

Exhibit 10.5

SUPPLY AGREEMENT

This supply agreement (“Agreement”), dated this 19th day of October, 2009 (the “Effective Date”) is entered into by and between Molecular Insight Pharmaceuticals, Inc. (referred to herein as “MIP”), a corporation organized and existing under the laws of The Commonwealth of Massachusetts and having its principal office at 160 Second Street, Cambridge, MA 02142 USA, and BIOMEDICA Life Sciences S.A., a corporation organized and existing under the laws of Greece, with offices at 4 Papanikoli Str., 15232 Halandri, Athens, Greece (referred to herein as “BIOMEDICA”), with Greek Tax ID of EL 094413470, from the tax office of FAEE Athens; each a “Party” and collectively the “Parties” hereto.

...

WHEREAS, MIP agrees to source and/or manufacture the products (defined below) and supply such products to **BIOMEDICA**;

...

3.2.1 Pricing *****

- Compound Transfer Price is set at ***** per Dose
- Product for clinical trials is set at ***** per Dose
- Product Transfer Price. The BIOMEDICA price per dose of the Product will be determined by the national competent authority of each country of the Territory in which the Product will be launched. If the price per dose for the Product by the national competent authority is set below ***** then the Parties will renegotiate in good faith the transfer price for Product in that country in the Territory.

| Price Per Dose* | Transfer Price | Percentage of Onalta Price Per Dose** |
|-----------------|----------------|---------------------------------------|
| ***** | ***** | ***** |
| ***** | ***** | ***** |
| ***** | ***** | ***** |
| ***** | ***** | ***** |
| ***** | ***** | ***** |
| ***** | ***** | ***** |
| ***** | ***** | ***** |

* Confidential Treatment Required *

Example 2: Non-Redacted Disclosure

The document is from a sales agreement in *MOSAIC CO*'s 10-K filing on 2007-08-09 without redacted information.

EX-10.II.OO 3 dex10iioo.htm SALE CONTRACT

Exhibit 10.ii.oo

SALE CONTRACT

This Sale Contract is made this 1st day of January, 2007 by and between the Salt Business Unit of Cargill, Incorporated with principal offices at 12800 Whitewater Drive #21, Minnetonka, MN 55343 ("Buyer") and Mosaic Crop Nutrition, LLC with its principal offices located at Atria Corporate Center, Suite E490, 3033 Campus Drive, Plymouth, MN 55441 ("Seller").

1. Seller agrees to sell to Buyer Untreated White Muriate of Potash (the "Commodity") at the terms and conditions set forth below and as further set forth in Exhibit A, attached hereto and by this reference made a part hereof.

...

Additional terms and conditions are set forth in Exhibit A.

EXHIBIT A

| | |
|--------------------|---|
| QUANTITY: | Approximately 20,000 short tons. Buyer agrees to purchase 100% of its requirements from Seller during the term of this Agreement. |
| PRICE: | For the January 1 through June 30, 2007 time period pricing will be as follows: \$218/st FFR at Buyer's designated facility Timpie, UT. \$203/st FFR at Buyer's designated facility Savage, MN. \$204/st FFR at Buyer's designated facility Buffalo, IA. \$230/st FFR at Buyer's designated facility White Marsh, MD. \$234/st FFR at Buyer's designated facility Tampa, FL. Pricing after July 1st, 2007 will be done for 6 month time periods with final pricing determined 15 days prior to the start of the period. For example, July 1 through December 31, 2007 pricing will be finalized by June 15, 2007. |
| PAYMENT TERMS: | Net 30 cash from date of invoice. |
| SHIPMENT PERIOD: | 01/01/07 to 12/31/08 |
| RAIL DEMURRAGE: | Buyer is exempt from demurrage on actual placement date plus two free days succeeding actual placement date, after which Seller will charge \$40 per day per railcar for private cars. If product shipped in railroad owned equipment, then demurrage will be charged per the railroads going rate. |
| STATE TONNAGE TAX: | For the account of Buyer |

Appendix A2: The Passage of Foreign Leniency Laws

The table presents years of leniency law adoption by country. The original source of the information is Cartel Regulation 2013, published by Getting the Deal Through. We complement the dataset using press releases and news articles.

| Country | Year | Country | Year |
|----------------|-------------|----------------|-------------|
| Argentina | None | Latvia | 2004 |
| Australia | 2003 | Lithuania | 2008 |
| Austria | 2006 | Luxembourg | 2004 |
| Belgium | 2004 | Malaysia | 2010 |
| Brazil | 2000 | Mexico | 2006 |
| Bulgaria | 2003 | Netherlands | 2002 |
| Canada | 2000 | New Zealand | 2004 |
| Chile | 2009 | Nigeria | None |
| China | 2008 | Norway | 2005 |
| Colombia | 2009 | Oman | None |
| Croatia | 2010 | Pakistan | 2007 |
| Cyprus | 2011 | Peru | 2005 |
| Czech Republic | 2001 | Philippines | 2009 |
| Denmark | 2007 | Poland | 2004 |
| Ecuador | 2011 | Portugal | 2006 |
| Estonia | 2002 | Romania | 2004 |
| Finland | 2004 | Russia | 2007 |
| France | 2001 | Singapore | 2006 |
| Germany | 2000 | Slovakia | 2001 |
| Greece | 2006 | Slovenia | 2010 |
| Hong Kong | None | South Africa | 2004 |
| Hungary | 2003 | Spain | 2008 |
| Iceland | 2005 | Sweden | 2002 |
| India | 2009 | Switzerland | 2004 |
| Indonesia | None | Taiwan | 2012 |
| Ireland | 2001 | Thailand | None |
| Israel | 2005 | Turkey | 2009 |
| Italy | 2007 | Ukraine | 2012 |
| Japan | 2005 | United Kingdom | 1998 |
| Jordan | None | Venezuela | None |
| Korea | 1997 | Zambia | None |

Appendix A3: Data Collection Process

A material supply contract is typically disclosed as Exhibit 10 as part of an annual report 10-K, quarterly report 10-Q, and current report 10-K, in the following form:

```
< Document >  
< TYPE > EX - 10(.)XXX  
...  
< TITLE > Supply Contract Title < /TITLE >  
CONTEXT  
  
< /Document >
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We first obtain the URL address of annual, quarterly and current reports filed by non-financial firms incorporated in the U.S. from WRDS, then download all material business contracts filed as Exhibit 10 through the 10-K, 10-Q and 10-K. As we are interested in supply contracts only, we require the contract's title to include at least one word from the following list: *sell, sale, order, procurement, supply, supplier, purchase, purchaser*.

If the title is not specified in the form of *< TITLE > "Title" < /TITLE >*, we require the contract to 1) have a word from the word list of *sell, sale, order, procurement, supply, supplier, purchase, purchaser* in conjunction with a word in the same sentence from the word list of *agreement, agrmt, agree, agmt, form, plan, contract, letter, confirmation, commitment, order, NO*; 2) have a word from the word list of *seller, purchaser, buyer, subscriber, producer, carrier, supplier, customer, consumer, manufacturer*.

Meanwhile, we exclude a contract automatically if it has a word in the beginning 200 words from the list of *interest, registration, receivable, acquisition, merge, real estate, patent, lease, compensation plan, real property, property, properties, bonus, financing, equity, loan, debt, lend, borrow, debenture, incentive plan, executive, stock, security, securities, bond, option, employee, asset, note, land, credit, warrant, residual, rent, share, bank, dollar, employ*. This word list is developed based on our manual reading of 500 business contracts. This results in 6,671 contracts from 4,007 unique firm-years over 2000 to 2012.

We next manually read each contract and exclude non-supply contracts, such as asset purchase agreements, stock purchase agreement, and transactions that contain only a trans-

fer of license, properties, notes or account receivable, which results in 3,066 contracts. This number is comparable to that of Costello [2013], who has 3,855 customer-supplier contracts over 1996 to 2012. We obtain the name of the customer and the supplier from the contract and exclude contracts filed by the customer, which results in 1,611 contracts from 1,096 unique firm-years. Lastly, we exclude non-manufacturing firms. The data collection procedure is summarized in the following table.

| Step | | No. Contracts | No. Firm-years |
|---|----------|---------------|----------------|
| Material Contracts filed with the SEC from 2000 to 2012, containing specific words | | 6,671 | 4,007 |
| Excluding non-customer-supplier contracts | (-3,605) | 3,066 | 1,861 |
| Requiring filer to be the supplier | (-1,455) | 1,611 | 1,096 |
| Excluding non-manufacturing firms | (-652) | 959 | 652 |
| Requiring information on control variables | | | 414 |