Competition Enforcement and Accounting for Intangible Capital*

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Abstract

Antitrust laws mandate regulatory review of mergers and acquisitions (M&A) when the measured book value of the acquired assets exceeds a specified threshold. However, these policies overlook the fact that accounting standards preclude firms from recognizing nearly all types of internally generated intangible capital as assets. We show that this omission of intangible capital leads to hundreds of acquisitions of intangible capital-intensive firms—mostly in the pharmaceutical and technology sectors—to go unreported to antitrust authorities each year. Consistent with these acquisitions potentially having anticompetitive implications, we document that, relative to reported deals, the equity values of acquiring firms and their competitors increase following such acquisitions. We also show that unreported deals in the pharmaceutical industry are nearly three times as likely to involve the consolidation of overlapping drug projects, and more than three times as likely to involve acquirers terminating these overlapping projects. Our results suggest that continued growth of intangible assets in the economy may exacerbate market consolidation via unreported mergers in the sectors that are of most concern for consumers.

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1. Introduction

Corporate mergers and acquisitions (M&As) can benefit shareholders and other stakeholders like consumers by creating synergies and cost efficiencies. But mergers can also reduce industry competition, raising prices and limiting choices for consumers. The Federal Trade Commission (FTC) and Department of Justice (DOJ) evaluate proposed M&A under the Hart-Scott-Rodino (HSR) Antitrust Improvements Act of 1976, which allows them to monitor proposed mergers that potentially harm consumers. However, resource constraints prevent the FTC and DOJ from reviewing all deals. Instead the agencies use screening criteria, such as the value of the deal and the size of the target firm's assets (i.e., the size of transaction and size of person tests, respectively), to determine which mergers to review. Notably, the regulatory criteria to evaluate deals based on asset-size thresholds only consider the value of assets based on merging parties' balance sheets reported under U.S. generally accepted accounting principles (GAAP), which exclude the value of nearly all intangible assets.[1] This exclusion suggests that the FTC ignores an increasingly important class of economic assets, as the total value intangible assets in the economy has surpassed the value of tangible assets in recent decades (Crouzet et al., 2022; Lev, 2019). We examine the role that intangible capital plays in the scrutiny of potentially anticompetitive M&A during regulatory scrutiny.

Reflecting its concerns over intangible capital-intensive industries, the FTC has focused on promoting competition within markets like pharmaceuticals and technology, where firms' intangible capital plays a central role. For example, in 2022, the FTC held a forum to discuss its concerns about enforcing competition related to pharmaceutical M&A, particularly the appropriate screening mechanisms.[2] Reflecting the unique challenges posed by technology companies on antitrust regulation, the FTC and DOJ have recently proposed significantly revised premerger reviews.[3] Yet little is known about the extent to which accounting rules over intangible capital shape industrial organization and, if so, how such changes in industry structure impact product market competition. This paper attempts to fill this gap.

We study how the rise in the importance of intangible capital shapes the efficacy of regulatory reviews of M&A. Using novel data on intangible assets of target firms based on

[1] Specifically, under GAAP a firm can only recognize an asset on its balance sheet if it has probable future economic benefits (FASB, 1985). Since internally generated intangible assets lack physical substance their economic benefits are highly uncertain, nearly all do not satisfy this criterion. One common exception occurs when a firm or its assets are acquired—the acquiring company recognizes the target company's internally generated intangible assets. Given the formal acquisition price for the target, the future economic benefits from the target's intangible asset portfolio become more certain and can be recognized on the balance sheet.

[2] For more information and a detailed transcript of this discussion, see www.ftc.gov/news-events/events/2022/06/future-pharmaceuticals-examining-analysis-pharmaceutical-mergers.

[3] https://www.ftc.gov/legal-library/browse/federal-register-notices/16-cfr-parts-801-803-premerger-notification-reporting-waiting-period-requirements.

post-merger purchase price allocations, we find a substantial number of acquisitions bypass pre-merger scrutiny solely because the intangible capital of target firms is not considered in determining whether to initiate regulatory review, even though it represents roughly an average of 47% of the acquisition price.[4] In particular, we show that adding identifiable intangible capital to the targets' assets would increase the number of reported deals by approximately 263 per year—equivalent to an additional $33 billion in transaction value annually—of which more than half are horizontal consolidations among competitors. Notably, the distribution of deal values and identifiable intangible assets for unreported and reported deals are nearly identical—however intangible assets comprise an additional 50% to 60% more of the unreported deal values relative to reported—indicating that the former deals, albeit unreported to antitrust regulators, are ostensibly sizable enough to lead to less competition and greater harm to stakeholders, like consumers. Indeed, if these deals were reported, we estimate that total Second Requests, the highest and most costly level of antitrust scrutiny by the FTC and DOJ short of litigation, would increase by approximately 10% per year.

Given the prominence and economic importance of unreported deals, we examine the characteristics of the intangible assets involved in these deals. Using data we collect on the specific categories of intangible assets included in the deals in our sample, we find that the vast majority—94%—of all deals include some identifiable intangible assets. Notably, and consistent with recent concerns of antitrust regulators, unreported deals involve more acquisition of intangibles related to in-process research and development (R&D) relative to reported deals.

One might wonder why antitrust regulators overlook these deals. In private correspondence between corporate lawyers and the FTC, we find suggestive evidence that the regulators advise merging firms to strictly follow the HSR rules—even when the regulators are made aware that adding intangible capital to the target's assets would mean a deal should be reported. Such advice is inconsistent with antitrust regulators believing these deals are harmless to consumers, given we also find that nearly 26% of all Second Requests are for deals that are nearly identical in transaction value to those that go unreported.[5] Taken together, these findings suggest that antitrust regulators are likely unaware of the extent to which the current pre-merger notification rules overlook potentially anticompetitive mergers involving the acquisition of intangible capital that is excluded when determining the size of assets of the target.

[4]The 47% represents *identifiable* intangible capital, which excludes goodwill.

[5]Further inconsistent with the idea that unreported deals are harmless, we find that private antitrust litigation is twice as likely to occur for unreported deals relative to reported deals, especially in the pharmaceutical and technology sectors, and unreported deals have a higher likelihood of litigation in these industries relative to reported deals (i.e., 88% versus 47%), which tend to focus on innovation-related intangibles.

We conduct three sets of analyses to study whether deals that bypass premerger review can create benefits to acquiring firms' shareholders and impose costs to other stakeholders, such as consumers, through reduced product market competition. First, we compare the deal premiums in unreported relative to reported M&A. If unreported deals indeed provide anticompetitive benefits, we expect acquirers in unreported acquisitions to pay more relative to reported acquisitions. Consistent with this idea, we find that, for the same acquirer, deal premiums are roughly 12% higher for unreported deals as compared to those that are reported. Strikingly, we also find that our results are entirely driven by those deals that consolidate product markets. Second, we compare the stock market returns around the announcement date of unreported and reported deals of both acquirers and their industry rivals. The intuition behind this comparison is that, if unreported deals provide anticompetitive benefits, stock prices of acquirers and their rivals should impound this information (e.g., Fathollahi et al., 2022; Kepler et al., 2023). Our results are consistent with this idea: unreported mergers are associated with 5.6% higher abnormal returns for acquirers and 0.7% higher abnormal returns for rival firms around the announcement date. Notably, we also find that these market responses are largely driven by deals that consolidate product markets.

Third, as a direct test of the impact of unreported deals on consumers, we narrow our focus to pharmaceutical deals, where there is growing evidence that acquirers in such deals buy targets with the sole intent to "kill off" projects to preempt competition (e.g., Cunningham et al., 2021).[6] Using data on pharmaceutical drug projects, we examine the projects of acquirers and targets and find that unreported deals are significantly more likely to involve the acquisition of targets with drug projects that overlap—e.g., have the same intended therapeutic market—with the projects of the acquiring firm. We also document that most of this difference is driven by acquisitions that resulted in consolidating the only therapeutic markets the target firm intended to enter. Strikingly, we further find that intangible assets related to in-process R&D comprise nearly 35% of the deal value for the most concerning overlaps—i.e., those involving targets with only one or two overlapping projects with the acquirer. Finally, to further illuminate the potential anticompetitive effects, we investigate the post-acquisition development of overlapping pharmaceutical projects and show that acquirers in unreported deals are roughly 40% more likely to discontinue the acquired project as compared to acquirers in reported deals, despite observing no differences in the ability to develop projects.

Our back-of-the-envelope calculations suggest that, if regulators were to screen based on the fair value of target firms' identifiable assets, the FTC would review an additional 90

[6] Acquiring to preempt competition—albeit in the technology sector—is also the focus of Kamepalli et al. (2022) who examine the development of "kill zones" around incumbent internet platforms.

deals involving horizontal rivals each year at an expected cost of 2.6% to 3.5% of the annual antitrust enforcement budget. Factoring in deterrence effects, we anticipate that such a policy change would eliminate 23 of those 90 newly reviewed deals. Alternatively, if accounting standard setters were to require firms to recognize identifiable intangible assets, which would increase targets' book assets and reclassify certain unreported deals to be reported, we would expect a similar increase in the number of reported deals. To examine this, we exploit a recent change in accounting standards that requires firms to capitalize off-balance sheet assets—i.e., capital leases. Consistent with concerns that firms might find ways to avoid antitrust scrutiny altogether, we find an increase in the proportion of unreported deals shortly after the accounting standard is announced but prior to its mandatory adoption. These findings suggest that firms exercise some discretion regarding the reportability of deals to regulators in the first place, and thus our back-of-envelope estimates on the regulatory implications of measuring intangible capital likely represent lower bound estimates.

Our paper contributes to the literature on regulation of product market competition. Studies in this literature primarily focus on how regulators use deal size as a threshold to determine which mergers to screen for potentially anticompetitive behavior (e.g., Cunningham et al., 2021; Wollmann, 2019). The intuition for these thresholds is that smaller mergers are less likely to pose significant risk to competition, although firms are aware of these regulatory bright lines and can strategically structure deals to avoid scrutiny (Kepler et al., 2023). Effective competition enforcement relies on regulators having sufficient information to determine whether a proposed merger is anticompetitive, and several studies find that decreases in this information—e.g., stemming from the screening thresholds involved in pre-merger notification—lead to significant increases in market consolidation and harm to consumers (Wollmann, 2019, 2020). Our study contributes to this literature by documenting the prominent role of accounting rules in facilitating the efficacy of threshold-based competition enforcement policies. In doing so, we show one way that ignoring intangible capital impacts the efficacy of anticompetitive oversight. Thus, our study raises the question whether accounting standards primarily intended for investors can be used efficiently in other circumstances, such as for competition regulation.

Our study also contributes to the literature that studies the connection between accounting and regulation—and in particular the role that financial reporting standards play in regulation. Regulators have long used accounting information to regulate and monitor organizations (e.g., Covaleski et al., 1995; Holthausen and Leftwich, 1983; Solomon, 1970; Taggart, 1981), and a large literature examines how firms alter their financial reporting and investments in response to regulation (See Leuz and Wysocki (2016) for a review). We contribute to this literature in two ways. First, by investigating how antitrust regulators use

accounting information to determine which mergers to review for anticompetitive effects, we show that financial reporting standards have implications for product-market structure via the takeover market. Second, by documenting the economic consequences of financial reporting standards in the context of antitrust enforcement, we broaden the understanding of how financial reporting is used in and can impact the real economy.

Finally, our paper also relates to literature focused on intangible assets (e.g., Crouzet et al., 2022; Lev, 2019). A burgeoning literature documents the rising importance of intangibles as the economy shifts from relying on physical assets, such as plant, property, and equipment, to services and technology as key production inputs (e.g., Haskel and Westlake, 2018; Peters and Taylor, 2017). Because the value of most intangible assets is difficult to measure, this literature focuses on the distortions that are unique to intangible assets, such as the difficulty of contracting on the assets (e.g., Eisfeldt and Papanikolaou, 2014; Rampini and Viswanathan, 2010) and the potential for inefficient prices (Giglio and Severo, 2012). We add to this literature by showing another potential source of inefficiency: Because assets used by regulators do not include most intangibles, potentially anticompetitive mergers can avoid regulatory scrutiny.

The remainder of this paper proceeds as follows. Section 2 discusses institutional features of antitrust regulation for M&A and the related literature. Section 3 describes our sample and key variables. Section 4 describes our research design and presents results on the role of intangibles in unreported M&As, and Section 5 discusses why the behavior we observe persists in equilibrium, as well the regulatory implications of our findings, and presents additional analyses. Section 6 concludes.

2. Institutional Background and Related Literature

2.1. Regulatory Screening of Proposed Mergers

Competition law in the United States heavily scrutinizes the impact of M&A on industry competition. For instance, Section 7 of the Clayton Act prohibits M&A "in any line of commerce or in any activity affecting commerce in any section of the country, [where] the effect of such acquisition may be substantially to lessen competition or tend to create a monopoly," and Section 5 of the FTC Act prohibits "unfair" methods of competition. To enforce these objectives, the antitrust divisions of the FTC and DOJ rely on the Hart-Scott-Rodino (HSR) Antitrust Improvements Act of 1976 to review M&A before deals occur. In particular, the HSR Act establishes that parties in deals above a specific size must file a pre-merger notification to give the FTC and DOJ 30 days to review whether the proposed

merger is anticompetitive.[7] After reviewing the notification, two possible outcomes exist for the mergers. The FTC and DOJ can clear the merger from additional regulatory review and allow the merger to proceed. Alternatively, the FTC and DOJ can issue a "Second Request," seeking additional information before determining whether to allow the transaction. Approximately 3.1% of reviewed deals are issued a Second Request (Billman and Salop, 2022), but this increases to roughly 6% for horizontal deals and to over 12% for horizontal deals in the technology and pharmaceuticals industries. A Second Request can be extensive and require the firms to invest significant resources in satisfying the request.

For most deals, a pre-merger notification and subsequent merger review are not required by the FTC and DOJ (Wollmann, 2019). This exemption arises when the size of the deal or the size of the transacting parties fall below one of the established size thresholds. Figure 1 displays these thresholds. The lower size of transaction threshold uses the deal value to determine whether a transaction will be subject to pre-merger review. All deals with transaction prices at or below this lower threshold need not submit a pre-merger filing and thus face no review by the antitrust regulators. The upper size of transaction threshold also uses the deal value to determine whether a transaction is subject to pre-merger review. All deals with prices above this upper threshold must submit a pre-merger filing and thus face a review by regulators. In 2001, the lower and upper size of transaction thresholds were \$50 million and \$200 million, respectively. Beginning in 2004, these thresholds were adjusted to track U.S. gross national income, so, by 2019, the lower threshold was \$90 million and the upper threshold was \$359.9 million. Figure 1 presents the dollar values of the lower and upper size of transaction thresholds from 2001 through 2019.

For deals that fall between the transaction thresholds, the HSR Act establishes the application of a "size of person" (hereafter, SoP) test. Specifically, the act requires a pre-merger notification filing for transactions when the deal value exceeds the lower size of transaction threshold but falls below the upper one—but *only* if two SoP conditions are met. First, the target has total assets or net sales above a specified level (e.g., \$18 million in 2019).[8] Second, the acquirer has total assets or annual net sales above a specified level (e.g., \$180 million in 2019). If *either* the target or acquirer does not meet these SoP conditions, a pre-merger filing is not required, and the deal is not reviewed by regulators.[9] Similar to the size of transaction thresholds, the SoP thresholds were revised upward to match gross national income

[7]The HSR Act amended the Clayton Act, adding the requirement that companies notify the government, via a pre-merger notification, of their intentions to merge. The HSR Act also added a mandatory 30-day waiting period to allow government agencies to review the proposed transaction.

[8]Both total assets and net sales are tested when the target is engaged in manufacturing. When the target is not engaged in manufacturing, only its total assets are tested.

[9]The intent for the SoP test is to ensure that only the largest mergers are reviewed by antitrust regulators (Howell, 2001). For more about the statute and the rule, see `www.law.cornell.edu/uscode/text/15/18a`.

beginning in 2004. Figure 1 presents the dollar values of the SoP asset threshold (for target firms) from 2001 through 2019. Notably, although the SoP test only applies to deals that fall between the lower and upper size of transaction thresholds, nearly 50% of deals reviewed by the FTC and DOJ from 2001 through 2019 do so.[10]

When determining the target and acquirer's total assets and net sales, for the purpose of the SoP test, the language in the HSR Act is clear. Rules § 801.11(c)(1) and (2) state that firms should use assets and sales values from the "last regularly prepared balance sheet" and the "last regularly prepared annual statement of income." As such, targets and acquirers must use financial statements generated using Generally Accepted Accounting Principles (GAAP). Importantly, this means that only book assets—which notably exclude most intangible assets—are considered when determining total assets for the purpose of the SoP test. Indeed, in an email to the FTC's Premerger Notification Office dated July 12, 2007 (shown in Appendix A), a representative of a target firm asked the FTC whether intangible assets should be ignored when determining the total assets of the firm.[11] Notably, the representative noted that, if intangible assets were included, total assets would exceed the SoP total assets threshold for the target, and the firm would need to file. Notwithstanding this information, the FTC agreed that the firm should use the most recently prepared balance sheet, which, in accordance with GAAP, excluded internally generated intangibles.[12]

Although the SoP test appears sufficiently restrictive, many targets, such as early-stage growth companies, can fall below the assets and sales threshold, negating the need to file for pre-merger review. Growth companies often have little revenue and few tangible assets. Moreover, these companies' intangible assets—e.g., patents and in-process R&D—are not recognized on the balance sheet. Thus, many deals—especially those with high-growth potential—can bypass regulatory scrutiny due to accounting standards.

Bypassing pre-merger review unambiguously benefits merging firms. In addition to the

[10]We use the HSR Annual Reports published by the FTC and DOJ for our estimate. From 2001 through 2019, We find 29,293 HSR transactions. We then use the data from Table I of each report to compute the number of transactions that fall between the lower and upper deal-size thresholds. We estimate that 13,498 (46%) of these transactions were subject to, and ultimately above, the asset or net sales threshold test.

[11]The email details a US GAAP reconciliation that was conducted as a requirement contained in an existing Shareholder's Agreement. Specifically, as part of the reconciliation, the company was required to recognize an intangible asset, but doing so caused total assets to exceed the SoP threshold for targets. Since this reconciliation differs from the most recent regularly prepared balance sheet, the company requested clarification from the FTC on which balance sheet should be used to determine total assets. The FTC, in their response on July 12, 2007, simply writes "Agree" at the end of the email, to indicate that the regulator agrees with the firm's understanding that the most recent regularly prepared balance sheet, which does not include intangibles, should be used to determine total assets.

[12]This correspondence illustrates that firms are aware of the SoP thresholds and the effect that intangible assets have on the outcome of the SoP test. It also illustrates that antitrust regulators understand to some extent that some deals will bypass pre-merger review because the balance sheet excludes intangible assets.

benefit from foregone payment of the initial filing fees (which range from $45,000 to $125,000), firms sidestep the possibility that the initial review will lead to a substantially more costly Second Request, which can be prohibitive to comply with for some deals. A 2014 survey commissioned by the American Bar Association Antitrust Section revealed that the median Second Request lasts for six months, costs $4.3 million (with a range of $2 million to $9 million) and consumes 1,000 internal hours of management and legal time.[13] More concerning to merging firms, however, is the fact that about three-quarters of Second Requests convert into orders by the FTC or DOJ to terminate the transactions or, at a minimum, to divest of key assets to mitigate the anticompetitive effects of the consolidation.

Firms are aware of the costs and risks of antitrust scrutiny and can take real actions to reduce the value of the target's assets so that they can bypass pre-merger review. For example, in a letter to the FTC Premerger Notification Office dated January 27, 2004 (shown in Appendix A), a representative of a target firm outlined a plan for the target to pay an extraordinary dividend, resulting in the company having "less than the $10 million in assets," and effectively asked the FTC whether the regulator agreed that the plan did not raise "avoidance issues." Such examples of communication between firms and the FTC highlight the importance that firms place on bypassing antitrust investigations.

2.2. Accounting for Intangibles

Measuring total assets in the SoP based on U.S. GAAP is potentially problematic because it immediately expenses internally generated intangibles, such as patents, customer lists, and trademarks, instead of reporting them as assets on the balance sheet.[14] A consequence is the book assets are primarily comprised of physical assets and often underreports the true value of a firm's economic assets.

In the vast majority of cases, book assets understate a company's economic assets. To better account for economic assets, when a firm acquires another, the acquirer recognizes the internally generated intangible assets of the target. Specifically, ASC 805-20-30 requires the acquirer to recognize all "identifiable assets acquired, the liabilities assumed ... at their acquisition date fair value." The identifiable assets include any intangibles of the target company that can be separately identified, including customer relationships, in-process R&D,

[13]Moreover, roughly 300,000 documents (equivalent to 28 GB of data) are produced during a Second Request, not including an additional 47 GB of email. For example, in a document submitted to the Bankruptcy Court in Delaware *In re RentPath Holdings, Inc (Case No. 20-10312)*, a senior executive of the firm estimated that the costs associated with complying with a Second Request from the FTC totaled nearly $7 million dollars, and produced roughly 2.6 million pages of documents and a terabyte of data.

[14]The one exception is internally generated software. According to ASC 350-40 and ASC 985-20, once the software achieves technological feasibility, firms can capitalize subsequent costs until it is brought to market.

trade names, and patents.[15] After determining the fair value of the target's assets and liabilities, the purchase price is allocated to the identifiable assets less the liabilities (collectively, called "net assets"). The remaining purchase price is then booked as goodwill.

As a result of accounting rules preventing firms from recognizing most intangible assets until a merger, there is often a large difference in the magnitude of book assets between the acquirer and the target before the merger. Thus, when the FTC and DOJ use pre-merger book assets to assess whether to review a merger, they ostensibly overlook large acquisitions that include sizeable amounts of intangible assets.

2.3. Related Literature

The literature demonstrates that M&A plays a prominent role in either creating or destroying shareholder value (see, e.g., Agrawal et al., 1992; Asquith, 1983; Eckbo, 1983; Schipper and Thompson, 1983). A merger can create value by consolidating the acquirer's industry to increase the acquirer's market power (e.g., Fathollahi et al., 2022; Hoberg and Phillips, 2010). Such increases in market power can also benefit shareholders of rival firms (e.g., Eckbo, 1992; Shahrur, 2005) but can harm other corporate stakeholders—especially consumers (e.g., Eliason et al., 2020). The possibility of harm to consumers leads antitrust regulators to scrutinize the competitive effects of M&As. Without antitrust enforcement, firms could freely pursue mergers that could raises prices and limit choices for consumers (e.g., Cunningham et al., 2021; Wollmann, 2020).

Another line of research investigates how anticompetitive mergers can occur and suggests that one way is to intentionally structure the merger to circumvent the antitrust thresholds for screening anticompetitive deals (Kepler et al., 2023).[16] The idea that firms actively try to conceal their anticompetitive mergers from enforcement also emerges in a burgeoning literature that examines how firms use disclosures to avoid alerting regulators of anticompetitive mergers (e.g., Afrin et al., 2020; Barrios and Wollmann, 2022; Oh, 2023).

This paper contributes to these literatures by showing that anticompetitive mergers can proliferate due to firms' increasing reliance on intangible capital, which antitrust regulators do not review. Intangible capital is an increasingly important component of the economy (e.g., Bronnenberg et al., 2022; Corrado and Hulten, 2010; Crouzet et al., 2022; Falato et al., 2022; He, 2023; Lev et al., 2016, 2009). However, we are unaware of research examining the extent to which intangible assets impact market structure and competition. Moreover, recent

[15] See `https://asc.fasb.org/1943274/2147479876`.

[16] Mehta et al. (2020) examines the role of the political process in antitrust reviews of anticompetitive mergers. More broadly, Azar et al. (2018) show that common ownership is linked to anticompetitive behavior, suggesting that mergers of ownership groups should also be of interest to antitrust regulators.

research examining anticompetitive mergers typically disregards the regulatory thresholds and thus overlooks the role that intangible capital plays in allowing firms to circumvent rules for the screening of anticompetitive deals.[17]

Our paper also relates to the accounting literature that examines how accounting standards can shape economic activity (e.g., Bens and Monahan, 2008; Dou et al., 2018; Garham et al., 2011; Kanodia and Sapra, 2016).[18] One important way accounting can influence the real economy is its use by regulators to restrict the activities of firms. Although accounting rules can distort real activity if they imperfectly reflect a firm's economics, the political, contracting, and monitoring costs to correct these imperfections may outweigh any efficiency gains (Holthausen and Leftwich, 1983; Jones, 1991). Studies that examine the effect of regulatory use of accounting tend to focus on regulated industries, such as utilities (Fields et al., 2001). This literature overlooks regulatory effects on unregulated industries and how accounting might affect market structure and product market competition.[19] Our paper adds to this literature by showing that the accounting standards for intangible assets can impact market structure via antitrust rules. Thus, our study also relates to the literature that questions whether the current method of accounting for intangibles has broader implications for users of financial statements (e.g., Kanodia et al., 2004; Lev, 2019). In particular, this paper introduces a new user to this literature—antitrust regulators—and shows that their reliance on GAAP financial statements has implications for M&A antitrust review and enforcement.

3. Data and Descriptive Statistics

3.1. M&A data

Our initial sample is drawn from all completed U.S. M&A involving public acquirers announced from February 2001 through February 2020 and recorded in the Refinitiv Mergers and Acquisitions database ("SDC"). We require the acquirer to be public because the SDC database lacks deal values for the majority of transactions when the acquirer is private. Additionally, we require the purchase price allocation, which is obtained from public acquirers' post-acquisition disclosures. We also require that the deal value fall within the annual HSR

[17] Recent work in this area examines whether firms alter their corporate finance policies to reduce their size to be below the size of transaction threshold to increase the probability of a takeover (Berger et al., 2023). Along a different line, Aggarwal and Baxamusa (2023) shows that acquisitions of public targets falling just below the size of transaction threshold are not associated with manipulation to avoid antitrust review but nonetheless lead to a reduction in investment and reduced product market competition.

[18] Other studies on how accounting standards impact firms' economic decisions include Bartov et al. (2021), Williams and Williams (2021), Chircop and Novotny-Farkas (2016), and Iselin and Nicoletti (2017).

[19] One exception is Bens and Monahan (2008), which shows that variation in accounting regimes is linked to North American banks losing asset-backed commercial paper market share to foreign banks.

pre-merger review lower and upper size of transaction thresholds (see Figure 1), since the SoP test does not apply to deal values outside this range.[20]

Due to the extensive hand-collection effort required for our analyses, we narrowed the sample to deals in industries most likely to matter to antitrust regulators. Specifically, we use aggregate data on Second Requests from the HSR Annual Reports to rank industries (using three-digit NAICS) by the total number of such requests from 2001 through 2019.[21] We keep deals in industries with an average of at least one deal per year with a Second Request. The final list of all industries that meet this requirement is presented in Appendix B. Our selection process, presented in Online Appendix C, yields an initial sample of 3,526 unique deals across 13 industries, representing $477.8 billion in total transaction value.

3.2. Purchase price allocation data

To collect data on purchase price allocations (PPA), we locate the acquirer's post-acquisition public filing—e.g., 10-K or 10-Q—and, if disclosed, collect the value of the acquired tangible assets, intangibles assets, and goodwill from the notes to the financial statements. Appendix C describes this data collection process and includes examples of PPA disclosures. We exclude deals when the acquirer consolidates the PPA for two or more deals in a reporting period or only reports net assets acquired because we cannot determine the target's total assets. This exclusion likely has the effect of biasing downwards the number of deals that go unreported in our sample, if managers aggregate deals to shield the firm from antitrust scrutiny.[22] This process reduces our initial sample from 3,526 to 1,918 deals with complete data that we use for our main analyses.

[20] We follow HSR rules and adjust the deal value on the announcement date to reflect the total value of the target held by the acquirer after the deal closes (i.e., percentage acquired plus percentage held before the announcement). We explain this calculation in more detail in Online Appendix A. We classify deals as above or below the reporting threshold based on the post-acquisition fair value of assets because we do not observe the book values of assets, which are the values used in determining whether deals are reviewed. In Online Appendix B, we describe how we mitigate concerns about misclassifying deals by using 'fair values' instead of 'book values.'

[21] We use 3-digit NAICS to identify industries because this is the convention applied by the antitrust regulators in the HSR Annual Reports. Since the SDC data include 4-digit SIC but not 3-digit NAICS classifications, we map SIC to NAICS (as shown in Appendix B) using the NAICS-to-SIC crosswalk at https://www.naics.com/naics-to-sic-crosswalk-2/.

[22] Using net assets could lead to incorrect classification if, e.g., the target reported $30 million in tangible assets and $25 million in liabilities in the most recent regular financial reports. In this case, net assets ($30 million minus $25 million equals $5 million) will be below the size of person threshold, whereas total assets ($30 million) are above the threshold.

3.3. Public and private litigation data

Data on litigation comes from four sources. For data on public litigation, we use the HSR Annual Report, published jointly by the FTC and the DOJ. This report provides yearly data on the number of pre-merger review filings (by industry and range of deal values) and the number of Second Requests (by industry and range of deal values). We supplement the HSR data with transaction data on public litigation compiled by Billman and Salop (2022). For data on private litigation, we use Lex Machina's Legal Analytics Platform. Lex Machina categorizes federal court data from the Public Access to Court Electronic Records (PACER). One limitation of our analysis of private litigation is that, prior to 2007, the adoption by U.S. district courts of electronic case filing using the PACER system was limited, reducing the number of deals we can match to court filings.[23] Finally, for our sample of M&A involving publicly traded acquirers, we collect additional data on public and private litigation from the legal proceedings section in the notes to their 10-K filings.

3.4. Drug development data

We obtain data on drug development projects from Cortellis Competitive Intelligence. The Cortellis data allows us to view the start and end dates for all phases of development for every drug project. For each, we can also view the drug's intended market (e.g., cancer) and mechanism of action (e.g., Collagen 1 transition inhibitors), which, following Cunningham et al. (2021), we use to identify overlapping projects. Our sample covers drug projects with start dates beginning in January 2000 through to the end of our sample period. We match drug projects to acquirers and targets in our SDC data through fuzzy matching.

3.5. Descriptive Statistics

Table 1 Panel A presents the distribution of deals by HSR reporting year.[24] Of the 1,918 deals we use for our main analysis, 1,682 (or 87.7%) involve private targets. In Table 1 Panel B, we present the distribution, by industry, of all deals and those classified as horizontal—i.e., deals where the target and acquirer share the same three-digit NAICS. Horizontal deals comprise 52.8% of the sample and 51.8% ($247.4 billion) of the total transaction value.[25] Notably, we find that two industries—i.e., computer and electronic product manufacturing and chemical manufacturing—represent more than half of all horizontal deals (or 994 of 1,863) in our

[23] For example, in 2002, only 11 of the 94 district courts used electronic filing.

[24] The HSR reporting year typically begins in February each year. Figure 1 presents these dates.

[25] This likely undercounts the number of deals that would be scrutinized by the regulator, since transactions that are anti-competitive at the product level are also of interest to the FTC and DOJ.

sample. In economic terms, the total value of horizontal deals in these two industries alone is $131.1 billion.[26]

Table 2 Panel A, presents the distribution of deals by filing status—i.e., by whether the deal was reported or unreported to FTC and DOJ—and by whether the deal is horizontal. We classify a deal as being reported (unreported) if the total assets for the target are above (below) the SoP asset threshold in that reporting year. For this analysis, we exclude 145 deals that fall below the asset threshold but were still subject to pre-merger review, as a result of net sales exceeding the SoP net sales threshold.[27] We find that unreported horizontal deals represent roughly the same percentage as reported horizontal deals (i.e., 55 to 56%), but are, on average, smaller (i.e., $121.3 versus $143.5 million).[28]

In Panel B of Table 2, we present the distribution, by industry, of the unreported horizontal deals. Notably, 169 of the 219 unreported horizontal deals (or 77.1%) that are exempt from pre-merger review are in the computer and electronic product manufacturing and chemical manufacturing industries. Unreported horizontal mergers in these two industries alone represent nearly $20 billion in total deal value. In total, over $26.5 billion in horizontal deals were not reviewed by the antitrust regulators. To put this in perspective, as shown in Table 1 Panel B, the total value of the 1,918 deals with PPA data is $267.7 billion. This implies that nearly 10% of the takeover market activity was horizontal mergers that neither the FTC nor DOJ reviewed.

In Panel C of Table 2, we present the PPA for reported and unreported horizontal M&A. The results show that the proportion of tangible assets for deals above the threshold is roughly seven times larger than the tangible assets for deals below the threshold (i.e., 35.5%

[26]The number of horizontal deals in our sample cannot be reconciled with the number of horizontal deals in the HSR annual reports for two reasons. First, our sample includes only deals involving public acquirers, while the HSR reports include deals involving both private and public acquirers. Second, our sample includes deals that were and were not reviewed by the regulators, while the HSR sample includes only deals that were subject to pre-merger review.

[27]To identify deals that fall below the SoP asset threshold but above the SoP net sales threshold, we obtain information on the granting of early terminations from the FTC's online legal library. Early terminations are pre-merger reviews completed before the 30-day waiting period, as a result of a request by one of the filing parties. The FTC and DOJ can approve an early termination request, if they determine there are no competitive issues. While requests for early terminations are not publicly available, approvals are. We use approvals, published on the FTC website, to identify deals that, by definition, were reported. In other words, if a deal falls below the asset the threshold but has an early termination, we conclude that it exceeded the net sales threshold. Online Appendix D presents additional information on the number of early terminations in our sample.

[28]Premerger reviews are conducted at the product level. To validate our measure of horizontal deals, we collect press releases, public disclosures, news articles, industry publications, and other information to determine whether the acquirer and target share common product markets. We find that our measure using three-digit NAICS is highly correlated with the results from this exercise. Using this alternative measure, we also test for and find no statistically significant difference between the proportions of unreported horizontal and reported horizontal M&A.

to 6.7%). Moreover, horizontal M&A that occur below the threshold include, on average, intangible assets that represent 46.8% (or $56 million) of the deal value.[29] Put differently, the ratio of intangible assets to tangible assets is, on average, seven to one (or 46.8% to 6.7%) in unreported horizontal deals, as compared to less than one to one (or 27.7% to 35.5%) in reported horizontals deals.

3.6. Economic Magnitudes

To illustrate the potential impact of intangible assets on antitrust enforcement, Panel A of Figure 2 uses our sample of 1,918 deals and plots the number of deals currently subject to review and the number that would be subject to review if intangible assets were also included in the thresholds. We determine the hypothetical number of deals subject to review if intangibles were included by adding on the fair of intangibles from the PPA. Adding intangibles increases the number of reported deals by an estimated 22.7% to 57.4% annually. In economic terms, using only our sample of deals involving public acquirers, we estimate that an additional 493 deals worth over $62 billion would be subject to pre-merger review if intangible assets were measured and included in the SoP test.

In Panel B of Figure 2, we extend this to a market-level analysis, which includes all public and private acquirers for all industries. To do so, we use the actual number of pre-merger filings disclosed in the HSR annual reports to compute the number of filings related to the SoP transactions. We then estimate the number of deals reviewed if intangibles were included by applying the same yearly blue-to-red percentage changes documented in Panel A. This figure highlights the primacy of intangibles in the takeover market, especially recently. In fact, using the expected number of additional deals that are currently unreported but would be if intangibles were included (i.e., 5,003) and the average deal value of the additional reported deals for our sample (i.e., $126 million), we estimate the red-shaded portion of the figure in Panel B represents approximately $630 billion in total unreported deals from 2001 through 2019 (or $33 billion per year on average) that would need to be reported. Although economically important, our estimates are likely lower bounds since deals that go unreported are also less likely to be publicly disclosed (e.g. Barrios and Wollmann, 2022), and therefore more likely to be excluded from our sample obtained from Refinitiv (Wollmann, 2023).

Although our estimates approximate the total M&A activity that likely goes unreported due to accounting standards, they do not speak to the level of potentially anticompetitive

[29] In our analysis, we do not consider whether the acquiring company's manager opportunistically allocates the purchase price across assets. We have no reason to believe that the incentives would differ between making acquisitions above or below the threshold, as re-allocating the purchase price across different assets would have no impact on whether the deal is or is not reviewed.

M&A that bypasses antitrust scrutiny. To estimate this, we begin with our sample of 219 unreported horizontal deals involving public acquirers—described in Panel B of Table 2—and add an estimate of the number of horizontal deals we likely miss due to data limitations.[30] We estimate the number of horizontal deals likely missing from our sample using data from the HSR annual reports.

Specifically, each HSR annual report includes the total number of pre-merger filings submitted to the FTC and DOJ. Because these filings include deals involving public and private firms, we can use these data to calculate the proportion of missing deals in our sample. As evidence, from 2001 through 2019, the HSR annual reports indicate that 13,498 pre-merger filings were submitted for deals with values for which the SoP test applies. By contrast, using SDC data, we find approximately 6,300 deals that must file. This suggests that our data capture about 47% (or 6,300/13,498) of actual reviewed M&A. We estimate from this ratio that, for every deal in our sample, an additional 1.13 deals are likely missing. Applying that ratio to our sample of 219 unreported horizontal deals gives us an estimate of an additional 247 horizontal deals that are likely missing from our analysis. In total, we estimate that these 466 unreported horizontal deals (or about 25 per year) represent approximately $57 billion in deal value or about 9% of the total M&A.[31]

4. Unreported M&A Deals and Intangible Capital

Given that the amount of intangible assets is likely a key reason why many deals are unreported, we next examine the consequences of intangible assets on market structure and product-market competition. We do so by comparing reported deals with unreported ones by examining several characteristics. First, we compare the economic role of intangibles. Second, we compare the types of identifiable intangible assets. Third, we examine differences in deal premiums and compare market responses. Finally, we observe whether unreported deals are more likely to consist of transactions that can lead to anticompetitive outcomes.

[30] Such data limitations include missing deals in the SDC database and missing deals due to our focus on public acquirers. Note that our focus on public acquirers is necessary, in order to obtain data on assets, intangibles, and goodwill, which are all critical to conducting our analysis, and to obtain data on deal values.

[31] In addition to this approach, we can also use the findings in Wollmann (2023) as a guide to estimate the number of deals that are likely excluded from our analysis. Specifically, Wollmann (2023) documents that, from 2001 through 2011, approximately 60% of mergers in the SDC data have undisclosed deal terms—and that the proportion increases to roughly 70% when narrowed to only horizontal M&As. This evidence suggests that for each unreported horizontal (non-horizontal) deal in our sample, an additional 2.3 (1.5) unreported deals involving private acquirers are missed in our analysis. Based on these figures, we estimate that, for horizontal deals alone, the total value of M&As that go unreported to antitrust regulators due to accounting standards is roughly $88.5 billion across 730 deals involving public and private acquirers (from 2001 through 2019).

4.1. Intangibles in Unreported Deals

We first examine how the level and proportion of intangible assets compare for reported and unreported deals. Figure 3 provides density plots of deal size for these two types of deals. Panel A shows the distribution of deal size for reported and unreported deals. Despite reported deals being perceived as bigger by the FTC and DOJ, the size distributions in Panel A reveal the two distributions are very similar. Panel B reports the distribution of intangible assets (in dollars) for the two deal types. As in Panel A, there is a significant overlap in the distributions. In fact, unreported deals have slightly more intangible assets than reported ones. This finding parallels the result in Panel C of Table 2, which indicates that intangibles represent a higher proportion of the deal value in unreported deals, suggesting that intangibles play a more significant economic role in deals that bypass pre-merger review.

4.2. Main Results

To examine how intangibles relate to unreported deals, we estimate the following OLS model:

$$Intangibles_{i,t} = \alpha + \beta Unreported_t + \tau_t + \gamma_{j,(i)} + \epsilon_{i,t}, \tag{1}$$

where $Intangibles_{i,t}$ is either the logarithm of the fair value of target firm i's identifiable intangible assets, or the proportion of target firm i's intangible assets, in year t. $Unreported_t$ is an indicator that takes the value of one if the fair value of target firm i's assets is equal to or less than the SoP threshold in the reporting year and zero otherwise. We include fixed effects of reporting year (τ_t) and acquirer-level industry ($\gamma_{j(i)}$). In all specifications, we double-cluster standard errors at the acquirer's industry and the reporting-year level.

We report the regression results in Table 3. Similar to the visual evidence in Panel B of Figure 3, the first three columns show no statistically significant difference in the level of intangibles in unreported deals relative to reported deals, suggesting that both kinds have similar amounts of identifiable intangibles. This result holds for estimates using the full sample, shown in column (1); in the sample of only horizontal deals, shown in column (2); and in the sample of horizontal deals that were also not identified as an early termination review, shown in column (3).

While the identifiable tangible assets are not statistically different between reported and unreported deals, we expect unreported deals to comprise more intangible assets, as such assets facilitate bypassing reporting in the first place (given these intangibles are not accounted for when determining whether to file). To quantify the magnitude of which intangible assets comprise in unreported deals relative to reported deals, in columns (4) to (6), we present es-

timates of equation (1) where the proportion of intangibles is the dependent variable. Across all columns, we find a positive and statistically significant difference for unreported relative to reported deals. The magnitudes of the coefficients indicate that the proportion of the deal related to intangibles is, on average, 14 to 16 percentage points higher for unreported relative to reported deals. Relative to the mean PPA to intangibles of approximately 28%, our results show that unreported deals have—as a proportion of the deal—50% to 60% more intangibles. Collectively, the results from this analysis suggest that intangibles constitute an important part of the overall acquisition price but, due to accounting standards, are not considered when determining whether the FTC or DOJ should review for anti-trust purposes.

4.3. Categories of Intangibles

Although the results in Section 4.2 suggest that intangibles constitute an important portion of reported and unreported deals, two questions remain. First, which types of intangible assets are acquired? Second, regarding value, which types of intangible assets are economically important? To address these questions, we collect data on the separate categories of intangibles disclosed in the PPA of acquirers' 10-K filings. Appendix C provides examples of typical PPA disclosures and Appendix D describes the different categories of intangible assets. We present the results of this analysis in Table 4.

As Panel A shows, 1,810 of the 1,918 deals (i.e., 94.4%) have acquirers reporting identifiable intangible assets. Of the 1,810 deals with reported intangibles, nearly 73% (or 1,400) have the purchase price allocated into separate intangible categories (instead of simply aggregating them into "intangibles"). Panel B of Table 4 shows that identifiable intangibles total nearly $79 billion across 22 categories. Figure 4 displays the percent of total identifiable intangibles attributed to these categories. Interestingly, the largest category, customer relationships and lists, represents 38.7% of all identifiable intangibles, and collectively the top four categories represent roughly 85%.

Next we test for differences in the categories of intangibles for reported to unreported deals. Intuitively, customer relationships and brands take time to develop and are thus more likely to be associated with mature firms (e.g., Foster et al., 2016)—i.e., firms with more tangible assets and higher sales. Therefore, we expect these categories to loom larger in reported deals. By contrast, early-stage, innovative firms—i.e., those with fewer tangible assets and lower sales—are more likely to be associated with categories such as in-process R&D. Therefore, we expect this category to be more prevalent in unreported deals. We present the results of this analysis in Panel C of Table 4.

Consistent with our expectations, when we compare reported to unreported deals, we

find statistically significant and economically meaningful differences and in the predicted directions in the mean value of customer- and brand-related intangibles and in-process R&D. Specifically, we find that unreported deals have, on average, approximately four times the level of in-process R&D as compared to reported deals, and reported deals have, on average, a little more than double the level of customer-related intangibles and nearly 35% more in brand-related intangibles as compared to unreported deals.

4.4. Deal Premiums for Unreported M&As

Next, we examine how deal premiums compare for reported and unreported deals. To the extent that intangible assets in unreported deals provide anticompetitive benefits to acquirers, we expect to find that acquirers are willing to pay higher deal premiums, for unreported versus reported deals. Given that our private targets do not have observable market values with which to calculate the premium paid by the acquirer, we adopt the methodology in Kepler et al. (2023) and use the proportion of goodwill in the deal. Specifically, we compare deal premiums for reported and unreported deals by estimating the following OLS model:

$$DealPremium_{i,t} = \alpha + \beta Unreported_t + \tau_t + \gamma_{j,(i)} + \epsilon_{i,t}, \tag{2}$$

where $DealPremium_{i,t}$ is the proportion of the acquired equity of target i that is recognized as goodwill in year t.[32] $Unreported_t$ is an indicator that takes the value of one if the fair value of target firm i's assets is equal to or less than the SoP threshold in the reporting year and zero otherwise. We include fixed effects of reporting year (τ_t) and acquirer-level industry ($\gamma_{j(i)}$). In all specifications, we double-cluster standard errors at the acquirer's industry and the reporting-year level.

Column (1) of Table 5 presents results form this analysis. The coefficient is positive (0.099) and statistically significant at the 1% level. Consistent with the idea that unreported deals can provide anticompetitive benefits that acquirers are willing to pay more for, the result in column (1) suggests that deal premiums for unreported deals are approximately 10 percentage points higher (or 20% higher) than deal premiums in reported deals.

To further explore the potential anticompetitive benefits to acquirers in unreported deals, we also consider whether the results in column (1) are driven by M&As where the outcome of the transaction is the consolidation of the acquirer's and target's product market. For this analysis, we create a new indicator variable, $ProductMarketOverlap$, which takes the value of one if the acquisition results in the consolidation of at leaste one product market and

[32] We calculate the total fair value of equity acquired by adding the fair value of tangible assets to the fair value of identifiable intangible assets to the value of goodwill and then subtracting the fair value of liabilities.

zero otherwise. To determine whether product market consolidation occurs in practice, we start with all horizontal M&As in our sample and then read press releases, public disclosures, news articles, industry publications, and other information of each deal for indication that the target and acquirer have overlapping product markets. We interact $ProductMarketOverlap$ with $Unreported_t$ and present the results in column (2). The coefficient on the interaction term is positive and statistically significant at the 10% level, suggesting that acquirers of unreported deals that involve the consolidation of product markets are willing to pay a 13.3 percentage point higher (or 26.6% higher) deal premium than acquirers of reported deals.

Finally, in columns (3) and (4), we limit our sample to only acquirers that have at least one reported and one unreported deal. This reduces our sample to 707 observations, but allows us to replace our industry fixed effect with an acquirer fixed effect. Thus, this analysis compares deal premiums for reported and unreported deals within the same acquirer. This analysis helps to address concerns that our initial results are merely capturing other unobservable factors, such as differences in synergies, that command higher deal premiums in unreported deals relative to reported deals. In column (3), we find that our baseline results continue to hold. To put this in perspective, the same acquirer is willing to pay a 6 percentage point higher deal premium in an unreported deal than it is willing to pay in a reported deal. In column (4), we extend this analysis to the product market-level and find that the same acquirer is willing to pay a 5.3 percentage point higher deal premium in an unreported deal that consolidates a product market than it is willing to pay in a reported deal that does the same.

4.5. Acquirer Equity Values and Unreported M&As

If unreported deals reduce competition, the resulting increase in market power to acquirers should flow through to product prices at the expense of consumers (e.g., Stigler, 1964). Assuming markets are efficient, stock prices should also reflect these pricing-power expectations soon after the merger is announced because the effect of changes in future cash flows should be impounded into prices relatively quickly. We compare the market reactions around the announcement date of reported and unreported deals in the following OLS model:

$$AnnReturn_{i,[-2,2]} = \alpha + \beta Unreported_t + \tau_t + \gamma_{j,(i)} + \epsilon_{i,t}, \tag{3}$$

where $AnnReturn_{i,[-2,2]}$ is acquirer $i's$ market-adjusted five-day cumulative abnormal returns (centered on the announcement date).[33] $Unreported_t$ is an indicator that takes the value of

[33]We use a 5-day window to capture market reactions that sometimes occur prior to the announcement date when, for example, the FTC publicly discloses an early termination decision before the merger is publicly

one if the fair value of the target firm's assets is equal to or less than the SoP threshold in the reporting year and zero otherwise. We include $DealPremium$, to control for the premium paid by the acquirer. We also include fixed effects of reporting year (τ_t) and acquirer-level industry ($\gamma_{j(i)}$). In all specifications, we double-cluster standard errors at the acquirer's industry and the reporting-year level.

The results for this analysis are reported in Panel A of Table 6. In our baseline model, reported in column (1), we do not find a statistically significant difference in abnormal returns around the announcement date of unreported deals relative to reported deals. However, when we interact $Unreported$ with the $ProductMarketOverlap$ indicator variable in column (2), we find a positive and statistically significant coefficient at the 5% level. This results suggests that the market recognizes the potential anticompetitive benefits of the consolidation of product markets in unreported deals and impounds such benefits in the acquirer's stock price soon after the deal is announced. In economic terms, the 3.6 percentage point increase in abnormal returns represents a 125% increase over the mean abnormal returns for reported deals that consolidate product markets.

In columns (3) and (4), we replace the industry fixed effect with an acquirer fixed effect. Our results in column (3) suggest that, for the same acquirer, the market responds 2.3 percentage points more favorably to unreported deals as compared to reported deals. Additionally, in column (4), we find a 5.6 percentage point higher abnormal return for the same acquirer when the deal is unreported and consolidates a product market as compared to a reported deal that does the same.

In Panel B, we examine the abnormal returns of industry rivals around the announcement date. If unreported deals are anticompetitive in nature, rents should also accrue to industry rivals, since these firms can free ride on the benefits—e.g., higher product prices, lower labor costs, or lower material prices. Such benefits should be reflected in stock prices soon after the merger is announced, assuming markets are efficient. We compare the market reactions of industry rivals around the announcement date of reported and unreported deals in the following OLS model:

$$RivalReturns_{i,[-2,2]} = \alpha + \beta Unreported_t + \tau_t + \gamma_{j,(i)} + \epsilon_{i,t}, \tag{4}$$

where, for deal i, $RivalReturns_{i,[-2,2]}$ is the market-adjusted five-day cumulative abnormal returns (centered on the announcement date) of all horizontal rivals of the acquirer. We consider a firm to be a rival, if it shares the same six-digit NAICS code as the acquirer. $Unreported_t$ is an indicator that takes the value of one if the fair value of the target firm's

disclosed by the merging firms.

assets is equal to or less than the SoP threshold in the reporting year and zero otherwise. We include $DealPremium$, to control for the possibility that abnormal returns of industry rivals are driven by under– or over–payment by the acquirer. We also include fixed effects of reporting year (τ_t) and acquirer-level industry ($\gamma_{j(i)}$). In all specifications, we double-cluster standard errors at the acquirer's industry and the reporting-year level.

The baseline results, reported in column (1) of Panel B, suggest that the market responds more favorably, on average, to industry rivals in unreported deals relative to reported deals, as reflected in the positive and statistically significant coefficient on $Unreported$. In column (2), we investigate whether the effects increase when the acquisition leads to product-market consolidation. Consistent with this idea, we find that the market response increases by nearly an additional percentage point (i.e., 0.008) for the rivals of acquirers involved in deals that enhance market power. In column (4), we narrow our focus to acquirers that have both unreported and reported deals, which allows us to replace the industry fixed effect with a firm fixed effect. This reduces our sample to 458 observations. The coefficient on the interaction term, $Unreported \times ProductMarketOverlap$ is positive (i.e., 0.007) and statistically significant at the one-percent level. To put this in perspective, the results in column (4) suggest that the market interprets the acquisition to be more beneficial to the rivals of the acquirer when a deal is unreported and consolidates a product market as compared to when a deal—by the same acquirer—is reported and consolidates a product market. Collectively, our results in Table 6 are consistent with the market impounding into stock prices the potential anticompetitive benefits of unreported deals, and particularly when there is an increase in market power.

4.6. Anticompetitive Implications in Unreported Pharmaceuticals Deals

If intangible capital-driven unreported deals that bypass pre-merger review are anticompetitive, we expect acquirers to benefit in ways that are potentially harmful to consumers, and these benefits should manifest through the acquired intangible assets themselves. To test this conjecture, we narrow our focus to the pharmaceutical industry, which is defined as chemical manufacturing by the antitrust regulators (i.e., NAICS 325). As shown in Appendix B, chemical manufacturing received the most Second Requests (102) and the highest rate of Second Requests (14.72%) for mergers involving horizontal rivals, suggesting that the FTC and DOJ heavily scrutinize consolidation in this industry.[34] Moreover, the evidence from our analysis of intangibles in litigation Online Appendix H further supports the idea that intan-

[34]This is also consistent with Tucker (2013) in that the FTC's concerns about the effects to market structure is one of the most frequently cited factors in Merger Screening memoranda leading to Second Requests in horizontal mergers in the pharmaceuticals industry.

gibles—in particular, in-process R&D—are a key concern in public and private complaints. Evidence from Cunningham et al. (2021) suggests that this scrutiny is at least partially motivated by regulators' concern that acquirers purchase target firms solely to preempt future competition. Consistent with this idea, accounting standard setters have provided explicit examples of how fair value measurements of acquired in-process R&D should be conducted when the acquirer does not intend to complete the project, but instead wants to "lock up" the project to "prevent its competitors from obtaining access to the technology."[35]

Focusing on pharmaceuticals also allows us to examine anticompetitive effects at the project level. Specifically, we use drug data to determine whether horizontal acquisitions are more likely to be unreported when merging firms have overlapping projects. The acquisition of overlapping projects is arguably anticompetitive if acquirers can exploit the acquisition to maintain product market power for an existing drug (Cunningham et al., 2021). Thus, to prevent anticompetitive behavior, regulators conduct comprehensive product market-level competitive reviews to determine whether the proposed merger or acquisition would harm consumers. However, without this review, as is the case when a transaction fails the SoP test, deals will proceed without the threat of antitrust enforcement, including those more likely to be anticompetitive.

To understand the prevalence of intangibles in horizontal deals involving pharmaceutical firms, we first focus our analysis on the 169 deals (i.e., 107 reported and 62 unreported deals) where the acquirer and the target are both in the pharmaceutical industry and then estimate equation (1). Online Appendix E presents the results.

In columns (1) and (3), we compare the level and proportion of total identifiable intangibles between reported and unreported deals. We find a positive and statistically significant difference in both columns, indicating that, on average, unreported deals include more intangibles and a higher proportion of intangibles than do reported deals. In columns (2) and (4), we present results that include filing-year fixed effects. In economic terms, the magnitude of the coefficient in column (2) indicates that, on average, unreported deals include an additional $20.8 million (or nearly 65% more) intangibles relative to reported deals. The magnitude of the coefficient in column (4) indicates that intangibles represent about 40% more of the deal in unreported relative to reported deals. In fact, given that we find that intangibles represent nearly 34% of the average deal in reported pharmaceutical deals, the result in column (4) means that identifiable intangibles represent nearly 75% of the average deal in unreported pharmaceutical deals.

Next, we narrow our focus to 126 pharmaceutical deals where the acquirer subsequently

[35]See, e.g., the accounting for Defensive IPR&D Assets on p.101 in https://assets.ey.com/content/dam/ey-sites/ey-com/en_us/topics/assurance/accountinglink/ey-frdbb1616-06-29-2023.pdf

discloses information on intangibles and focus on the level and proportion of in-process R&D. If unreported horizontal deals in the pharmaceutical industry are comprised mainly of targets with early-stage, innovative projects, then we expect these deals include more in-process R&D. Consistent with this idea, the results in columns (1) through (4) of Table 7 indicate that unreported deals include more in-process R&D and a higher proportion of the deal value is in-process R&D. Notably, relative to reported deals, the magnitude of the coefficient in column (2) indicates that unreported deals include almost six times more in-process R&D (i.e., $11.3 million in unreported deals versus $1.7 million in reported deals). Similarly, the magnitude of the coefficient in column (4) indicates that, relative to the proportion of in-process R&D in reported deals, the proportion in unreported deals is nearly three times higher (i.e., 34.8% versus 8.8%).

Overall, these findings suggest that intangibles—in particular, in-process R&D—figure prominently in unreported horizontal deals in the pharmaceutical industry. In the analysis that follows, we explore whether this acquired in-process R&D poses a risk to competition in the pharmaceutical industry, by investigating the acquisition of overlapping drug projects.

4.6.1. Acquisitions to Preempt Future Competition

Following Cunningham et al. (2021), we identify overlapping drug projects by examining the intended therapeutic market (e.g., Parkinson's disease) and the mechanism of action (e.g., growth hormone receptor). If the acquirer and the target each have a drug project that shares the same intended market and mechanism of action (MOA), we categorize the projects as overlapping. We also consider the importance of the overlapping project(s) to the deal. Specifically, we create a measure of the number of overlapping projects scaled by the target firm's total number of drug projects. Intuitively, if a target firm has only one project and that project overlaps with one by the acquirer, it is likely that acquiring the project is the focus of the deal. By contrast, if a target has many projects and one of the projects overlaps with a project of the acquirer, it is ambiguous whether the overlapping project is the focus of the deal.

We begin by investigating the prevalence of overlapping projects. Of the 169 horizontal pharmaceutical deals in our sample, 13 have at least one drug project that overlaps. Separating deals by reported and unreported, drug project overlaps occur in 5 of the 107 reported deals (i.e., a rate of 4.7%) and 8 of the 62 unreported deals (i.e., a rate of 12.9%). A test of the difference in means is significant at 1% level.

Next we use our two measures of overlap to compare unreported horizontal deals in the

pharmaceutical industry to reported deals in the following OLS model:

$$ProjectOverlap_{i,t} = \alpha + \beta Unreported_t + \tau_t + \epsilon_{i,t}, \tag{5}$$

where $ProjectOverlap_{i,t}$ is either an indicator variable (i.e., assuming the value of 1 if at least one project overlaps) or a continuous variable (i.e., the proportion of overlapping projects), both measured in year t. $Unreported_t$ is an indicator that takes the value of one if target firm i's assets are equal to or less than the size-of-person asset threshold and zero otherwise. We also include reporting year (τ_t) fixed effects. In all specifications, we cluster standard errors at the reporting year level.

The results from this regression when $ProjectOverlap_{i,t}$ is an indicator are presented in columns (1) and (2) of Panel A of Table 8. The coefficient in column (1) indicates that, on average, unreported deals are associated with a 10.1 percentage point higher likelihood of involving overlapping drug projects relative to reported deals. Based on a mean of 2.8% in reported deals, the magnitude of coefficient in column (1) indicates that overlapping drug projects in unreported deals occur at over four times times the rate of overlapping drug projects in reported deals (i.e., 13% versus 2.8%).

Columns (3) of (4) of Panel A report our results where $ProjectOverlap_{i,t}$ is the proportion of overlapping projects. This measure may better approximate how anticompetitive a merger is. For the 13 horizontal deals that have at least one overlapping project, five have a proportion of overlap that is equal to or greater than 0.125. Strikingly, we further find that all five of those deals were unreported. For all eight unreported deals with overlapping projects, we find that the average level of in-process R&D is approximately $41 million and comprises nearly 35% of the deal; whereas the average level of in-process R&D comprises roughly 15% of reported deals.[36] In our regression estimates, we find a positive and statistically significant difference in the proportion of overlap between unreported and reported deals. Collectively, the evidence in Table 8 suggests unreported deals in the pharmaceutical industry potentially posing a risk to competition via the acquisition of intangible assets.

4.6.2. Development after Acquisition

An acquirer may have incentives to continue the projects of the target, e.g., when there are synergies (Beneish et al., 2022), or to discontinue projects, e.g., when the acquisition was made to preempt competition (Cunningham et al., 2021). If the acquisition was done to preempt competition, Cunningham et al. (2021) shows that incumbents will acquire drug projects solely to shut them down when the drug project is an imperfect substitute for

[36] In one of these deals, the estimated market size for therapeutic drugs is $1.4 billion in annual sales.

the incumbent's project. This occurs because the successful development of the project by the target could shift consumer demand and profits away from the acquirer's products. In our setting, the acquirer's ability to shut down overlapping projects is likely enhanced when the size of the target firm's assets are below the asset-size threshold, allowing the merger to bypass pre-merger review. Moreover, as we show later, the threat of private litigation by consumers is most likely near zero, given we are studying drug development before commercialization.

To formally examine whether drug development rates differ between unreported and reported deals, we exploit the granularity of our project-level data, which tracks the status of development throughout the life of the project. We identify a project as being discontinued, if, at any time after the acquisition date, the project's status is either "discontinued" or "no development reported." For this analysis, we use a sample of 210 overlapping drug projects across the 13 deals that involve overlap. Approximately 47% of the projects (or 98 of 210) are discontinued after acquisition. In Panel B of Table 8, we present the results of an OLS model that regresses an indicator variable that assumes a value of 1 if a project is discontinued (and zero otherwise) on our *Unreported* indicator.

In column (1), without fixed effects, the estimate is 0.148 and statistically significant at the 5% level, meaning that acquired overlapping projects in unreported deals are about 15 percentage points more likely to be discontinued relative to overlapping projects in reported deals. The magnitude of the coefficient represents a 40% increase over the 37.5% probability of discontinuing a project in reported deals. In column (2), we include therapeutic-class fixed effects to control for the possibility that unreported and reported deals differ in development rates, due to the types of drug projects being acquired. In this specification, the magnitude of the effect increases and remains statistically significant at the 5% level. Finally, in column (3), we add filing-year fixed effects and find similar results.

Next, to address concerns that acquirers in unreported deals may naturally have higher project discontinuation rates relative to acquirers in reported deals, we broaden our analysis to include all of the acquirers' own ongoing projects. Specifically, a project is included in the sample if it was initiated but not discontinued by the acquirer before the acquisition date. Combining these non-overlapping projects with the 210 overlapping projects increases our sample to just over 3,500 unique projects. For this analysis, we respecify the OLS model used in columns (1) and (2) of Panel B by including the interaction term *Unreported* $\times$

AcquiredProject in the following empirical model:

$$\begin{aligned} ProjectDiscont'd_{i,t} =& \alpha + \beta_1\ 1\{Unreported\}_{i,j,t} + \beta_2\ 1\{AcquiredProject\}_{i,j,t} \\ &+ \beta_3\ 1\{Unreported\}_{i,j,t} \times 1\{AcquiredProject\}_{i,j,t} \\ &+ \beta_4 X_{i,t-1} + \tau_t + \phi_j + \epsilon_{i,j,t}. \end{aligned} \tag{6}$$

The second term in the interaction, *AcquiredProject*, is an indicator variable that assumes the value of 1 if the project is an overlapping project acquired via M&A and zero otherwise. The larger sample of projects allows us to include a vector of controls that proxy for the size and the financial health of the acquirer (e.g., *Size*, *Sales*, *Leverage*, *EBITDA/Assets*, *Cash/Assets*, *CashFlow/Assets*, *R&D*, and *Q*). We describe these variables in Appendix E. We also can include a therapeutic-class × mechanism of action fixed effect, to control for unobserved heterogeneity. We report the results in Panel C of Table 8.

In column (1), the coefficient on the interaction term is positive and statistically significant at the 1% level and indicates that acquired overlapping projects in unreported deals are roughly 16 percentage points more likely to be discontinued. This represents an increase of approximately 77%, relative to the discontinuation rate in reported deals. Notably, the coefficient on *Unreported* is not statistically significant at any conventional level, suggesting that the discontinuation rate of internally developed projects in unreported deals does not differ from that of internally developed projects in reported deals.[37]

In column (2), we control for the size and financial health of the acquirer. This reduces our sample to 2,541 unique drug projects. The coefficient on the interaction term remains positive and statistically significant at the 5% level. Moreover, with the inclusion of these additional controls, we find that the discontinuation rate for acquired projects in reported deals does not differ from that of internally developed projects, as shown by the statistically insignificant coefficient on *AcquiredProject*.

In column (3), we include therapeutic-class fixed effects to control for variation in discontinuation rates due to unobservable drug-therapy characteristics. We find that the estimate on the interaction term is statistically significant at the 1% level and of similar economic magnitude to that in column (1). We also find that the difference between discontinuation rates for acquired overlapping in unreported deals relative to reported deals is roughly the same economic magnitude, albeit slightly larger (i.e., 23 percentage points), to that in column (1). We repeat this analysis in column (4), but now include our set of control variables

[37] Our finding that the discontinuation rate of internally-developed projects for acquirers in unreported relative to those in reported deals is close to zero and not statistically significant helps alleviate the concern that there may be *ex ante* differences in the development rates due to agency problems in the organization of these firms (Seru, 2014).

and find that our results hold.

In columns (5) and (6), we add filing-year fixed effects to focus our analysis on targets acquired in the same filing year and find that our results continue to hold. Finally, in columns (7) and (8), we replace therapeutic-class fixed effects with TC-MOA fixed effects, which narrows our focus to drug-projects within the same therapeutic class and the same mechanism of action. This analysis reduces our sample to 2,658 and 2,003 observations, respectively. These results show that, even within the same TC-MOA, acquired overlapping projects in unreported deals have a higher rate of discontinuation relative to internally generated projects. Collectively, our results in Panel C are consistent with acquirers of overlapping projects in unreported deals having anticompetitive reasons for buying and shutting down drug projects.

5. Discussion of Results and Additional Analysis

In this section, we examine why the behavior we observe persists in equilibrium. We also estimate the effects of a change in policy, consider a number of threats to our inferences, and investigate the impact of a change in accounting standards.

5.1. Public and Private Competition Enforcement

Our analysis thus far reveals that unreported deals face limited public enforcement, despite these deals appearing to be anticompetitive. In this subsection, we explore the role of public antitrust enforcement in preventing transactions that can lead to anticompetitive outcomes. We also examine whether and, if so, to what extent private enforcement substitutes for public enforcement in our setting. Finally, we consider the impact of the *threat* of public and private litigation.

5.1.1. Public Enforcement

Our results suggest that intangibles are a material piece of reported and unreported deals. However, it could still be that, in general, deals that are subject to an SoP test are unimportant to antitrust regulators. This may be the case if, for example, the FTC and DOJ only focus on the largest M&As when allocating enforcement efforts. To investigate this possibility, we use premerger review data compiled from the HSR annual reports to examine the level of premerger scrutiny these deals receive from the antitrust regulators. Each annual report provides data, by deal size, on the number of premerger filings and Second Requests. We use data on Second Requests—i.e., the highest level of antitrust scrutiny excluding litigation—to

compute the percentage of all Second Requests that are directly connected to SoP deals. We report the results of this analysis in Online Appendix F.

The data indicate that, on average, roughly 26% of all Second Requests are issued for deals that were tested and found to be above the asset threshold. Moreover, Second Request investigations of deals that are subject to the SoP test are similar in length to investigations of the largest U.S. mergers (e.g., 146 days vs. 160 days) Tucker (2013), and approximately 70% of all Second Requests result in litigation or a demand by the FTC or DOJ to cease or restructure the deal. Given that Second Requests are costly for the merging firms *and* the antitrust regulators, our initial analysis suggests that deals that are subject to the SoP test receive significant anticompetitive attention from the FTC and DOJ.

However, public enforcement beyond a Second Request, such as further investigation and litigation by the FTC or DOJ, imposes even higher costs on the antitrust regulators, likely forcing them to focus on fewer but larger deals (Wollmann, 2020). Indeed, when we match Second Requests that resulted in more stringent enforcement actions to deals, we find that deals above the upper size of transaction threshold are nearly 29 times more likely to be the target of these actions as compared to deals that are subject to the SoP test (i.e., 3.0% vs. 0.1%).[38] However, this decreases to approximately 3 times more likely when we narrow our focus to deals that are just above, i.e., within 100% of the upper size of transaction threshold, as compared to deals that are subject to the SoP test. In terms of the number of enforcement actions, the differences around the threshold are less pronounced; nine enforcement actions are for deals that are above but proximate to the upper size of transaction threshold versus seven for deals that are subject to the SoP test. Notably, these seven, more stringent enforcement actions represent roughly 5% of the total enforcement activity (i.e., 7 of 154 enforcement actions) that we can observe with the data.[39]

5.1.2. Private Enforcement

Anticompetitive deals that bypass public enforcement actions—either because they fall below the SoP asset threshold or because of budget constraints of the antitrust regulators—might still be subject to private enforcement, i.e., lawsuits (e.g., Lancieri et al., 2023). The legal basis for bringing a stand-alone private action is the Clayton Act, which extends protections

[38]The results from an untabulated OLS regression reveals a positive and statistically significant relation between deal values and additional enforcement actions. More specifically, in a sample of 11,247 deals involving public and private acquirers, we find that the mean deal has a 0.4% probability of an action, and this probability increases by roughly 0.9% for each $1 billion in deal value.

[39]Billman and Salop (2022) uncover 526 Second Requests that are not cleared by the FTC and DOJ, resulting in further enforcement actions, including litigation. We are able to match 154 of these cases to M&As. In other words, our finding of seven enforcement actions likely understates the true number by severalfold. However, our estimate of the rate of enforcement (i.e., 5%) is likely in the range of the true rate.

to "any person who shall be injured in his business or property by anything forbidden in the antitrust laws." However, the fixed costs of private antitrust litigation for both the plaintiff and defendant are usually high (Davis and Kohles Clark, 2022), potentially limiting the extent to which such enforcement is used against SoP deals. Thus, it is not clear whether private litigation is used in deals that are subject to the SoP test and, particularly, in those deals that are below the asset threshold.

We use two sources of data for this analysis. First, we collect corporate disclosures of litigation from the 'Legal Proceedings' section of the notes to the financial statements in 10-Ks of acquiring firms. The Securities and Exchange Commission requires public firms to disclose litigation if it satisfies a predefined materiality threshold.[40] Second, we complement the 10-K disclosure data with legal data collected from Lex Machina. This dataset covers all private antitrust litigation, regardless of materiality, filed in US district courts from 2007 through 2019, and some private litigation filed from 2001 through 2006.[41]

Panel A of Online Appendix G presents descriptive statistics on private litigation. Among the 1,918 unique deals in our sample, we find that 6 have disclosures of private antitrust-related litigation, a rate of about 0.3%. This increases to 23 complaints, or a rate of 1.2% (i.e., 23/1,918), when we include private litigation collected directly from court filings. Although this rate appears small, it understates the number of lawsuits during our sample period given online court filings only became universal in 2007. As a benchmark, from 2001 through 2020, 1.4% of all mergers reviewed by the FTC and DOJ resulted in public litigation (Billman and Salop, 2022). We also find that, among the 23 deals with private complaints, 8 are related to unreported deals. Thus, 2.1% of unreported deals in our sample faced a private antitrust lawsuit, which is 50% higher than the rate of public litigation for reported deals during the same sample period—i.e., 2.1% versus 1.4%. Panel B presents cases by industry and by reported versus unreported deals. Similar to public enforcement, we find that much of the focus of private antitrust litigation is on two industries: Computer and Electronic Product Manufacturing and Chemical Manufacturing. These two industries represent 14 of the 23 total cases and 7 of the 8 cases for unreported deals.

We also examine case outcomes. To do so, we collect additional data on cases for our sample of private antitrust lawsuits. Panel C presents the findings for the 15 completed

[40]The FASB Statment of Concepts No. 8 defines an item to be material if, "the magnitude of the item is such that it is probable that the judgment of a reasonable person relying upon the report would have been changed or influenced by the inclusion or correction of the item." As SAB 99 discusses, this definition is entity-specific, and firms and auditors have developed "rules of thumb", such as a 5% threshold of net income. For more information, see https://fasb.org/page/getarticle?uid=fasb_NewsRelease08-28-18Body_0228221200 and https://www.sec.gov/interps/account/sab99.htm

[41]Prior to 2007, adoption of electronic case filing using the PACER system was limited. For example, in 2002, only 11 of the 94 district courts used electronic filing.

private cases with electronic court filings and the eight cases that are either ongoing or do not have electronic court filings. First, we find that the length of the average case is typically several years, showing that these lawsuits are costly in terms of legal expenses and allocation of management time and effort to all parties involved. Second, we find that 33% of these cases (or 5 out of 15) resulted in a favorable court ruling for the plaintiff or a monetary settlement. For comparison, Billman and Salop (2022) document that the FTC or DOJ prevails in court roughly 65% of time (i.e., 17 of the 26 court decisions). Finally, while successful public enforcement typically results in forced divestitures, plaintiffs in private antitrust litigation also request damages to be awarded. In our sample of cases, we find one instance when a divestiture (but no damages) was ordered, and four cases when either a settlement was reached or damages were awarded. The average amount of disclosed settlements and awarded damages is $187.4 million. Collectively, the findings from our analysis suggest that private antitrust litigation in M&As has important economic consequences.[42]

5.1.3. Threat of Public and Private Litigation

Our comparisons of private versus public litigation thus far exclude several important considerations. First, deals are sometimes abandoned or restructured after a Second Request is issued but before a formal legal complaint (e.g., request for an injunction) is filed by the FTC or DOJ (Billman and Salop, 2022). Second, even after receiving a formal legal complaint, firms typically choose to resolve the issue before actual litigation commences. In fact, from 2001 to 2020, only 26 of the 441 legal complaints by the FTC or DOJ resulted in a court decision (Billman and Salop, 2022). As such, the true threat of public litigation is likely higher than the rate of observed litigation.

Estimating the threat of private litigation is also confounded by several factors. The first is that, by law, private antitrust litigation can be initiated by competitors, customers, or even both, and litigants can initiate their actions before or after the merger is consummated. The second is that, due to legal precedent, competitors and customers face different thresholds below which the courts are more likely to dismiss a complaint. For competitors seeking to oppose the merger ex ante, the United States Supreme Court's decisions in *Brunswick Corp. v. Pueblo Bowl-O-Mat, Inc.* and *Cargill, Inc. v. Monfort of Colorado, Inc.* mean that whether a competitor seeks to enjoin a merger or seeks damages, it must prove both that the merger violates antitrust law and that alleged harm from the merger is of the nature that the antitrust laws were designed to prevent (e.g., predatory pricing, market foreclosure, and

[42]In Online Appendix H, we study the extent to which intangibles appear in the court filings of public and private complaints. If, as we posit, intangibles are an important asset with anticompetitive implications, then we should find direct evidence of these assets playing a key role in antitrust complaints.

more). By comparison, customers (including commercial) typically do not face such legal hurdles. Specifically, direct purchasers are generally perceived to be harmed by a merger or even a proposed merger if they can show the merger violates antitrust law, but they do not have the additional burden of having to show that the nature of the harm is of the antitrust-injury type.[43] Finally, the true threat of private litigation is impacted by differences in the remedies sought by private litigants relative to those sought by public enforcement.

The differences between the threat of public and private litigation are important to document, given the US relies on a combination of public and private enforcers to oppose anti-competitive conduct (Baer, 2014). Yet while it is expected that public and private antitrust enforcement will complement each other, they nonetheless generally serve the interests of different stakeholders, and therefore have different enforcement incentives. Consequently, when private enforcement faces legal constraints, or when there are no private enforcers, anticompeititve acquisitions will likely go unchecked by both public and private enforcement. In our setting, the absence of public enforcement occurs naturally because intangible capital-intensive firms can fail the SoP test and bypass premerger review. At the same time, the threat of private antitrust litigation might also be weakened if (1) customers are too far from the product market—i.e., the product is still being researched and developed—or (2) there are no competitors (e.g., the target is the only potential threat to the incumbent's existing technology). Consistent with this, we find, for all private litigation cases in our sample, that the court complaint includes allegations of antitrust injury to customers that are close to the product market or to direct competitors in existing product markets.

5.2. Estimated Regulatory Effects

In this section, we provide some back-of-the-envelope calculations on the economic effect of a counterfactual HSR rule requiring firms to include the fair value of identifiable intangibles in their calculations for the SoP test. Requiring firms to do this would naturally increase the number of reported mergers and increase costs to firms and regulators. At the same time, it could also deter M&A with increased antitrust costs and enforcement risk. We estimate the economic magnitudes of these outcomes separately to determine the net change from this counterfactual policy.

[43] To better understand the implications of such a hurdle, we can think of this in terms of complaints that base the alleged antitrust harm on the post-acquisition effects on price. While customers can allege that increased market power due to the merger will lead to higher prices, a similar complaint from a competitor—i.e., the post-merger firm will lower prices to steal market share—would not pass the the higher bar set by the Supreme Court's decisions in *Brunswick* and *Cargill*.

5.2.1. Enforcement Costs

To estimate the burden to the regulators attributed to the expected increase in pre-merger reviews, we rely on the data in Figure 2. From Panel B, we estimate an additional 263 deals per year will need to be reported. However, our descriptive statistics in Panel A of Table 2 suggest approximately 44% of those new filings would involve nonhorizontal deals, which are unlikely to require a Second Request. The costs to the regulators for reports that do not require a second request are low. In fact, (Wollmann, 2020) estimates the average nonhorizontal review costs the regulator less to review than the filing fees. Accordingly, most of the incremental pre-merger review costs incurred by the regulators are likely to come from the increase in reported horizontal deals.

Horizontal deals are estimated to comprise 55% of reported deals, which suggests recognizing intangible assets would increase the number of horizontal deals by an average of 145. However, not all of these deals receive regulatory scrutiny as Online Appendix D suggests an estimated 40% of those deals will likely be granted an early termination of the pre-merger review process. As such, we expect that the regulators will conduct more intensive pre-merger reviews on an additional 90 horizontal deals (i.e., 60% of the 145 deals) annually.

We next calculate the expected additional costs to the FTC and DOJ directly attributed to a change in policy based on these estimated 90 new horizontal deals. For this calculation, we rely on the estimates in Wollmann (2020), which approximate that Second Request investigations cost the regulator, on average, roughly $163,000 to $215,000 per investigation. Our prior analysis in Section 2 suggests that 6% of these 90 deals would be subject to a Second Request. Thus, we expect about five to six of the 90 new reported horizontal deals to receive a Second Request—equivalent to a 10.2% increase in total Second Requests annually. We estimate these new Second Requests would cost the regulator an estimated additional $815,000 to $1,075,000. As a benchmark, Wollmann (2020) estimates $31 million to $41 million in total annual regulatory enforcement costs. Therefore, our estimates imply an increase of about 2.6% to 3.5% in annual antitrust enforcement costs for the regulator, due to the policy change.

5.2.2. Deterrence Effects

Thus far, our analysis has ignored the deterrence effect of the policy change. To estimate the expected level of deterrence, we assume firms not only incur the cost of filing but also costs related to the collection and filing of a comprehensive list of proprietary information

they must file with the antitrust regulators.[44] Furthermore, firms would also likely consider the probability (and thus the additional costs) of a Second Request and, as a result, the probability of public enforcement (e.g, a consent decree or litigation) when deciding whether to merge. Thus, we expect that increasing antitrust costs and risk, through the policy change, will also deter some deals.

Wollmann (2020) estimates that up to three-quarters of horizontal mergers in the dialysis industry would be deterred if they needed to be reported. That estimate suggests that, despite the relatively low rate of Second Requests, merging firms would be unwilling to absorb the incremental antitrust costs arising from pre-merger review. The sample in Wollmann (2020) is for smaller deals (i.e., deal values less than $50 million) than what we examine. Thus, if we assume that the relationship between deal value and the rate of deterrence is linear and negative (i.e., higher deal values are associated with lower deterrence rates), then we can extrapolate the estimates in (Wollmann, 2020) to estimate the expected deterrence rate for our sample. Table 2 Panel A, shows that the average deal value for a reported horizontal transaction in our sample is nearly three times that of the deals examined in Wollmann (2020), suggesting our sample's deterrence rate is about 25%. Applying this rate to the estimated 90 new reported horizontal deals means that nearly 23 horizontal deals annually would not occur if a policy change was implemented. Moreover, the expected decrease in horizontal deals would also likely reduce our estimated number of additional Second Requests from five to four per year. As a consequence, our estimated additional regulatory costs per year would also likely decrease by a fifth to around $652,000 to $860,000.

Finally, deterrence is beneficial in at least two ways. First, it benefits regulators because it directly reduces the costs of investigation and potentially litigation. Second, it benefits consumers, if we believe that the outcome of an anticompetitive deal would have been higher prices, lower quality, less choice, or a combination of these. However, given that our study includes many different industries, we do not attempt to estimate the benefits to consumers due to deterrence, although they are likely substantial.[45] Thus, one takeaway from our analysis is that, by requiring merging firms to include the fair value of intangibles in their SoP test, antitrust regulators could deter or block transactions that could harm consumers.

[44] Firms are required to disclose sensitive information to the FTC and DOJ in their pre-merger filing. The instructions for the filing, found here (insert link here) shed light on the cost burden placed on merging firms that are required to file.

[45] Consistent with this, Wollmann (2020) estimates the value of lives saved in the kidney dialysis attributed to a reduction in horizontal mergers, and concludes that the benefits approach $100 million per year.

5.2.3. Threats to Our Estimates

It is important to note that if firms can manipulate their balance sheets to strategically avoid pre-merger screening, then including intangible capital when accounting for the SoP test could result in some form of manipulation by the ones with the highest incentives to do so. Indeed, the email correspondence we find between firms and the FTC suggests that firms do consider ways to avoid review—e.g., by using extraordinary dividend payments. In such case, the remaining acquisitions that, as a result of adding intangibles to the balance sheet, shift from unreported to reported might then be those that are of lower concern to the regulator (i.e., non-manipulators). However, increasing the number of deals that the regulator must review might negatively impact the average quality of all reviews—e,g., if the regulator requires more effort per reviewer, rather than hiring more reviewers. While manipulation to avoid review is illegal, Kepler et al. (2023) provides evidence of manipulation around the lower deal-size threshold. In terms of economic magnitude, that paper finds a 45% higher-than-expected number of deals just below the lower deal-size threshold. Applying the same magnitude to our estimates indicates that approximately 41 of the 90 annual horizontal mergers we predict would become reportable (if required to add intangible capital to the balance sheet) would avoid reporting through manipulation. To further understand the importance of such behavior as it relates to the SoP test, we next examine how firms respond to changes in accounting standards that increase the size of tangible assets and thus shift some deals from unreportable to reportable.

5.3. Changes to Accounting Standards

Until now, we have assumed that firms take the accounting standards as given and structure their deals accordingly. As such, we have assumed away the idea that changes to accounting standards might have real implications in our setting. In this section, we briefly discuss the potential real effects of a change to an accounting standard but examine the connection between accounting and M&A more extensively in Online Appendix I.

One way a change to accounting standards could impact M&A is a change to the measurement of assets. Specifically, given that the SoP test explicitly uses the book value of assets to determine the need for a pre-merger review, a change in the way assets are measured or a change in which assets are included on the balance sheet—e.g., being required to capitalize an off-balance sheet asset, which then naturally increases total assets—could shift deals from being unreportable to reportable. For some deals with potential anticompetitive effects, such a shift would naturally heighten the risk of regulatory intervention (e.g., Second Request or public litigation) solely because the deal would be reported. If firms internalize

these costs, we expect that such a change to an accounting standard would affect the decision to acquire or the timing of deals. In the analysis in Online Appendix I, we examine how M&A are impacted after a recent change to the accounting standard for operating leases that required firms to recognize these leases as an asset. While the change did not impact intangible capital per se, it nonetheless increased the the size of assets used to determine reportability and thus has implications in our setting. Notably, we find a statistically significant increase of roughly 50% in the proportion of unreported deals that are conducted shortly after the change to the accounting standard but before the mandated adoption. We also show that the increase is driven by target firms that, if operating leases were recognized on the balance sheet, would shift from unreportable to reportable.

6. Conclusion

We show that current accounting standards for antitrust screening lead to many M&A going unreported to regulators, despite having similar deal size as deals that are reported. We find these unreported deals are driven by horizontal transactions in intangible capital-intensive industries about which regulators have expressed concerns regarding product market consolidation. These deals often involve the acquisition of patented technology and in-process R&D that plausibly lead to anticompetitive behavior, as evidenced by increased private antitrust litigation against these unreported deals. Consistent with this, we find that unreported deals in the pharmaceutical industry are more likely to involve the acquisition of in-process R&D and overlapping projects that are more likely to be subsequently discontinued when such projects go unreported. Indicative of the potential influence of accounting standards, we find suggestive evidence that a standard that forced capitalization of leases as assets significantly increased M&A.

Our findings have several policy implications. Given current antitrust review guidelines that involve bright lines that trigger pre-merger review, accounting standards have implications for the types of deals that systematically bypass antitrust review and thereby impact market structure. Our results suggest implementing arbitrary thresholds based on accounting standards can have real effects on industrial organizational behavior. In this regard, our study suggests that regulatory concern about the limitations set by pre-merger review thresholds is plausibly warranted, as certain industries that are more intangible intensive are more likely to go undetected. Overall our study underscores the importance of accounting frameworks for intangible assets as a core aspect of competition regulation and suggests that continued growth in intangible assets in the economy may exacerbate market consolidation via unreported mergers in the exact sectors that are of most concern for consumers.

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Figure 1. Notification Thresholds

Rules of Premerger Notification for Size of Transaction and Size of Person Tests

If, on the date the deal is announced, the total value of the target that would be held by the acquirer is *at or below* the lower size of transaction threshold, a **premerger notification is not required**.

If, on the date the deal is announced, the total value of the target that would be held by the acquirer is *above the lower* and *at or below upper size* of transaction thresholds, the "Size of Person" test is **used to determine if the deal is subject to a premerger notification is required**

If, on the date the deal is announced, the total value of the target that would be held by the acquirer is above the upper size of transaction threshold, a premerger notification is required.

Notification Thresholds (by year)

Reporting Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Size of Transaction Lower Threshold ($ mm)	50.0	50.0	50.0	50.0	53.1	56.7	59.8	63.1	65.2	63.4	66.0	68.2	70.9	75.9	76.3	78.2	80.8	84.4	90.0
Size of Person Asset Threshold ($ mm)	10.0	10.0	10.0	10.0	10.7	11.3	12.0	12.6	13.0	12.7	13.2	13.6	14.2	15.2	15.3	15.6	16.2	16.9	18.0
Size of Transaction Upper Threshold ($ mm)	200.0	200.0	200.0	200.0	212.3	226.8	239.2	252.3	260.7	253.7	263.8	272.8	283.6	303.4	305.1	312.6	323.0	337.6	359.9
Effective Date	Feb 1, 2001	Feb 1, 2002	Feb 1, 2003	Feb 1, 2004	Mar 2, 2005	Feb 17, 2006	Feb 21, 2007	Feb 28, 2008	Feb 12, 2009	Feb 22, 2010	Feb 24, 2011	Feb 27, 2012	Feb 11, 2013	Feb 24, 2014	Feb 20, 2015	Feb 25, 2016	Feb 27, 2017	Feb 28, 2018	Apr 3, 2019

Figure 2. Reported M&As

This figure displays the number of deals reported to antitrust regulators when only tangible assets are included in the size-of-person test (in blue) and the number of deals that would be reported if both tangible and identifiable intangible assets are included in the size-of-person test (in red). In Panel A, we present the current HSR regime (blue) and the counterfactual regime (red) for only our sample of deals. In Panel B, we present the current HSR regime (blue) using data from HSR annual reports and then estimate the counterfactual HSR regime (red) using red-to-blue proportions obtained from Panel A.

Panel A. Within-sample Analysis

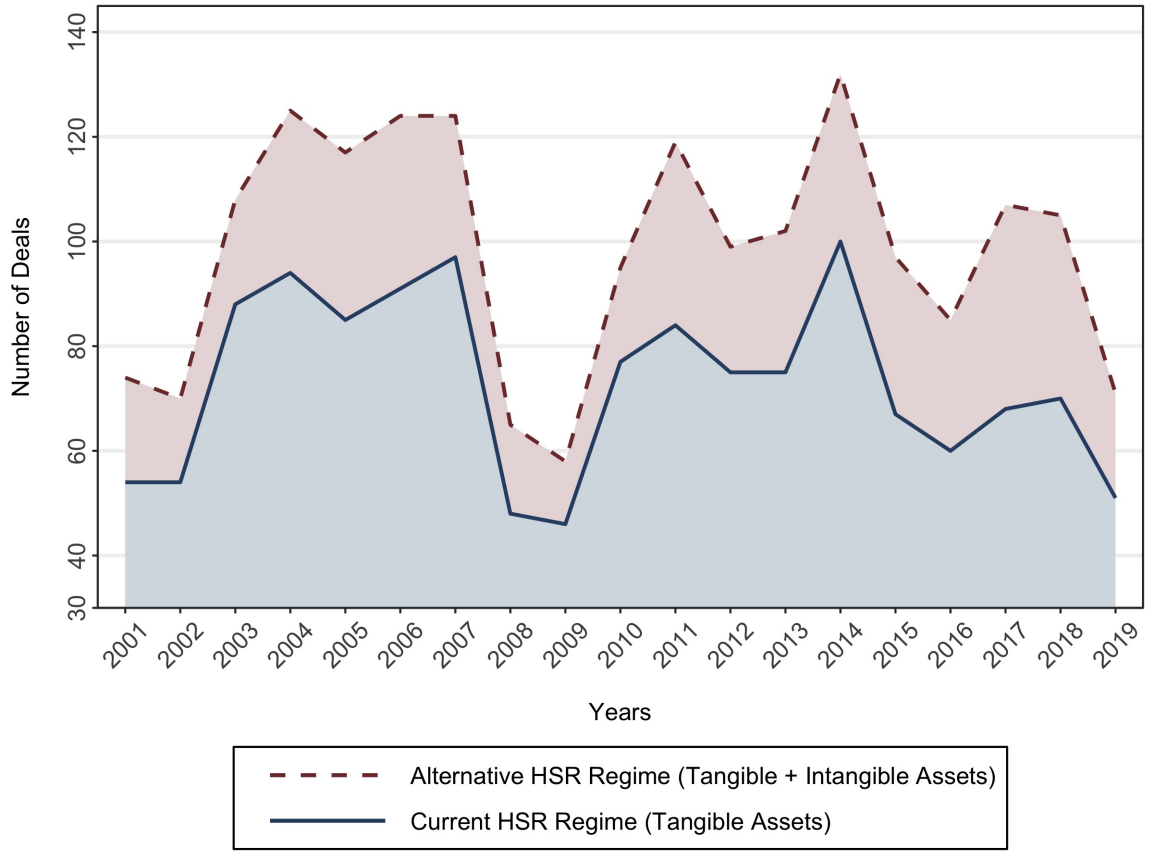


Figure 2. Reported M&As (Continued)

Panel B. Market-level Analysis

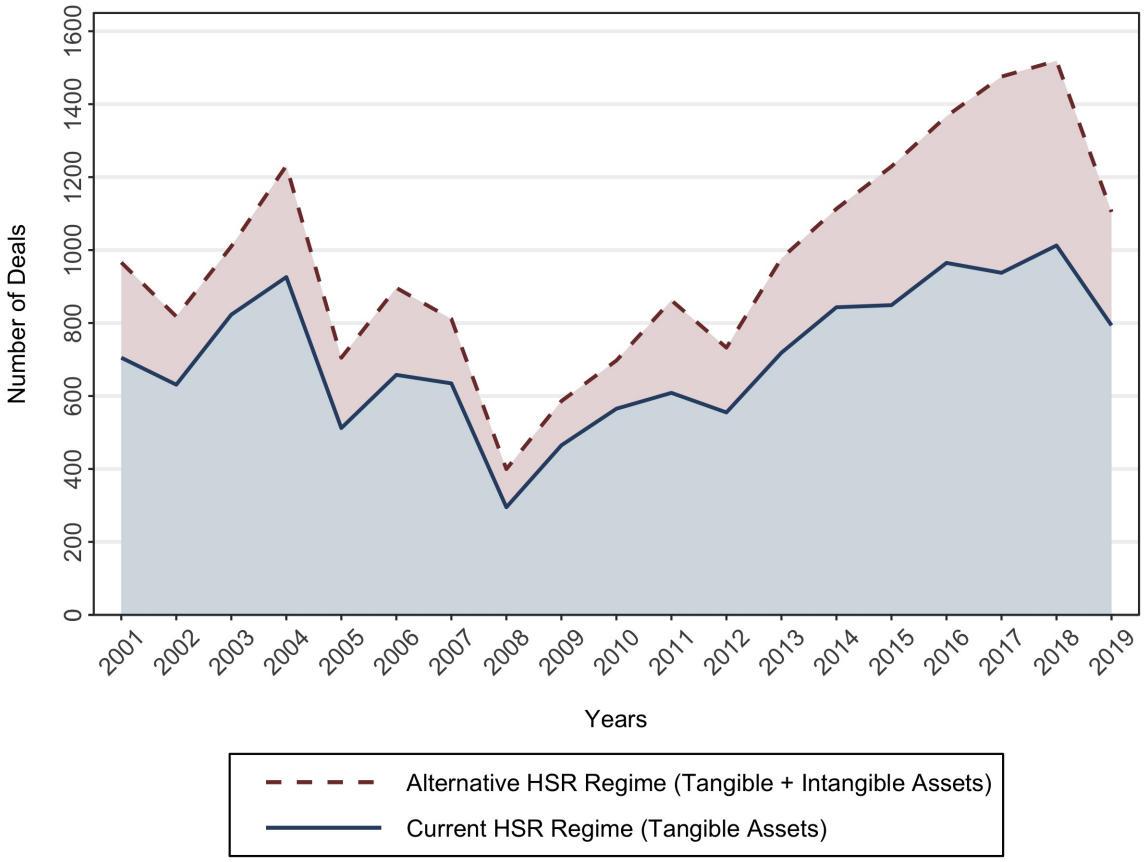


Figure 3. Unreported vs. Reported Deals

This figure graphically displays the distribution of unreported vs. reported deals. In Panel A, we present the distribution of deal values for unreported and reported M&As. In Panel B, we present the distribution of identifiable intangible asset values for unreported and reported M&As.

Panel A. Distribution of Deal Values for Unreported and Reported M&As

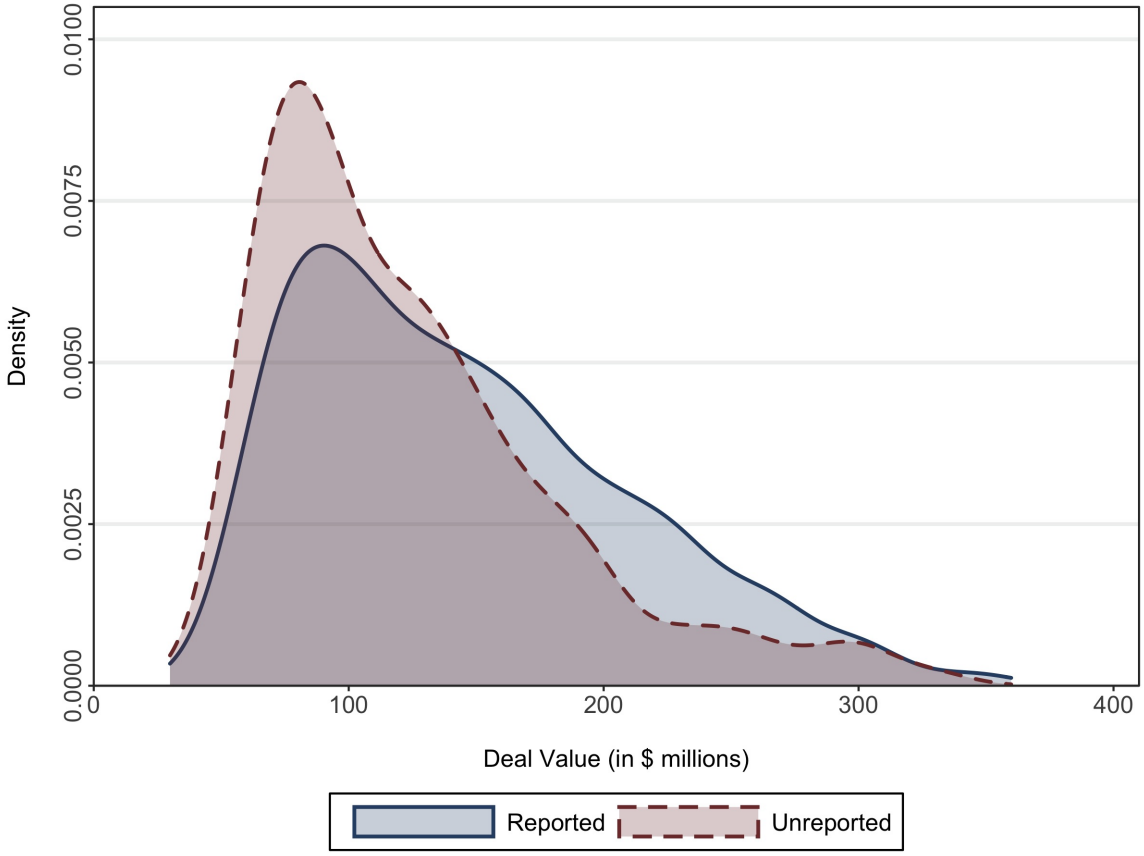


Figure 3. Unreported vs. Reported Deals (Continued)

Panel B. Distribution of Intangibles for Unreported and Reported M&As

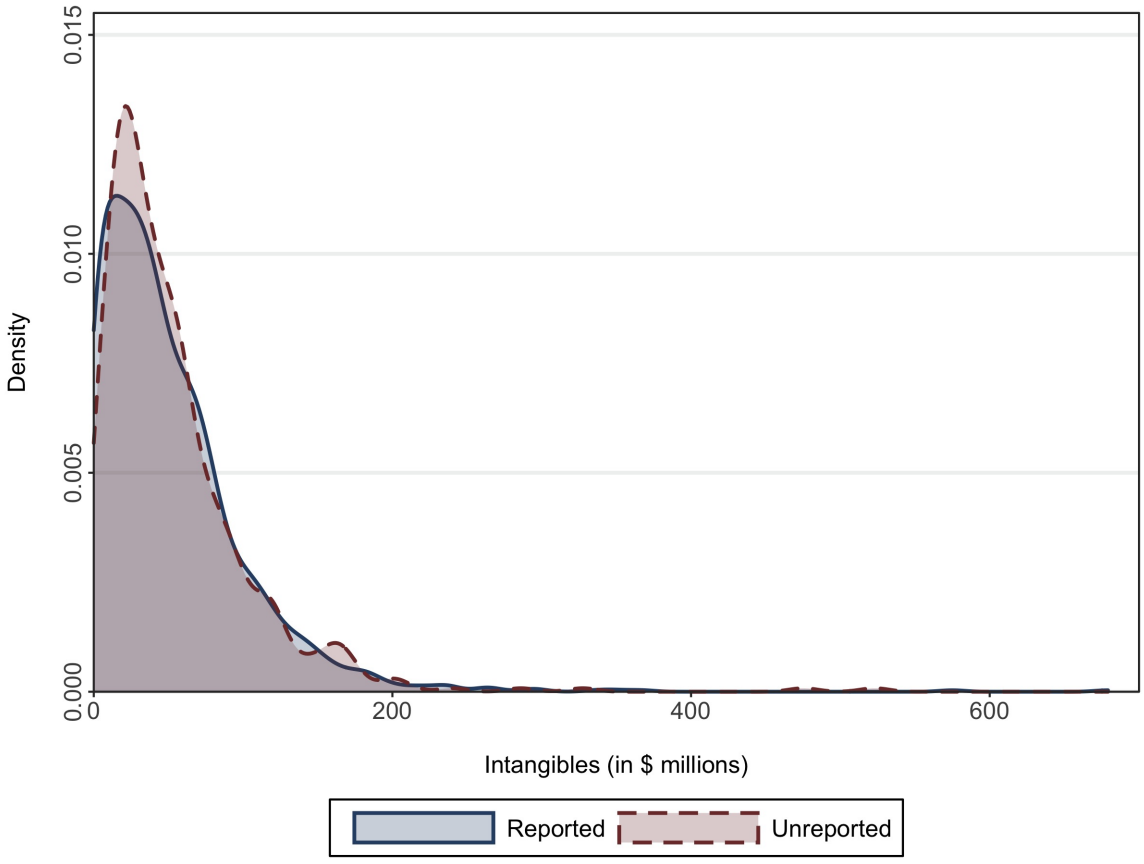


Figure 4. Categories of Intangibles

This figure displays, by category of intangible asset, the percent of total identifiable intangibles that each category represents. We display the top four categories separately and then aggregate the remaining 18 categories and call it "All Others." See Panel B of Table 4 for the complete list of categories, dollar values, and percents.

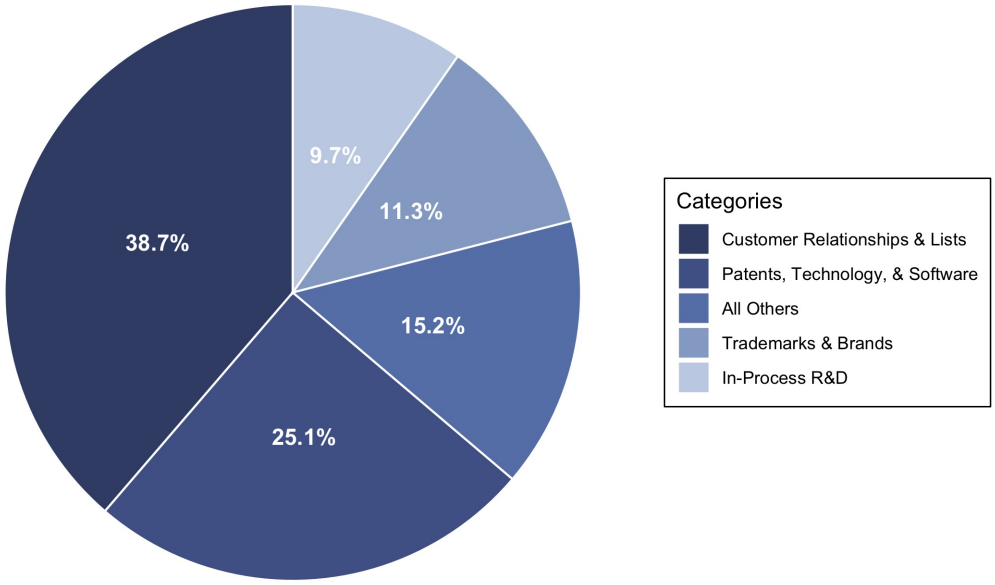


Figure 5. Proportion of Private Litigation Cases

This figure graphically displays the proportion of private litigation cases that include in the complaint the mention of a dispute over an acquired intangible asset. We display, separately for reported and reported deals, the proportions for the top four categories of intangible assets mentioned in private cases.

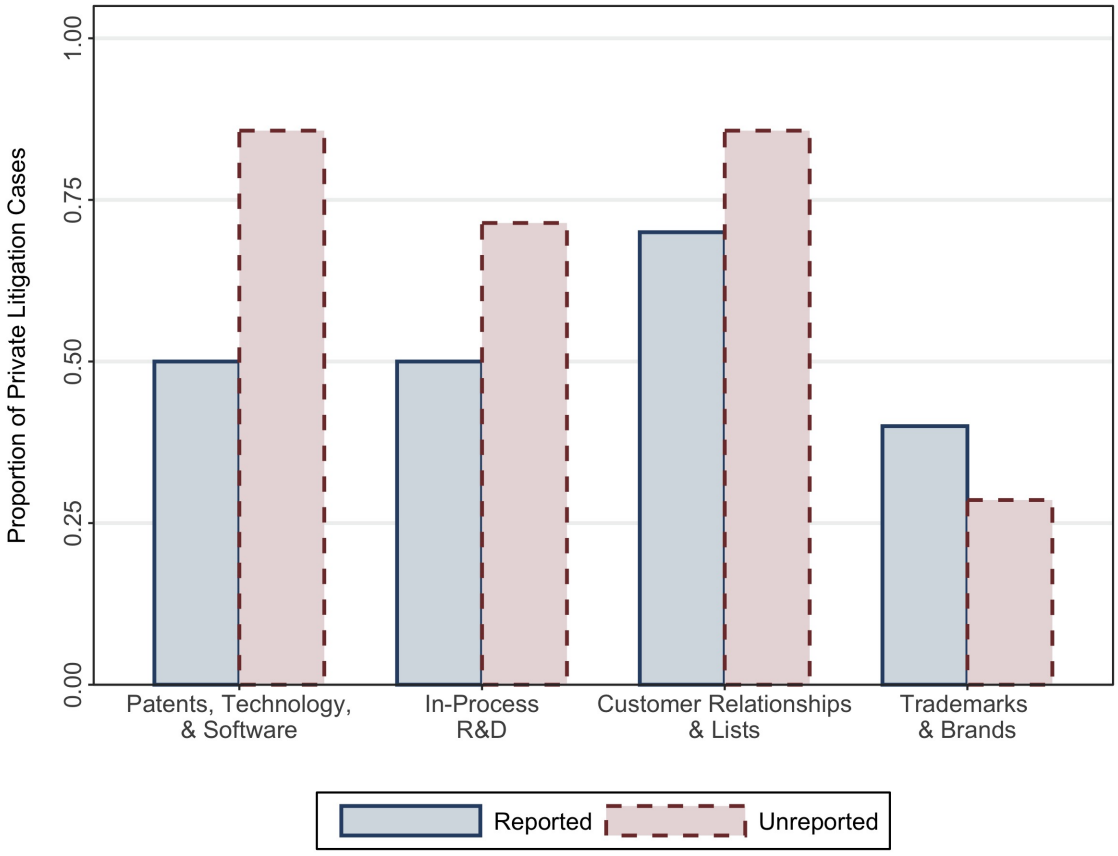


Table 1. Sample and Distribution

In Panel A, we present the sample distributed by HSR reporting year. Reporting Year is measured from the 'Effective Date' of the current HSR reporting year to the day before the 'Effective Date' of the following reporting year. See Appendix A for 'Effective' dates and 'Reporting' years. In Panel B, we present, by industry (3-digit NAICS), the horizontal M&As in the sample. In both panels, columns may not add to 100%, due to rounding.

Panel A. All M&As (by year)

Reporting Year*	M&As (Full sample)	M&As (For analysis)
2001	220 (6.2%)	81 (4.2%)
2002	179 (5.1%)	73 (3.8%)
2003	209 (5.9%)	110 (5.7%)
2004	236 (6.7%)	128 (6.7%)
2005	243 (6.9%)	120 (6.3%)
2006	255 (7.2%)	125 (6.5%)
2007	253 (7.2%)	127 (6.6%)
2008	138 (3.9%)	67 (3.5%)
2009	115 (3.3%)	58 (3.0%)
2010	196 (5.6%)	95 (5.0%)
2011	189 (5.4%)	121 (6.3%)
2012	179 (5.1%)	100 (5.2%)
2013	168 (4.8%)	102 (5.3%)
2014	201 (5.7%)	135 (7.0%)
2015	153 (4.3%)	97 (5.1%)
2016	153 (4.3%)	88 (4.6%)
2017	158 (4.5%)	111 (5.8%)
2018	163 (4.6%)	108 (5.6%)
2019	118 (3.3%)	72 (3.8%)
Full sample	3,526 (100%)	1,918 (100%)
Total value (in $ billions)	$477.8	$267.7

Panel B. Horizontal Mergers (by industry (3-digit NAICS))

Industry	Horizontal M&As (Full sample)	Horizontal M&As (For analysis)
Computer and Electronic Product Manufacturing	662 (35.5%)	409 (38.4%)
Chemical Manufacturing	332 (17.8%)	189 (17.8%)
Professional, Scientific, and Technical Services	215 (11.5%)	128 (12.0%)
Telecommunications	123 (6.60%)	64 (6.00%)
Utilities	108 (5.80%)	37 (3.50%)
Food and Kindred Products	93 (5.00%)	49 (4.60%)
Machinery Manufacturing	92 (4.90%)	59 (5.50%)
Transportation Equipment	67 (3.60%)	36 (3.40%)
Communications	59 (3.20%)	31 (2.90%)
Health Services	29 (1.60%)	17 (1.60%)
Publishing Industries (except Internet)	29 (1.60%)	18 (1.70%)
Hospitals	28 (1.50%)	9 (0.90%)
Merchant Wholesales, Nondurable Goods	26 (1.40%)	19 (1.80%)
Sample of Horizontal Mergers	1,863 (100%)	1,065 (100%)
Total value (in $ billions)	$247.4	$146.2

Table 2. Descriptive Statistics

This table presents descriptive statistics for our sample of reported and unreported deals. A deal is classified as reported is it has total assets that are above the SoP threshold in that reporting year. A deal is classified as unreported if it has total assets that are equal to or below the SoP asset threshold in that reporting year but has not been reviewed by the FTC or DOJ. In Panel A, we present descriptive statistics separately for reported and unreported deals. In Panel B, we present descriptive statistics, by industry, for only unreported horizontal deals. In Panel C, we present, separately for reported and unreported horizontal deals, the mean percent of tangible assets, intangible assets, and goodwill. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

Panel A. Reported vs. Unreported M&As

	Reported	Unreported	Difference
Type of M&A			
Horizontal (3-digit NAICS)	766 (55.2%)	219 (56.6%)	-1.0%
Non-Horizontal	621 (44.8%)	168 (43.4%)	1.0%
Average deal value (in $ millions)			
Horizontal (3-digit NAICS)	$143.5	$121.3	$22.2***
Non-Horizontal	$148.1	$122.1	$26.0***

Panel B. Unreported Horizontal M&As

Industry	Horizontal M&As (Unreported)	Value (in $ billions)
Computer and Electronic Product Manufacturing	107 (48.8%)	$11.83
Chemical Manufacturing	62 (28.3%)	$8.72
Professional, Scientific, and Technical Services	17 (7.80%)	$2.11
Telecommunications	8 (3.70%)	$0.71
Utilities	0 (0.00%)	$0.00
Food and Kindred Products	5 (2.30%)	$0.57
Machinery Manufacturing	10 (4.60%)	$1.62
Transportation Equipment	0 (0.00%)	$0.00
Communications	5 (2.30%)	$0.44
Health Services	0 (0.00%)	$0.00
Publishing Industries (except Internet)	4 (1.80%)	$0.45
Hospitals	1 (0.50%)	$0.12
Merchant Wholesales, Nondurable Goods	0 (0.00%)	$0.00
Total	219 (100%)	$26.56

Panel C: Tangible Assets, Intangibles, and Goodwill of Horizontal M&As

	Reported	Unreported	Difference
Horizontal M&As			
Tangible assets	35.5%	6.7%	28.8%***
Intangibles	27.7%	46.8%	-19.1%***
Goodwill	36.8%	46.4%	-9.6%***
Total	100%	100%	

Table 3. Degree of Intangible Assets

This table presents results from ordinary least squares (OLS) regressions of intangibles on unreported M&As. The main variable of interest, *Unreported*, assumes the value of 1 if the target firm's assets are below the size-of-person asset threshold; and 0 otherwise. In columns (1), (2), and (3), the dependent variable the natural log of intangible assets. In columns (4), (5), and (6), the dependent variable is proportion of intangibles; measured as the level of intangibles scaled by the sum of assets plus intangibles plus goodwill. We include filing-year and industry (3-digit NAICS) fixed effects across all columns. Robust t-statistics are reported in parentheses and calculated using standard errors clustered at the acquirer's industry and reporting-year levels. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable:	(1) *Log (Intangibles)*	(2) *Log (Intangibles)*	(3) *Log (Intangibles)*	(4) *Proportion of Intangibles*	(5) *Proportion of Intangibles*	(6) *Proportion of Intangibles*
Unreported	-0.098	-0.039	0.061	0.136**	0.156*	0.157*
	(-0.73)	(-0.20)	(0.34)	(2.57)	(1.94)	(1.96)
Observations	1,774	985	673	1,774	985	673
Adjusted R^2	0.192	0.232	0.235	0.227	0.277	0.302
Filing-Year F/E	Y	Y	Y	Y	Y	Y
Industry F/E	Y	Y	Y	Y	Y	Y

Table 4. Categories of Intangibles

This table presents results of the analysis of categories of intangibles. In Panel A, we present the frequency of intangibles in our sample. In Panel B, we present the amounts (in $ millions) and percents for all categories of identifiable intangible assets in our sample. In Panel C, we present results for difference-in-means tests, by category, for reported vs. unreported deals. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

Panel A. Frequency of Intangibles in M&As

Description	Observations
No intangibles	108
Intangibles (not disaggregated)	410
Intangibles (disaggregated by category)	1,400
Total	1,918

Panel B. Economic Importance by Category of Intangible

Category	Amount($ millions)	Percent
Customer Relationships & Lists	$30,491.91	38.7%
Patents, Technology, & Software	$19,808.12	25.1%
Trademarks & Brands	$8,906.38	11.3%
In-Process R&D	$7,663.93	9.7%
Licenses	$3,212.06	4.1%
Product Rights	$3,036.69	3.9%
Distribution Agreements	$1,242.37	1.6%
Power Purchase Agreements	$628.67	0.8%
Other Intangibles	$627.16	0.8%
Non-Compete Agreements	$513.91	0.7%
Mineral Interests	$475.20	0.6%
Usage Rights	$391.00	0.5%
Franchise Rights	$325.60	0.4%
Databases	$272.60	0.3%
Lease Intangibles	$247.96	0.3%
Supplier Agreements	$163.03	0.2%
Maintenance Contracts	$122.20	0.2%
Management Agreements	$103.10	0.1%
Pipeline Capacity Rights	$87.60	0.1%
Other Contract Rights	$66.90	0.1%
Assembled Workforce	$50.80	0.1%
Royalty Agreements	$4.90	0.0%
Total	$78,760.16	100.0%

Panel C. Difference-in-Means Tests (by Category) for Reported vs. Unreported M&As

Category	Mean($ millions) Reported	Mean($ millions) Unreported	Difference
Customer Relationships & Lists	$25.19	$12.04	$13.15***
Patents, Technology, & Software	$13.78	$15.05	−$1.27
Trademarks & Brands	$ 6.54	$ 4.88	$1.66*
In-Process R&D	$ 2.94	$12.14	−$9.20***

Table 5. Deal Premiums and Unreported M&As

This table presents results from ordinary least squares (OLS) regressions of deal premiums on an indicator for whether the deal was reviewed or not reviewed by the antitrust regulators. The main variable of interest in columns (1) and (3), *Unreported*, is an indicator variable that assumes the value of 1 if the target firm's assets are below the size-of-person asset threshold; and 0 otherwise. The main variable of interest in columns (2) and (4), *Unreported* × *ProductMarketOverlap*, is an interaction term that assumes the value of 1 when the acquirer and the target firm share overlapping product markets in an unreported deal; and 0 otherwise. Across all columns, the dependent variable, *DealPremium*, is a continuous variable that captures the proportion of the acquired equity that is allocated to goodwill. All variables are described in Appendix F. We vary the inclusion of fixed effects as follows. In columns (1) and (2), we include filing-year and acquirer's industry fixed effects, respectively. In columns (3) and (4), we include filing-year and firm (i.e., acquirer) fixed effects, respectively. *DealPremium* is winsorized at the 1% and 99% levels. Robust t-statistics are reported in parentheses and calculated using standard errors clustered at the filing-year and the acquirer's industry level, respectively. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable:	*DealPremium*	*DealPremium*	*DealPremium*	*DealPremium*
Unreported	0.099***	0.085**	0.060*	0.046
	(3.16)	(2.50)	(1.86)	(1.32)
ProductMarketOverlap		-0.046*		-0.040
		(-2.13)		(-1.21)
Unreported × *ProductMarketOverlap*		0.048*		0.053***
		(1.89)		(4.37)
Observations	1,663	1,663	707	707
Adjusted R^2	0.151	0.154	0.481	0.482
Filing-year F/E	Y	Y	Y	Y
Industry F/E	Y	Y	N	N
Firm F/E	N	N	Y	Y

Table 6. Announcement Returns and Unreported M&As

This table presents results from ordinary least squares (OLS) regressions of cumulative abnormal returns on an indicator for whether the deal was reviewed or not reviewed by the antitrust regulators. In Panels A and B, the main variable of interest in columns (1) and (3), *Unreported*, is an indicator variable that assumes the value of 1 if the target firm's assets are below the size-of-person asset threshold; and 0 otherwise. The main variable of interest in columns (2) and (4), *Unreported* × *ProductMarketOverlap*, is an interaction term that assumes the value of 1 when the acquirer and the target firm share overlapping product markets in an unreported deal; and 0 otherwise. Across all columns of Panel A, the dependent variable, *AnnReturn*, is a continuous variable that captures the 5-day market-adjusted cumulative abnormal returns of the acquirer centered on the announcement date. We control for *DealPremium* in all columns. Across all columns of Panel B, the dependent variable, *RivalReturns* is a continuous variable that captures the 5-day market-adjusted cumulative abnormal returns of rivals of the acquirer. We consider a firm to be a rival of the acquirer, if the firm shares the same 6-digit NAICS code. The average cumulative abnormal returns of rivals is computed using equal-weighted returns. We control for *DealPremium* in all columns. All variables are described in Appendix F. In Panels A and B, we vary the inclusion of fixed effects as follows. In columns (1) and (2), we include filing-year and acquirer's industry fixed effects, respectively. In columns (3) and (4), we include filing-year and firm (i.e., acquirer) fixed effects, respectively. *AnnReturn* and *RivalReturns* are winsorized at the 1% and 99% levels. Robust t-statistics are reported in parentheses and calculated using standard errors clustered at the filing-year and the acquirer's industry level, respectively. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

Panel A. Acquirer's Announcement Returns

	(1)	(2)	(3)	(4)
Dependent Variable:	*AnnReturn*	*AnnReturn*	*AnnReturn*	*AnnReturn*
Unreported	-0.003	-0.010	0.023***	0.009
	(-0.33)	(-1.63)	(4.85)	(0.64)
ProductMarketOverlap		0.010		-0.016
		(1.60)		(-0.95)
Unreported × *ProductMarketOverlap*		0.036**		0.056**
		(2.16)		(2.20)
DealPremium	-0.009	-0.009	-0.042	-0.045
	(-1.00)	(-0.93)	(-1.74)	(-1.74)
Observations	1,064	1,064	505	505
Adjusted R^2	0.003	0.011	0.169	0.180
Filing-year F/E	Y	Y	Y	Y
Industry F/E	Y	Y	N	N
Firm F/E	N	N	Y	Y

Table 6. Announcement Returns and Unreported M&As (Continued)

Panel B. Rivals' Announcement Returns

	(1)	(2)	(3)	(4)
Dependent Variable:	*RivalReturns*	*RivalReturns*	*RivalReturns*	*RivalReturns*
Unreported	0.005**	0.003*	-0.001	-0.002
	(2.70)	(2.00)	(-0.15)	(-0.73)
ProductMarketOverlap		0.001		-0.003
		(0.64)		(-0.83)
Unreported × *ProductMarketOverlap*		0.008*		0.007*
		(2.14)		(2.08)
DealPremium	-0.002	-0.002	0.004	0.003
	(-0.60)	(-0.62)	(0.27)	(0.25)
Observations	998	998	458	458
Adjusted R^2	0.01	0.01	0.031	0.026
Filing-year F/E	Y	Y	Y	Y
Industry F/E	Y	Y	N	N
Firm F/E	N	N	Y	Y

Table 7. Degree of In-Process R&D and Unreported Pharmaceutical M&As

This table presents results from ordinary least squares (OLS) regressions in-process R&D on unreported pharmaceutical M&As. The main variable of interest, *Unreported*, assumes the value of 1 if the target firm's assets are below the size-of-person asset threshold; and 0 otherwise. In columns (1) and (2), the dependent variable is one plus the natural log of in-process R&D. In columns (3) and (4), the dependent variable is one plus the natural log of in-process R&D. In all columns, we include only horizontal deals in the pharmaceutical industry; defined as deals with targets and acquirers having the same 3-digit NAICS code (i.e., NAICS code '325'). We include filing-year fixed effects in columns (2) and (4). Robust t-statistics are reported in parentheses and calculated using standard errors clustered at the reporting-year level. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable:	(1) *Log (In-Process R&D)*	(2) *Log (In-Process R&D)*	(3) *Proportion of In-Process R&D*	(4) *Proportion of In-Process R&D*
Unreported	1.422***	1.525***	0.334***	0.348***
	(6.70)	(7.55)	(8.30)	(7.50)
Observations	126	126	126	126
Adjusted R^2	0.129	0.184	0.225	0.255
Filing-year F/E	N	Y	N	Y

Table 8. Overlapping Pharmaceutical Projects and Below Asset-Threshold M&As

This table presents results from ordinary least squares (OLS) regressions of pharmaceutical projects on an indicator for whether the deal was reviewed or not reviewed by the antitrust regulators. The main variable of interest in Panels A and B, *Unreported*, is an indicator variable that assumes the value of 1 if the target firm's assets are below the size-of-person asset threshold; and 0 otherwise. The main variable of interest in Panel C, *Unreported* × *AcquiredProject*, is an interaction term that assumes the value of 1 when an overlapping project is acquired in an unreported deal; and 0 otherwise. In columns (1) and (2) of Panel A, the dependent variable, *Pr(ProjectOverlap)*, is an indicator variable that assumes the value of 1 if the target firm and the acquiring firm have at least one drug development project that directly overlaps; zero otherwise. In columns (3) and (4) of Panel A, the dependent variable, *ProjectOverlap*, is a continuous variable that measures the proportion of the target firm's drug development projects that overlap with the acquirer's drug development projects. In all columns of Panel B, the dependent variable, *ProjectDiscont'd*, is a an indicator variable that assumes the value of 1 if a drug project is discontinued after the acquisition date. In Panel C, the dependent variable across all columns, *ProjectDiscont'd*, is a an indicator variable that assumes the value of 1 if a drug project is discontinued after the acquisition date. For both Panels A and B, we vary the inclusion of fixed effects as follows. In columns (1) and (3) of Panel A, we exclude filing-year fixed effects; in column (2) and (4), we include filing-year fixed effects. In column (1) of Panel B, we exclude fixed effects; in column (2) we include therapeutic-class fixed effects; and in column (3), we include therapeutic-class and filing-year fixed effects, respectively. For Panel C, we vary the fixed effects sturcture across columns. We also vary the inclusion of our control variables; e.g, we include control variables in columns (2), (4), (6), and (8). Control variables included, but not reported, in the estimations in Panel C are *Size*, *Sales*, *Leverage*, *EBITDA/Assets*, *Cash/Assets*, *CashFlow/Assets*, *R&D*, and *Q*. Robust t-statistics are reported in parentheses and calculated using standard errors clustered at the filing-year level. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

Panel A. Overlapping Projects

	(1)	(2)	(3)	(4)
Dependent Variable:	*Pr(ProjectOverlap)*	*Pr(ProjectOverlap)*	*ProjectOverlap*	*ProjectOverlap*
Unreported	0.101**	0.098**	0.015**	0.012**
	(2.57)	(2.56)	(2.75)	(2.68)
Observations	169	169	169	169
Adjusted R^2	0.033	0.063	0.045	0.051
Filing-year F/E	N	Y	N	Y

Panel B. Drug Project-Level Development and Competition

	(1)	(2)	(3)
Dependent Variable:	*ProjectDiscont'd*	*ProjectDiscont'd*	*ProjectDiscont'd*
Unreported	0.148**	0.332**	0.595*
	(2.92)	(2.39)	(2.29)
Observations	210	210	210
Adjusted R^2	0.016	0.044	0.088
Therapeutic Class F/E	N	Y	Y
Filing-year F/E	N	N	Y

Table 8. Overlapping Pharmaceutical Projects and Below Asset-Threshold M&As (Continued)

Panel C. Drug Project-Level Development

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable:	*ProjectDiscont'd*	*ProjectDiscont'd*	*ProjectDiscont'd*	*ProjectDiscont'd*	*ProjectDiscont'd*	*ProjectDiscont'd*	*ProjectDiscont'd*	*ProjectDiscont'd*
Unreported × *AcquiredProject*	0.161***	0.331**	0.235***	0.424**	0.216***	0.361**	0.282***	0.366*
	(3.51)	(2.26)	(4.60)	(2.82)	(4.32)	(2.52)	(6.44)	(2.08)
Unreported	-0.013	-0.026	0.000	-0.007	-0.043	-0.026	-0.002	-0.017
	(-0.38)	(-0.79)	(0.00)	(-0.23)	(-0.87)	(-1.25)	(-0.05)	(-0.64)
AcquiredProject	0.209***	0.057	0.200***	0.028	0.190***	0.074	0.137***	0.074
	(4.76)	(0.41)	(4.17)	(0.19)	(4.31)	(0.52)	(3.40)	(0.42)
Observations	3,504	2,541	3,504	2,541	3,504	2,541	2,658	2,003
Adjusted R^2	0.039	0.065	0.043	0.073	0.071	0.104	0.265	0.328
Controls	N	Y	N	Y	N	Y	N	Y
Therapeutic Class F/E	N	N	Y	Y	Y	Y	N	N
Filing-year F/E	N	N	N	N	Y	Y	Y	Y
TC × MOA F/E	N	N	N	N	N	N	Y	Y

Appendix A. Examples of FTC Correspondence

This section of the Appendix contains two correspondences between representatives of merging parties and the FTC. The correspondences are regarding two unrelated deals. The first correspondence is a letter to the FTC. The second is an email to the FTC. Correspondences were obtained from the FTC's publicly available records.

Sample correspondence No. 1 (January 27, 2004)

[redacted]

801.10
801.90

PRIVILEGED AND CONFIDENTIAL

January 27, 2004

HAND DELIVERY

Mr. Michael Verne
Compliance Specialist
Premerger Notification Office
Bureau of Competition
Federal Trade Commission
Washington, DC 20580

2004 JAN 27 A 11:17
FEDERAL TRADE COMMISSION
PREMERGER NOTIFICATION OFFICE

Re: Balance Sheet based upon Payment of Extra-Ordinary Dividend

Dear Mr. Verne:

Pursuant to our telephone conversation of January 8, 2004 I have prepared this letter to memorialize the facts presented to you and to confirm your opinion on how the Premerger Office would analyze the parties' actions to reduce the assets found in the acquired person's balance sheet and thereby fail the HSR "size-of-the person" test.

FACTS:

Company A intends to acquire 100 percent of either the voting stock or the assets of Company B, which is not engaged in manufacturing. Company B has a large amount of cash, a corporate aircraft and other assets not deemed by management of Company B to be required for the operations of its core business. Company B may declare and pay an extra-ordinary dividend (cash and non-cash) to its shareholders resulting in Company B having less than $10 million in assets as reflected on its next regularly prepared balance sheet, which will be prepared by the time of the closing. There is nothing precluding the shareholders of Company B from leasing to Company A based on arm's length basis some of the non-cash assets distributed in the extra-ordinary dividend.

Company B's balance sheet for many years has normally been prepared on a fiscal year basis ending the last day of February each year. In 2003, Company B elected to be taxed as an S corporation under §1361 of the Internal Revenue Code and therefore consistent with applicable tax regulations adopted a December 31 tax year end. However, Company B will continue to prepare on a regular basis, a last day of February fiscal year end balance sheet. Continuing the preparation of such a consistent fiscal year balance sheet will enable management to compare financial results with prior years.

[redacted]

Appendix A. Examples of FTC Correspondence (Continued)

ANALYSIS:

For a proposed transaction valued in excess of $50 million and up to and including $200 million to be reportable under the HSR Act, the parties to the proposed transaction must meet the "size-of-person" test. In this regard, if an acquiring person has over $100 million in assets or sales and it intends to acquire the voting stock or assets of a person not engaged in manufacturing, the acquired person must have at least $10 million in assets as shown on its last regularly prepared balance sheet. Opinion number 195 of the Premerger Notification and Practice Manual (2003 edition) provides a question submitted to the Premerger Notification Office ("PNO") inquiring whether a problem arises where shortly before it is to be acquired the acquired person "declares an extraordinary (and accelerated) dividend that reduces its size below $10 million on its next regularly prepared balance sheet, which is prepared by the time of closing".

The PNO analysis in Opinion 195 states that it does not view this as a device for avoidance and that the HSR rules of practice instructs that the size of a person is to be determined by referring to its financial statements prepared in accordance with the accounting principles normally used; and, if the statements have been prepared on a regularly prepared basis in accordance with the person's normal accounting practices and show that the person does not satisfy the relevant size-of-person test the proposed transaction would not be reportable.

DISCUSSION:

In our conversation, I noted that the PNO's analysis in opinion 195 reverses the viewpoint presented previously in opinion number 215 published in the 1991 edition of the Premerger Notification and Practice Manual. In that opinion, based on a memorandum dated January 23, 1979, the PNO felt that an extra-ordinary dividend declared shortly before the transaction to reduce the person's size and thereby fail the size-of-person test would raise avoidance issues under section 801.90 of the rules. You stated that many of the older opinions in the 1991 edition have been reversed in the new edition of the Premerger Notification and Practice Manual (2003 edition) and that you had "no problem with opinion 195". Additionally, you noted that the size of a person is its size even though the extra-ordinary dividend was created to fail the size-of-person test and was created at the request of the acquiring person.

In regard to the issuance of a balance sheet on a calendar year basis for tax purposes, it is your view that this does not preclude Company B from issuing its regularly prepared balance sheet reflecting a fiscal year as it has done for numerous years in the past. We note that Company B's management needs such a financial statement for management and financial comparison purposes. Thus, the fiscal year statements continue to be regularly prepared financial statements because they will be prepared at the same time and in the same manner in the future as they have been prepared in the past.

Appendix A. Examples of FTC Correspondence (Continued)

CONCLUSION:

The issuance of the extra-ordinary dividend (cash and non-cash) does not raise avoidance issues under section 801.90 of the rules even though the issuance of the dividend occurs shortly before a proposed transaction results in the failure of the acquired person to meet the HSR "size-of-person" test. The continuation of the issuance of balance sheets on a fiscal year basis, to be used for management and financial comparison purposes, is considered to be the creation of regularly prepared balance sheets even though Company B has changed to a calendar year basis for tax purposes.

If the above analysis is incorrect, please telephone me at [redacted] to discuss the matter. Thank you for your time and consideration in this matter.

Sincerely,

[redacted]

AGREE.
B. Mich
1/27/04

Page 3

Appendix A. Examples of FTC Correspondence (Continued)

Sample correspondence No. 2 (July 12, 2007)

[redacted] 801.11

Verne, B. Michael

From: [redacted]
Sent: Thursday, July 12, 2007 3:43 PM
To: Verne, B. Michael
Cc: [redacted]
Subject: Size-of-Person Test

Hi Mike.

I hope you are doing well. It was nice to talk to you earlier today.

We have a question about the size-of-person test and the financials that are used to determine if a party satisfies the $12 million prong of the size-of-person test.

Company A proposes to acquire all of the voting securities of Company B, a U.S. issuer not engaged in manufacturing, for $70 million. Company B is its own UPE. Company A has in excess of $119.6 million in assets or annual net sales. Company B's most recent regularly prepared balance sheet (April 30, 2007) shows total assets of approximately $7 million. Company B's most recent regularly prepared annual income statement (FY 2006) shows total net sales of approximately $71 million.

Largely for historical reasons, and because of a contractual requirement contained in an existing Shareholder's Agreement among the shareholders of Company B, Company B performs a US GAAP reconciliation of its **annual** financial statements, which requires Company B to recognize an intangible asset. The reconciliation in Company B's most recent annual financial statement (12/31/06) shows total assets in excess of $12 million. However, Company B's most recent regularly prepared balance sheet (April 30, 2007) does not show assets in excess of $12 million because it was not performed with a US GAAP reconciliation. Company B does not do such reconciliations in connection with its monthly or quarterly financials.

We understand that when determining Company B's size under the size-of-person test, it is necessary to examine only its most recent regularly prepared annual income statement to determine its annual revenues and its most recent regularly prepared balance sheet (April 30, 2007) to determine its total assets, and we would disregard the 12/31 balance sheet that was prepared with a US GAAP reconciliation. Please advise if you agree.

Mike, thanks for your help.

Best regards,
[redacted]

[redacted]

Agree
B
7/12/07

This electronic message transmission contains information from this law firm which m

7/12/2007

Appendix B. Second Requests

Top Industries (by Second Requests)

This table presents industries ranked by the total number of Second Requests (from 2001-2019). Column (2) presents the total number of horizontal mergers reviewed by the FTC and DOJ (from 2001-2019); column (3) presents the percent of horizontal mergers that received a Second Request; column (4) presents the industry (as defined by the HSR Annual Report); column (5) presents the 3-digit NAICS code for the industry (obtained from the HSR Annual Report); and column (6) presents all 4-digit SICs that correspond to the 3-digit NAICS. Data on Second Requests, horizontal mergers, industry (3-digit NAICS) are obtained from the HSR Annual Reports.

(1)	(2)	(3)	(4)	(5)	(6)
Second Requests	Horizontal Mergers (HSR)	% of Horizontal Mergers with Second Requests	Industry	NAICS (3-digit)	SIC (4-digit)
102	693	14.72	Chemical Manufacturing	325	2812, 2813, 2816, 2819, 2821, 2822, 2823, 2824, 2833, 2834, 2835, 2836, 2841, 2842, 2843, 2844, 2851, 2861, 2865, 2869, 2873, 2874, 2875, 2879, 2891, 2892, 2893, 2895, 2899, 3087, 3861, 3952, 3999, 7389
50	540	9.26	Computer and Electronic Product Manufacturing	334	3429, 3495, 3571, 3572, 3575, 3577, 3578, 3579, 3599, 3651, 3652, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3676, 3677, 3678, 3679, 3695, 3812, 3822, 3823, 3824, 3825, 3826, 3829, 3842, 3844, 3845, 3873, 3915, 7372, 7819
42	655	6.41	Publishing Industries (except Internet)	511	2711, 2721, 2731, 2741, 2771, 7331, 7372
41	442	9.28	Food and Kindred Products	311	0723, 0751, 2011, 2013, 2015, 2021, 2022, 2023, 2024, 2026, 2032, 2033, 2034, 2035, 2037, 2038, 2041, 2043, 2044, 2045, 2046, 2047, 2048, 2051, 2052, 2053, 2061, 2062, 2063, 2064, 2066, 2067, 2068, 2074, 2075, 2076, 2077, 2079, 2082, 2083, 2087, 2091, 2092, 2095, 2096, 2098, 2099, 2899, 5147, 5441, 5461
41	947	4.33	Professional, Scientific, and Technical Services	541	0741, 0742, 0781, 1081, 1382, 1481, 3721, 3724, 3728, 3761, 3764, 3769, 4499, 4731, 5199, 6541, 7221, 7291, 7299, 7311, 7312, 7313, 7319, 7331, 7335, 7336, 7361, 7371, 7373, 7376, 7379, 7389, 7819, 8099, 8111, 8711, 8712, 8713, 8721, 8731, 8732, 8733, 8734, 8742, 8743, 8748, 8999
39	369	10.57	Merchant Wholesales, Nondurable Goods	424	5111, 5112, 5113, 5122, 5131, 5136, 5137, 5139, 5141, 5142, 5143, 5144, 5145, 5146, 5147, 5148, 5149, 5153, 5154, 5159, 5162, 5169, 5171, 5172, 5181, 5182, 5191, 5192, 5193, 5194, 5198, 5199
27	197	13.71	Telecommunications	517	4812, 4813, 4822, 4841, 4899, 7375
25	276	9.06	Transportation Equipment	336	2396, 2399, 2531, 3069, 3292, 3429, 3465, 3499, 3519, 3531, 3585, 3592, 3599, 3647, 3694, 3711, 3713, 3714, 3715, 3716, 3721, 3724, 3728, 3731, 3732, 3743, 3751, 3761, 3764, 3769, 3792, 3795, 3799, 3944, 3999
25	215	11.63	Health Services	621	4119, 4522, 8011, 8021, 8031, 8041, 8042, 8043, 8049, 8071, 8082, 8092, 8093, 8099
25	334	7.49	Hospitals	622	8062, 8063, 8069
24	260	9.23	Machinery Manufacturing	333	2499, 2599, 3429, 3433, 3443, 3444, 3496, 3511, 3519, 3523, 3524, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3541, 3542, 3544, 3545, 3546, 3547, 3548, 3549, 3552, 3553, 3554, 3555, 3556, 3559, 3561, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3577, 3578, 3579, 3581, 3582, 3585, 3586, 3589, 3593, 3596, 3599, 3634, 3639, 3699, 3743, 3799, 3821, 3827, 3841, 3861, 3999
42	404	10.40	Communications	513	4812, 4813, 4822, 4832, 4833, 4841, 4899
20	557	3.59	Utilities	221	4911, 4923, 4924, 4925, 4931, 4932, 4939, 4941, 4952, 4961, 4971

Appendix C. Purchase Price Allocation Collection

We obtain data on the purchase price allocation (PPA) by collecting and reading the post-acquisition public disclosures (e.g., 10-K, 10-Q, or Annual Report) of the acquirers. Such disclosure is required by Accounting Standards Codification (ASC) 805-10-50.

For foreign acquirers, we first search for public disclosures on the SEC.gov website. We also collect Annual Reports disclosed on company websites. If the disclosure in the Annual Report is not in US dollars, we convert the amounts using the conversion rate on the date of the acquisition.

PPA is usually presented in a table in the firm's disclosure, such as the example disclosure below. Acquirers sometimes disclose only the net of assets and liabilities acquired, which is permitted by the rules, but not useful for our study. In addition, acquirers can consolidate several transactions into one PPA disclosure, if each transaction on its own is not considered material.

Example of a Purchase Price Allocation (PPA) Disclosure

The following is an example of a PPA disclousre obtained from the acquirer's 10-K. Immediately below the PPA, the acquirer provides additional disclosure on the breakdown of the identifiable intangible assets acquired. We use these additional disclosures for our analysis of the categories of intangibles.

	October 13, 2015
Accounts receivable	$ 1,450
Inventories	682
Other current assets	166
Property and equipment	311
Intangible assets	46,200
Other assets	7
Total identifiable assets	$ 48,816
Accounts payable	$ 256
Accrued liabilities	1,589
Total liabilities assumed	$ 1,845
Net identifiable assets acquired	$ 46,971
Goodwill	69,871
Total consideration	$ 116,842

The valuation of the intangible assets acquired and related amortization periods are as follows:

	Valuation	Amortization Term (in years)
SUBTLE access technology	$ 2,179	5
IPR&D	44,021	
Total	$ 46,200	

Appendix D. Categories of Intangibles

The following table presents descriptions of the categories of intangibles.

Category	Group	Description
Customer Relationships & Lists	Customer-related	Customer contracts and related customer relationships; noncontractual customer relationships; customer lists; order or production backlog.
Databases	Technology-based	Databases of information, typically stored electronically.
In-Process R&D	Technology-based	Research and development that is in process, has substance, but is incomplete.
Patents, Technology, & Software	Technology-based	Patented technology; trade secrets; computer software.
Non-Compete Agreements	Marketing-related	Legal arrangement that prohibit a person or business from competing with a company in certain market for a specified period of time.
Trademarks & Brands	Marketing-related	Trademarks; trade names; newspaper mastheads; painternet domain names.
Assembled Workforce	Contract-based	Intangible asset may be recognized for an assembled workforce acquired in an asset acquisition.
Distribution Agreements	Contract-based	Contractual-based distribution agreements.
Franchise Rights	Contract-based	Contractual-based franchise rights.
Lease Intangibles	Contract-based	Contractual-based leases.
Licenses	Contract-based	Contractual-based licenses.
Maintenance Contracts	Contract-based	Contractual-based maintenance agreements.
Management Agreements	Contract-based	Management contract may be below market value, resulting in an intangible asset.
Mineral Interests	Contract-based	Contractual-based mineral rights.
Other Contract Rights	Contract-based	All other contractual-based rights agreements.
Pipeline Capacity Rights	Contract-based	Contractual-based rights to pipeline capacity.
Power Purchase Agreements	Contract-based	Contractual-based power purchase agreements.
Product Rights	Contract-based	Various rights (e.g., manufacturing, distribution, etc.) attached to a specific product.
Royalty Agreements	Contract-based	Contractuak-based royalty agreements.
Supplier Agreements	Contract-based	Contractual-based supplier agreements.
Usage Rights	Contract-based	Contractual-based usage rights.
Other Intangibles	Any	Any identifiable intangible asset that does not fit into a specific category.

Appendix E. Variable Descriptions

The following table presents descriptions of the variables.

Variable	Description
AcquiredProject	Indicator variable that takes the value of 1 if the drug project was acquired; and zero otherwise. Source: Refinitiv.
Cash/Assets	Continuous measure of cash scaled by total assets of the acquirer. Source: Compustat.
CashFlow/Assets	Continuous measure of cash flow scaled by total assets acquirer. Source: Compustat.
EBITDA/Assets	Continuous measure of EBITDA scaled by total assets acquirer. Source: Compustat.
In-Process R&D	Continuous measure of in-process R&D of the target. Source: Purchase price allocations.
Leverage	Continuous measure of current portion of long-term debt plus long-term debt of the acquirer. Source: Compustat.
MarketShare	Continuous measure of market share. Where market share is calculated as 100 divided by the number of firms with on-going drug projects in the same therapeutic class and mechanism of action. Source: Cortellis
ProjectDiscont'd	Indicator variable that takes the value of 1 if the drug project is terminated or there is no development activity after the acquisition date; and zero otherwise. Source: Cortellis.
Pr(ProjectOverlap)	Indicator variable that takes the value of 1 if at least one on-going drug project of the acquirer shares the same therapeutic class and mechanism of action as an on-going drug project of the acquirer. Source: Cortellis.
Proportion ProjectOverlap	Continuous measure of the number of overlapping drug projects scaled by the total number of on-going drug projects of the target. Source: Cortellis.
Q	Continuous measure of market to book of the acquirer. Source: Compustat and CRSP.
R&D	Continuous measure of R&D expense of the acquirer. Source: Compustat.
Sales	Continuous measure of sales (in $ million) of the acquirer. Source: Compustat.
Size	Continuous measure of the natural logarithm of total assets of the acquirer. Source: Compustat.
Unreported	Indicator variable that takes the value of 1 if target's tangible assets, as reported in the acquirer's PPA, are below the asset-size threshold; and zero otherwise. Source: Acquirer's public disclosures.

Online Appendix

Competition Enforcement and Accounting for Intangibles

This appendix contains additional analyses and details referenced in our paper, and is organized as follows:

- Process to Determine Total Value Held by Acquirer on Announcement Date in OA.A.
- Process to Determine whether M&A is Exempt from Premerger Antitrust Review in OA.B.
- Sample Construction in OA.C.
- Early Terminations in OA.D.
- Unreported Pharmaceutical M&As in OA.E.
- Second Requests (within Lower and Upper Size of Transaction Thresholds) in OA.F.
- Private Litigation and Unreported M&As in OA. G.
- Intangibles in Public and Private Litigation in OA. H.
- Changes to Accounting Standards in OA.I

OA.A. Process to Determine Total Value Held by Acquirer

We follow the FTC guidelines when determining the total value of the target held by the acquirer after the M&A is completed. Specifically, we use SDC data on the percent of the target held by the acquirer on the date the deal is announced, and data on the deal value, to calculate the value (in $) of the target held by the acquirer on announcement date. For example, if the acquirer holds 20% of the target on the date the deal is announced, and is acquiring the remaining 80% for $80 million, then the 20% has a value of $20 million (i.e., the total value of the target as implied by the acquisition is $80 million $\div$ 80% = $100 million).

Since HSR per-merger review rules stipulate that the total value of the target held by the acquirer after the completion of the merger must be used to determine whether a HSR filing is required, we apply the above calculation to our initial sample of M&As.

OA.B. Process to Determine whether M&A Bypassed Premerger Antitrust Review

We use several datapoints to determine whether a deal is exempt from filing a premerger notice to the FTC and DOJ. To begin, we use data on the target's total assets collected from public disclosures by the acquirer. However, since the disclosed amounts are the 'fair value' estimates, it is possible that these estimates may be higher or lower than the 'book' value reported in the financial statements prior to the date of the acquisition, which is value the FTC and DOJ uses in the Size of Person test. Importantly, differences between 'fair value' and 'book value' can lead to incorrect identification if, e.g., the total fair value of total assets is slightly above the SoP threshold when the total book value of assets (if known) is below. In addition, sometimes the 'fair value' estimates are net of liabilities (i.e., fair value of tangible assets minus fair value of liabilities), thereby understating the amount of total assets. Since the rule requires the use of 'total assets' when determining whether a premerger notification filing is required, this difference can also lead to incorrect identification if, e.g., total assets are above the threshold but net assets are below.

To address this issue, we take three additional steps to help us identify mergers that are exempt from premerger review:

Days to completion: Hart-Scott-Rodino (HSR) Act requires that parties to certain M&As submit premerger notification filings and wait before consummating the transaction. The waiting period begins when both the Federal Trade Commission and the Department of Justice receive complete filings from both the buyer and seller. For most filings, the waiting period is 30 days (or 15 days for tender offers) and expires at 11:59 ET on the last day. If the waiting period expires without either agency issuing a request for additional information, the parties have met their HSR filing obligation and can complete the deal. However, since premerger filings are not publicly disclosed, and cannot be obtained through Freedom of Information Act requests, we must use the announcement date and effective date of the deal to infer whether a filing was required (e.g., Wollmann, 2023). Specifically, if the number of days between these two dates is less than 30 (or less than 15 for tender offers), it is likely that a filing was not required. There is, however, one additional factor that will reduce the number of days, even if there is an HSR filing: an Early Termination (ET) request. This request can be made by either party and, if granted by the FTC or DOJ, will mechanically reduce the premerger review time. Notably, all ETs that are granted are also publicly disclosed on the FTC website (https://www.ftc.gov/legal-library/browse/early-termination-notices), which allows us to verify that deals with fewer than 30 (or 15) days between announcement and completion dates have not been granted an ET and thus did not file a premerger notification.

Acquirer's public disclosures: We also search the public disclosures of acquirers for mention of "FTC," "DOJ," "HSR," and other related terms. If any of these terms are found in the disclosure, we examine the document for information pertaining to this specific transaction; e.g., indication of whether the deal required premerger review.

Shareholder voting: We also use data on shareholder voting to check whether the target (if it is a public firm) or the acquirer required transaction to be approved by their respective shareholders, which can mechanically increase the number of days between the announcement and completion dates.

OA.C. Sample Construction

This table presents the sample selection construction for our full sample of M&A observations.

Description	Observations	
Full sample:		3,526
Horizontal M&As (by 3-digit NAICS)	1,863	
Non-horizontal M&As	1,663	
	3,526	
Less: M&As with incomplete or missing data on 'assets' of the target		(1,608)
Sample of M&As with data for analysis:		1,918
Horizontal M&As (by 3-digit NAICS)	1,065	
Non-horizontal M&As	853	
	1,918	

OA.D. Early Terminations

This table shows the percent of deals that have early terminations granted by the FTC. We present this data by horizontal vs. non-horizontal deals, and by reported vs. unreported deals. Data on early terminations are obtained from the FTC's online Legal Library. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

	Reported	Unreported	Difference
Type of M&A			
Horizontal (3-digit NAICS)	312/766 (40.7%)	80/299 (26.8%)	13.9%***
Non-Horizontal	250/621 (40.3%)	64/232 (27.6%)	12.7%***

OA.E. Unreported Pharmaceutical M&As

This table presents results from ordinary least squares (OLS) regressions of intangibles on unreported pharmaceutical M&As. The main variable of interest, *Unreported*, assumes the value of 1 if the target firm's assets are below the size-of-person asset threshold; and 0 otherwise. In columns (1) and (2), the dependent variable is one plus the natural log of intangible assets. In column (3) and (4), the dependent variable is proportion of intangibles; measured as the level of intangibles scaled by the sum of assets plus intangibles plus goodwill. In all columns, we include only horizontal deals in the pharmaceutical industry; defined as deals with targets and acquirers having the same 3-digit NAICS code (i.e., NAICS code '325'). We include filing-year fixed effects in columns (2) and (4). Robust t-statistics are reported in parentheses and calculated using standard errors clustered at the reporting-year level. *, **, *** represent significance at the 10%, 5%, and 1% level, respectively.

Dependent Variable:	(1) *Log (Intangibles)*	(2) *Log (Intangibles)*	(3) *Proportion of Intangibles*	(4) *Proportion of Intangibles*
Unreported	0.522*	0.488*	0.412***	0.399***
	(2.05)	(1.80)	(8.08)	(7.49)
Observations	169	169	169	169
Adjusted R^2	0.029	0.023	0.369	0.385
Filing-year F/E	N	Y	N	Y

OA.F. Second Requests (within Lower and Upper Thresholds)

This table presents, by FTC Fiscal Year, the number of Second Requests for M&As with deal values that fall between the lower and upper size of transaction thresholds. (See Figure 1 for size of transaction thresholds.) Deals within this range are subject to the Size of Person test. We also present the total number of Second Requests across all deal value sizes and the percent of all Second Requests that fall between the lower and upper size of transaction thresholds. FTC Fiscal Year is October through September (per the HSR Annual Reports).

	(1)	(2)	(3)
FTC Fiscal Year	Second Requests (within Lower and Upper Thresholds)	Total Second Requests	Percent of Total Second Requests (1) ÷ (2)
2001	20	70	29%
2002	17	49	35%
2003	15	35	43%
2004	12	35	34%
2005	13	50	25%
2006	16	45	35%
2007	21	63	33%
2008	12	41	28%
2009	7	31	22%
2010	16	46	35%
2011	11	58	19%
2012	14	49	29%
2013	14	47	29%
2014	9	51	18%
2015	8	47	17%
2016	11	54	21%
2017	11	51	22%
2018	7	45	15%
2019	7	61	12%
Total	241	928	26%

OA.G. Private Litigation and Unreported M&As

This table presents descriptive evidence of private antitrust lawsuits for our sample of M&As. In Panel A, we show the number of cases, by reported and unreported. In Panel B, we show the number of cases, by industry. In Panel C, we show case outcomes. As described in the paper, we use two sources (i.e., 10-K filings of the acquirer and electronic court filings from LexMachina) for firm-level data on private antitrust litigation.

Panel A. Cases by Reported & Unreported Deals

Type	Cases	Total M&As	Percent
Reported	15	1,529	0.98%
Unreported	8	389	2.06%
Reported + Unreported	23	1,918	1.20%

Panel B. Cases by Industry

Industry	Reported	Unreported	Total
Computer and Electronic Product Manufacturing	4	5	9
Chemical Manufacturing	3	2	5
Professional, Scientific, and Technical Services	2	1	3
Machinery Manufacturing	3	0	3
Food and Kindred Products	1	0	1
Merchant Wholesales, Nondurable Goods	1	0	1
Communications	1	0	1
Total	15	8	23

Panel C. Case Outcomes

Outcome	Observations	Average Length (in days)	Average Amounts ($ millions)
No electronic filings	3	n.a.	
Ongoing litigation	5	n.a.	
Terminated by plaintiff	1	21	
Forced divestiture	1	2,056	
Settlement or awarded damages	4	1,973	$187.4
Complaint dismissed by court	9	916	
Total	23		

OA.H. Intangibles in Public and Private Litigation

To investigate the importance of intangibles in litigation, we first obtain from the court records the initial "complaint" filing, which outlines the reason(s) for the lawsuit and details the proposed anticompetitive effects of the deal. We then read through each filing, with the aim of answering two questions. First, are the proposed anticompetitive effects of the deal related to the acquisition of identifiable intangible assets? Second, if yes, which categories of intangibles?

We determine whether the case involves identifiable intangible assets and identify which categories of intangible assets are involved based on whether they are mentioned in legal findings (Francis et al., 1994). We find intangible assets are prevalent in legal complaints for both public and private litigation. Specifically, of the 510 (17) public (private) cases we investigate, 417 (17) include the mention of intangible assets directly in the written complaint. Thus, more than 80% of public complaints and 100% of private complaints dispute the merger because of the alleged competitive harm caused by the acquisition of an intangible asset.

In the table below, we present descriptive evidence of the prevalence of intangibles, by category, for public and private litigation. Notably and consistent with our earlier analysis of intangibles, Panel A reveals that the four most frequently mentioned categories, in both public and private complaints, are Patents, Technology & Software, In-Process R&D, Customer Relationships & Lists, and Trademarks & Brands. Strikingly, nearly 50% of public antitrust litigation and 60% of private antitrust litigation involve a dispute over innovation projects that have yet to be developed into an actual product (i.e., in-process R&D).

In Figure 5, we display the proportion of private litigation cases that include the mention of intangible assets for reported and unreported deals. Consistent with intangible capital playing a more prominent role in unreported deals, we find a higher proportion of cases mentioning the largest categories of intangibles, including in-process R&D and internally-generated technology, in unreported relative to reported deals. Taken together, the evidence shows that intangible capital plays a key role in antitrust complaints, particularly in private complaints against deals that went unreported.

OA.H. Intangibles in Public and Private Litigation (Continued)

This table presents descriptive evidence of the prevalence, by category, of identifiable intangible assets in public and private litigation. *Public Frequency* represents the number of unique public litigation cases where the complaint includes intangible capital (from that category). *Public Percent* represents the percent of all public complaints that the intangible capital (from that category) mentioned. *Private Frequency* represents the number of unique private litigation cases where the complaint includes intangible capital (from that category). *Private Percent* represents that percent of all private complaints that the intangible capital (from that category) is mentioned.

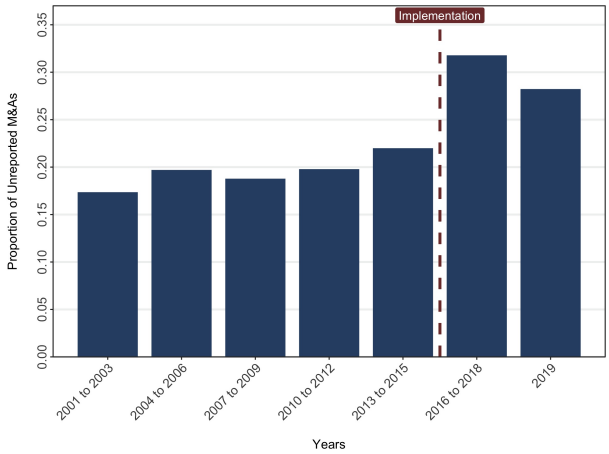
Category	Public Frequency	Public Percent	Private Frequency	Private Percent
Patents, Technology, & Software	223	53.5%	14	82.4%
In-Process R&D	197	47.2%	10	58.8%
Customer Relationships & Lists	161	38.6%	13	76.5%
Trademarks & Brands	138	33.1%	6	35.3%
Licenses	94	22.5%	3	17.6%
Product Rights	79	18.9%	3	17.6%
Distribution Agreements	77	18.5%	3	17.6%
Assembled Workforce	68	16.3%	6	35.3%
Supplier Agreements	17	4.1%	2	11.8%
Databases	13	3.1%	1	5.9%
Non-Compete Agreements	12	2.9%	4	23.5%
Lease Intangibles	1	0.2%	0	0%
Power Purchase Agreements	0	0%	0	0%
Other Intangibles	0	0%	0	0%
Mineral Interests	0	0%	0	0%
Usage Rights	0	0%	0	0%
Franchise Rights	0	0%	0	0%
Maintenance Contracts	0	0%	0	0%
Management Agreements	0	0%	0	0%
Pipeline Capacity Rights	0	0%	0	0%
Other Contract Rights	0	0%	1	5.9%
Royalty Agreements	0	0%	0	0%

OA.I Changes to Accounting Standards

If accounting standards play a critical role in the regulation of the takeover market, it is plausible that significant changes to standards that impact how assets are measured will affect M&A activity. We exploit a recent change to the accounting standard for operating leases. Specifically, beginning in January 2019 (2022), ASU 2016-02 requires all U.S. public (private) firms to recognize their operating leases as an asset (to represent the right of use) and, correspondingly, a liability (to represent the future payments) on their balance sheets. To put this change in perspective, some reports estimate that the new standard added $3.3 trillion in operating leases to the balance sheets for publicly-listed firms or an average of 12.5% of lagged sales (Ma and Thomas, 2023).[46] In our setting, increasing the target firm's assets via the capitalization of operating leases could conceivably shift deals from being unreported to being required to report.

To avoid the costs and risks associated with needing to report the deal, firms can take real actions. For instance, Appendix A shows private correspondence with the FTC from attorneys representing merging parties where the firms wanted to pay a special dividend to reduce the target's assets so it is below the SoP threshold. Alternatively, firms could conduct a merger earlier, as the standard was proposed in 2010 and finalized in 2016, but did not go into effect until 2019 for public companies (or 2022 for private companies). This idea parallels prior findings that observe that changes to regulation, at least partially, explain merger activity (e.g., Harford, 2005; Mitchell and Mulherin, 1996).

We first generate a histogram of the proportion of deals that are unreported.[47]



[46] See https://www.ifrs.org/content/dam/ifrs/project/leases/ifrs/educational-materials/leases-fact-sheet-jan-2016.pdf.

[47] We use 3-year increments because the accounting standard implementation period for public firms is three years (i.e., 2016 through 2018). We present 2019 alone because our data ends in early 2020 and because the implementation for private firms continued until January 2022.

The histogram shows that from 2001 through 2015, the proportion of unreported M&As remains relatively stable (e.g., 0.18 to 0.22). By contrast, from 2016 through to the end of 2018, we see about a 50% increase in the proportion of deals that are unreported. This sharp increase coincides with the years during which public and private firms were aware of the forthcoming change to the accounting standard, but before the years they were required to adopt the new lease standard (i.e., 2019 for public firms; and 2022 for private firms). Interestingly, we also find a slight decrease in the proportion of unreported deals in 2019—i.e., when public firms were required to adopt the standard but private firms were not yet required to adopt. Given most of our target companies are private, and therefore not subject to the standard until 2022, the elevated activity in 2019 also suggests firms may be engaging in deals before the lease standard went into effect. Collectively, the evidence in Figure 4 is consistent with the idea that changes to accounting standards that impact assets could have real effects on M&A activity in our setting.

To provide further evidence, we present the results of an OLS model that regresses unreported deals on a set of time indicators. Specifically, following Ma and Thomas (2023), we create an indicator for the 3-year period (i.e., 2016 through 2018) during which firms were implementing but not yet adopting the new lease standard. To remain consistent, we create separate indicators for each of the 3-year windows that precede 2016; e.g., an indicator for 2013 through 2015, for 2010 through 2012, and so on. We also create a single indicator for 2019, since this is the first year that public firms were required to adopt the new lease standard while private firms could continue to implement the standard. We set the exclusion period in our specification to the 3-year window immediately at the beginning of our sample (i.e., 2001 to 2003). The results are presented in the table below.

	(1)	(2)	(3)
Dependent Variable:	*Unreported*	*Unreported*	*Unreported*
2004 to 2006	0.024	0.021	0.022
	(0.69)	(0.61)	(0.63)
2007 to 2009	0.011	0.011	0.011
	(0.29)	(0.29)	(0.29)
2010 to 2012	0.025	0.025	0.025
	(0.56)	(0.60)	(0.60)
2013 to 2015	0.044	0.044	0.044
	(1.27)	(1.27)	(1.27)
2016 to 2018 (Public and Private Firm Implementation)	0.145***	0.021	0.048
	(4.21)	(0.60)	(1.38)
2019 (Only Private Firm Implementation)	0.109***	-0.017	0.005
	(3.25)	(-0.52)	(0.15)
Observations	1,774	1,774	1,728
Adjusted R^2	0.011	-0.002	-0.002

In column (1), we find that relative to the exclusion window, the proportion of unreported deals in 2016 through 2018 is roughly ten percentage points higher, or the equivalent of a 44.5% increase. Notably, we do not find a statistically significant difference in any of the 3-year windows before the exclusion window, suggesting that our findings are not an artifact of a pre-period trend.

Next, we consider whether the increase in the proportion of unreported deals, shown in column (1), is indeed driven by deals that, if operating leases were included when determining the size of the target's assets, would shift from unreported to reported. For this analysis, we require data on future operating lease commitments, which we have for a subsample of 236 deals involving public targets. We use these data to estimate the relationship between deal values (i.e., target-firm size) and operating leases and then apply the coefficient from this regression to deals with missing values of operating leases. Specifically, we use the disclosure of future lease commitments located in the 10-K filings of public targets to determine the value of operating leases. Of the 236 public targets in our sample, we find disclosed operating lease commitments for 220 of them. At a minimum, nearly all firms disclose future operating lease commitments for at least two years, and approximately 72% of the firms disclose them for five years or more. For simplicity, we follow Moody's and multiply the first year of the future minimum lease commitments by a factor of 3.5, which is the average Moody's industry multiple. (See Moody's Investor Service report: https://ratings.moodys.com/api/rmc-documents/69913). We use this value as our estimated present value of operating leases (PVOP). Next, we use an OLS model to regress PVOP on deal values, and include target-firm industry fixed effects and year fixed effects, respectively. The output of this model is reported in the table below.

Dependent Variable:	*Operating Leases*
DealValue	0.044**
	(2.62)
Observations	217
Adjusted R^2	0.122
Filing-year F/E	Y
Industry F/E	Y

The magnitude of the coefficient (0.044) indicates that, on average, future operating lease commitments increase by roughly $44,000 per $1 million of deal value. This estimate appears realistic, given that we find that the average future lease commitments for a sample of public targets in unreported deals is about $3.75 million. Finally, we use the coefficient from the regression output to impute the value of future lease commitments for deals with missing values. We use these imputed values for our analysis.

Specifically, we add the imputed lease amounts to only those deals occurring in 2016 through 2019 and then estimate the same equation we used in column (1) of the time-indicators analysis. We contend that if capitalizing operating leases increases the target's assets such that the deal shifts from unreported to reported, we should find no statistically significant difference in the 2016 to 2019 and 2019 windows relative to the exclusion window. Put differently, if operating leases are indeed economically important, we should find that capitalizing them shifts the additional unreported deals we found in column (1) to being reported deals. The results are reported in column (2). Consistent with our conjecture, in column (2), we do not find a statistically significant difference in any of the windows relative to the exclusion window. Moreover, when comparing the results in column (2) to those in column (1), we find a significant decrease in the magnitude of the coefficients for the 2016 to 2018 and 2019 windows, indicating that operating leases are economically important for unreported deals. In column (3), we exclude those deals that, due to the capitalization of operating leases, shift from unreported to reported. The intuition is that, absent the announcement of new lease standard, these deals might not have occurred. Our results continue to hold. Overall, the results suggest that changes to accounting standards can have real effects on M&A activity via the SoP test.[48]

[48]One might question why some firms may choose to accelerate a merger, rather than just waiting and using an avoidance technique, such as the approach of paying a special dividend shown in Appendix A. However, section § 801.90 of the HSR Act prohibits "[a]ny transaction(s) or other device(s) entered into or employed for the purpose of avoiding the obligation to comply with the requirements of the act." Based on this fact, firms might be unwilling to delay and risk an avoidance strategy that the antitrust regulators will challenge.