

## Stealth Consolidation: Evidence from an Amendment to the Hart-Scott-Rodino Act<sup>†</sup>

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*Prospective merger review is the most frequent application of anti-trust law. It exempts transactions on the basis of size, though small deals can have large anticompetitive effects in segmented industries. I examine its impact on antitrust enforcement and merger activity in the context of an abrupt increase in the US exemption threshold. I find that among newly-exempt deals, antitrust investigations fall to almost zero while mergers between competitors rise sharply. Effectively all of the rise reflects an endogenous response of firms to reduced premerger scrutiny, consistent with large deterrent effects of antitrust enforcement. (JEL G34, G38, K21, L41)*

Antitrust laws serve a vital role in society, safeguarding against the deadweight losses that would occur in their absence. Their most frequent application by far is prospective merger review, wherein firms provide government agencies advance notice of pending transactions, giving them time to assess the competitive effects of deals *prior* to their completion.<sup>1</sup> The process exempts mergers below certain size thresholds in an effort to screen out minor deals unlikely to have major effects on market structure, but when industries are highly segmented, this can result in *stealth consolidation*: anticompetitive deals whose individual size enables them to escape regulatory scrutiny but whose cumulative effect is large. Consider, for example, two industries that are otherwise identical except that the relevant market of the first is national, as in automotive manufacturing, whereas the second is local, as in funeral

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<sup>1</sup> Over the last decade, for example, the US Department of Justice investigated 758 mergers and reviewed 15,311 premerger filings. All other competition-related investigations over that period totaled only 509. Moreover, most of the over 150 countries and supranational unions with antitrust laws have premerger notification programs in place, and many of those without are in the process of creating them. Egypt is the most recent at the time of writing, though its mergers involving cross-border commerce with other Common Market for Eastern and Southern Africa (COMESA) member states already require notifications.

services. In the first, all mergers require notifications, inviting antitrust scrutiny. In the second, though, even mergers to monopoly can fail to trigger filings.<sup>2</sup>

Prospective merger review exemptions present distinct concerns. One relates to potential deterrent effects of antitrust enforcement. As the ability of the agencies to detect harmful deals falls, anticompetitive mergers may rise not only because more transactions “slip past” the authorities—holding firm behavior fixed—but also because more direct competitors *attempt to merge*. In fact, as this paper shows, the latter, endogenous response can easily exceed the former, mechanical effect. Another relates to their prevalence. Mergers transfer trillions of dollars in ownership rights each year, and the vast majority fall *below* premerger reporting thresholds, which have been increasing worldwide for decades. Thus, stealth consolidation may play a role in increasing aggregate concentration and, in turn, affecting markups (De Loecker and Eeckhout 2017) and private investment (Gutiérrez and Philippon 2017), aiding the rise of “superstar” firms (Autor et al. 2017), and even impacting the share of output going toward profits (Barkai 2016) and away from labor (Elsby, Hobijn, and Sahin 2013; Karabarbounis and Neiman 2013).

I study these issues in the context of US antitrust enforcement and merger activity. The country’s premerger notification program was established with the 1976 Hart-Scott-Rodino (HSR) Antitrust Improvements Act, regarded today as one of the most important pieces of antitrust legislation in the twentieth century (Scher 1977; Baer 1997). The Act provides exemptions based on revenues, assets, the proportion and value of control transferred, and the type of economic activity in which the parties are engaged. In practice, though, the Act can be summarized as exempting deals whose target firms have assets under \$10 million (and sales under \$10 million, in the event the target is engaged in manufacturing). The only major modification of the program came with a December 27, 2000 amendment to the Act, which can be summarized as additionally exempting transactions valued at less than \$50 million, i.e., the “amended threshold.” Its effect, however, was dramatic. Premerger notifications fell abruptly by 70 percent. In short, the competition authorities stopped receiving details about—or warning of—most previously reported US mergers.

My data consist of premerger notifications, merger-related investigations, and blocked transactions, compiled by the US Department of Justice (DOJ) and Federal Trade Commission (FTC), and of reported US mergers, collected by Thomson Reuters. These measures are observed from 1994 to 2011 and broken down by transaction value, so variation occurs due to the timing of the amendment and the size of the amended threshold.<sup>3</sup> In particular, this allows for comparisons between never-exempt mergers, which require premerger notifications throughout the panel, and newly-exempt mergers, which are no longer reportable after the law change, since their transaction values fall below the amended threshold. Notably, 32 percent of all HSR-related investigations prior to the amendment target deals valued at less than \$50 million, rejecting the notion that these newly-exempt deals are unlikely to be anticompetitive.

<sup>2</sup>Such extreme events have recent precedent, with examples ranging from web-based business services and equipment manufacturing to healthcare and death care. For the first and second, see *United States v. Bazaarvoice, Inc.*, 2013 U.S. Dist. LEXIS 29074 (N.D. Cal., Mar. 4, 2013) and *United States v. Election Sys. & Software*, 722 F. Supp. 2d 117 (D.C.C., Jun. 30, 2010), respectively. For the third and fourth, see Section IV.

<sup>3</sup>Blocked deals are the exception. They are not broken down by size, but this turns out to be immaterial to the paper.

Additional variation occurs because some mergers are horizontal, meaning the target and acquirer operate in the same narrowly-defined industry. These often involve a merger between direct competitors and thus are more likely to be anticompetitive.

I first assess the effect on the detection of anticompetitive mergers, which I proxy for using merger-related investigations. If premerger notifications are crucial to the detection of anticompetitive deals, then agency investigations directed toward newly-exempt deals will decline post-amendment. I show that these fall sharply from about 150 per year to near 0. (Note that this is no presumed fault of the US agencies—it merely confirms the importance of the Act.) A coincidental shift toward less aggressive policy is an unlikely culprit. For never-exempt deals, merger activity and enforcement actions track closely with one another throughout the sample.

I then estimate the effect on mergers. If infrequent investigations encourage anticompetitive deals, then newly-exempt horizontal mergers will rise post-amendment. I employ a difference-in-difference (DD) research design, which controls for shifts in merger activity over time by comparing the post-amendment changes in newly-exempt horizontal and non-horizontal mergers. I also employ a triple-difference (DDD) research design, which additionally controls for shifts in horizontal merger activity over time by comparing the aforementioned DD estimate to one obtained on never-exempt mergers. I find that the amendment leads to an increase in mergers between competitors. Newly-exempt horizontal and non-horizontal mergers track very closely with one another prior to the amendment but diverge sharply after. This is unlikely to be driven by factors increasing horizontal merger activity overall: never-exempt horizontal and non-horizontal mergers track very closely with one another *throughout the sample*. Furthermore, effectively all of the rise in newly-exempt horizontal mergers reflects an endogenous response of firms to reduced premerger scrutiny.

DD and DDD estimates are close in magnitude and precision. They indicate a 19 to 22 log point increase in newly-exempt horizontal mergers—between 253 to 324 more mergers each year on a pre-amendment base of only 634 such deals. In the 10 years following the amendment, the law change consolidates over \$50 billion of US output (in constant 2018 currency). Over the full sample, comprising 8 pre-amendment years in addition to the 10 post-amendment years, all horizontal exempt mergers—newly-exempt mergers as well as transactions that are always exempt from the Act on the basis of size—consolidate about \$407 billion.

While there is little or no academic research examining these issues, the idea is certainly known to practitioners. For example, one prestigious, multinational law firm explicitly advises its clients with respect to “smaller scale transactions” that the “use of terms like ‘dominant,’ ‘powerful,’ ‘rationalizing,’ and ‘strength’ tend to get the attention of the regulators when used in reference to a completed transaction” (Murphy 2016, p. 2). Another states, “Not only do competitors and frustrated suppliers have an incentive to *tell the agencies about non-reportable deals* in their markets, they can provide significant market information and direction on issues for greater focus” (emphasis added). Remarkably, the firm adds that “it is prudent to avoid rapid and sudden price increases in the first year after closing, particularly if they are not tied to cost increases” (Farrington et al. 2015, p. 30), suggesting that although these transactions may permit higher markup through reduced rivalry, one should be careful to not broadcast this fact.

Even so, these findings do not on their own advocate for one policy over another. To do so requires equating industry consolidation to a specific amount of economic harm and then comparing the resulting figure to the benefits derived from raising thresholds, which could be large. Even if the agencies ignore the reduced regulatory burden on firms, introducing exemptions can free up agency resources to pursue other cases (or reduce public spending). These and related issues require careful consideration but simply fall outside the scope of the present work.

This paper ties into a recent, growing literature on secular trends in market structure, markups, investment, and income (described briefly at the beginning of this section). If declining competition is driving these trends, then this paper provides one potential antecedent. Moreover, to the extent that “killer acquisitions” shut-down small rivals and eliminate future competition (Cunningham, Ma, and Ederer 2018), or to the extent that concentration facilitates entry barriers, stealth consolidation may also contribute to the decline in economic dynamism in the United States (Decker et al. 2014). Notably, these changes—particularly those evidenced by US data—coincide with or accelerate around the effective date of the amendment.<sup>4</sup> Other candidate explanations include increasing common ownership of rival firms by financial intermediaries (Azar, Schmalz, and Tecu 2018; Antón et al. 2016) and less restrictive antitrust policy overall following the 1982 *Merger Guidelines* (United States Department of Justice 1982) and influential work of Robert Bork (Peltzman 2014), though these are probably complementary rather than competing theories with respect to the present work.<sup>5</sup>

## I. Institutional Details

### A. Requiring Notification

In the absence of premerger notification requirements, US antitrust enforcement was relatively ineffective (Baer 1997). The responsibility for discovering mergers near their completion fell to the agencies and proved difficult. In the event an anti-competitive deal was not spotted and challenged quickly, the process of ex post unwinding was so slow and expensive that it came to be known as “unscrambling the egg.” When, for example, El Paso Natural Gas Co. acquired its only potential rival in a market, the government’s challenge lasted 17 years and involved 7 trips to the Supreme Court (Signs 2015). As a result, the agencies balked at pursuing completed deals and, in response, firms merged “speedily and surreptitiously” to avoid detection. Antitrust entered an era of what are euphemistically called “mid-night mergers” (Baer 1997).

To combat the problem, Congress provided bicameral, bipartisan support to the 1976 Hart-Scott-Rodino Antitrust Improvements Act, which established the US premerger notification program. Firms who wish to merge and are not explicitly

<sup>4</sup>Profit shares roughly triple through the early to mid-2000s. (See Figure 2(b) of Barkai 2016.) Weakness in private fixed investment starts in the early 2000s. (See Figures 2 and 4 of Gutiérrez and Philippon 2017.) Declining dynamism accelerated since about 2000.

<sup>5</sup>For example, prospective merger review exemptions may be expediting many “common” ownership transfers. They may also work in concert with the circa-1982 enforcement changes that eliminated *per se* illegality for horizontal mergers.

exempted by the Act must notify the agencies of their intentions. They then must wait a predetermined period—about a month—before closing the deal.

The Act provides exemptions. Transactions in the ordinary course of business, like an airline's purchase of a jet, or those that do not affect US commerce, like the combination of firms that only operate in Canada, do not require a filing.<sup>6</sup> There are also exemptions based on size. In particular, a filing is required when both a "size-of-persons" and "size-of-transaction" test are met. The first of these tests is met if (i) the acquired party is engaged in manufacturing, has sales or assets of \$10 million or more, and the acquiring party has sales or assets of \$100 million or more; (ii) the acquired party is not engaged in manufacturing, has assets of \$10 million or more, and the acquiring party has sales or assets of \$100 million or more; or (iii) the acquired party has total assets of \$10 million or more and the acquiring party has sales or assets of \$100 million or more. The second of these tests is met if (i) 15 percent or more of the voting securities or assets are acquired or (ii) an aggregate amount of voting securities or assets in excess of \$15 million are acquired.

Though the Act is written for a host of contingencies, for almost all deals the rules simplify considerably. First, the acquirer is almost always larger than the target, so the size-of-persons test hinges on the target's financial statements alone. Second, deals that transfer small ownership stakes can be ignored. In the first year of the data, for example, they account for only about 2.5 percent of notifications and less than 2.0 percent of enforcement actions. Moreover, these deals by definition usually do not involve changes of control, so they are unlikely to have operational impact. If one ignores them, i.e., transactions where less than 15 percent of voting rights change hands, the size-of-transactions test is always satisfied. In practice, then, the premerger notification requirement of the Act turns on whether the target has assets under \$10 million (and sales under \$10 million, in the event the target is engaged in manufacturing).

### *B. Amending the Act*

On December 20, 2000, President Clinton signed into law an amendment to the Act, effective February 2, 2001, whose main purpose was to modify the size and nature of the aforementioned thresholds. First, with respect to the size-of-transaction test, criterion (i) was eliminated while the threshold in criteria (ii) was moved from \$15 million to \$50 million. Second, in all cases where the size of the transaction exceeds \$200 million, the parties must report the deal, regardless of whether the size-of-persons tests was met. To summarize the Act, as amended, no deal is reportable whose transaction size is below \$50 million, all deals are reportable whose transaction sizes exceed \$200 million, and for deals whose transaction size fell between these amounts, the size-of-persons tests applies. Last, all dollar-based thresholds increase with gross national income after September 30, 2004.<sup>7</sup>

<sup>6</sup>There are other exemptions, e.g., hotels without casinos, which are described in the online Appendix.

<sup>7</sup>The amendment also stipulates a trivial filing fee increase of, at worst, 0.0016 of the deal size. See the online Appendix for more details.

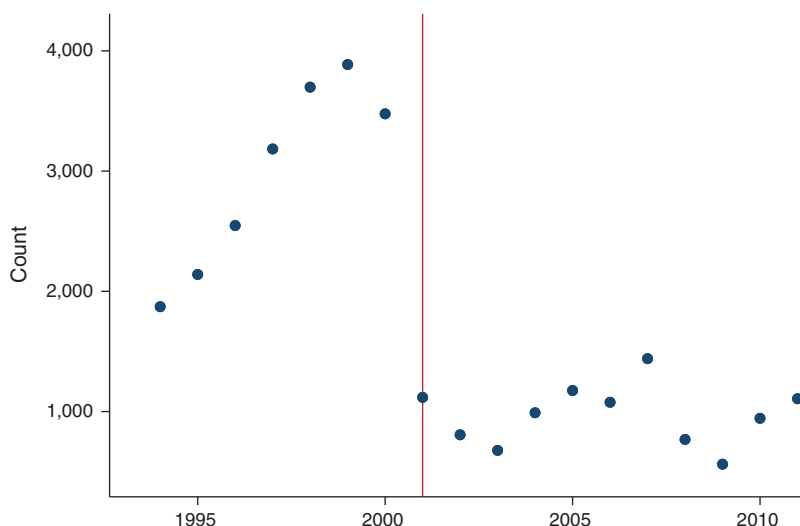


FIGURE 1. NOTIFICATIONS DROP SHARPLY WHEN THE AMENDMENT TAKES EFFECT

*Notes:* This graph plots the number of transactions for which premerger notifications were filed in the United States over time. Filings are required pursuant to the Hart-Scott-Rodino Antitrust Improvements Act and reviewed by the Department of Justice and Federal Trade Commission. A vertical line marks 2001, the year the Act was amended to exempt deals valued at less than \$50 million.

For almost all mergers, the amendment amounted to one crucial, almost immediate change: for parties meeting the size-of-persons test, the size-of-transactions test threshold rose from \$0 to \$50 million. The 15 percent transfer-of-control criterion can be ignored, following the logic above, as can the elimination of the size-of-persons test for transactions over \$200 million. For the latter test to bind, a deal must be valued at 20 times the underlying assets or more (and/or at 20 times sales or more, if the target was engaged in manufacturing), which is very unlikely.

This single change, though, exempts most previously-reportable US mergers. Figure 1 reports its effect. Premerger notifications rise alongside overall merger activity throughout the 1990s from just over 1,000 to nearly 4,000, but they fall nearly 70 percent as the amendment takes effect.

## II. Data

### A. Sources

The *Hart-Scott-Rodino Annual Report*<sup>8</sup> counts the transactions for which the agencies receive premerger notifications. These are broken down by deal size, so I observe the number of *never-exempt notifications* and *newly-exempt notifications* each year. The annual report also counts the investigations related to those

<sup>8</sup>All editions of the report are available at <https://www.ftc.gov/policy/reports/policy-reports/annual-competition-reports>.



notifications, which are again broken down by deal size.<sup>9</sup> This provides the number of *never-exempt investigations* each year.<sup>10</sup>

The annual report does not, though, cover investigations into newly-exempt mergers following the amendment. For these, I turn to the DOJ *10-Year Workload Statistics Report*,<sup>11</sup> which counts the investigations into mergers that fall outside the purview of the Act.<sup>12,13</sup> The sum of HSR-related investigations into below-the-amended-threshold mergers (from the annual report) and non-HSR-related investigations into all mergers (from the statistics report) provide a comprehensive measure of *newly-exempt investigations* each year. For transparency, I also separately report the first of these figures, referring to them as *newly-exempt HSR-only investigations*.

The Thomson Reuters Mergers and Acquisition Database provides transaction-level merger data. This includes the effective date and purchase price of the deal as well as the identity and industry of the firms involved. Target assets and revenues are also occasionally available.<sup>14</sup> I also classify them as horizontal or non-horizontal based on whether or not the target and acquirer operate in the same four-digit SIC code industry, which is common convention (Eckbo 1992, Shahrur 2005). These classifications provide the number of *newly-exempt horizontal*, *newly-exempt non-horizontal*, *never-exempt horizontal*, and *never-exempt non-horizontal mergers* each year.

Mergers that are attempted but blocked by an agency action do not appear in the Thomson Reuters data but are published in the annual report. This provides the number of *blocked mergers* per year. The figure is not broken down by deal size and contains transactions inside and outside the purview of the Act, but since the vast majority of challenged US mergers are restructured rather than abandoned, this distinction is immaterial to the paper, as this section later shows.

## B. Summary

Panels A and B of Figure 2 plot never-exempt and newly-exempt mergers and notifications over time.<sup>15</sup> Over 57,000 mergers comprise the sample, which spans 18 years. The mean number of mergers each year is 3,180. The DOJ and FTC receive 31,464 notifications over this period, or 1,748 per year. Also, as stated above, blocked mergers are very infrequent: there are on average 13 per year pre-amendment and 9

<sup>9</sup>Formally, these are called “clearances.” The agencies share responsibility for merger control but legally cannot both investigate the same deal. Thus, if the DOJ wishes to examine a deal, the FTC must “clear” it to do so (and vice versa).

<sup>10</sup>A more precise, less concise name would be “investigations into never-exempt mergers.” An analogous naming convention could be applied to their newly-exempt counterparts.

<sup>11</sup>Current and historic versions of the report are available at <https://www.justice.gov/atr/division-operations>.

<sup>12</sup>The FTC does not publish this statistic, but it can be approximated by the DOJ figure, since on all other dimensions these agencies’ actions are highly correlated. For example, correlation in formal merger enforcement actions between 1994 to 2011 is 77 percent, with each contributing equally—414 for the FTC and 411 for the DOJ.

<sup>13</sup>This figure is not broken down by deal size, so it can include investigations into consummated as well as always-exempt mergers, e.g., those that failed the size-of-persons test. However, there are sufficiently few non-HSR-related investigations as to make this distinction unimportant (as this section later shows).

<sup>14</sup>For very small deals, purchase price is also often unavailable, though these are always exempt from the Act and thus play no role in the main findings of the paper. In rare cases, missing values were available through CapitalIQ, an alternate data provider. The resulting panel appears to provide comprehensive, consistent coverage, as described later in this section.

<sup>15</sup>Sample statistics underlying the figures that follow are provided in tabular format in the online Appendix.

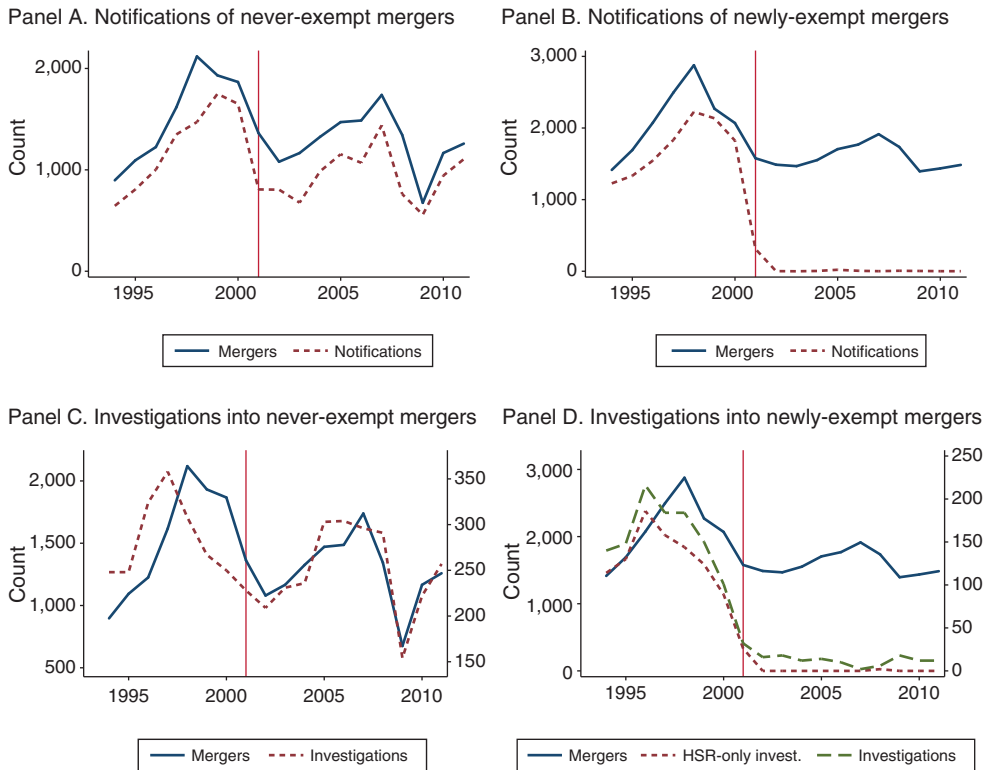


FIGURE 2. NEARLY ALL OF THE DECLINE IN NOTIFICATIONS AND INVESTIGATIONS OCCURS AMONG NEWLY-EXEMPT MERGERS

*Notes:* Panels A and B plot notifications and mergers over time. Panels C and D plot investigations and mergers over time, with the primary and secondary y-axes counting the former and latter, respectively. Panels A and C are based on never-exempt mergers, while panels B and D are based on newly-exempt mergers. In each, a vertical line marks 2001, the year the Act was amended to raise the size-of-transactions threshold. Note that the vertical distance between the dashed lines in panel D represents non-HSR-related investigations (of which there are few).

per-year post-amendment. (Due to their infrequency, these are plotted and summarized in the online Appendix but not shown here.)

Comparing the plots over time, it is clear that the Thomson Reuters data offers good coverage and accurate information. Prior to the amendment, when the total number of notifications and mergers should be near one another, the 2 measures differ by 19 percent. Over all years, but restricting the sample to never-exempt observations, for which notifications are always required, they differ by 23 percent. This is not surprising, since some merging parties each year claim exemptions that I do not observe. Paramount to this, the ratio of never-exempt to newly-exempt observations tallied by the DOJ and FTC prior to the amendment (0.716) almost exactly equals the ratio based on the asset, sales, and transaction values extracted from Thomson Reuters (0.722). Perhaps most compelling, notifications and mergers track closely with one another from year to year (modulus the effect of the amendment). Prior to the amendment, the correlation between these 2 is 93 percent. Over all years, but restricting the sample to never-exempt observations, the correlation is 91 percent.



These graphs validate the use of the quasi-experiment. They rule out that a drop in merger activity overall—perhaps related to the “dot com” bust and ensuing recession—drives the aforementioned 70 percent drop in notifications. In fact, mergers activity falls less than 25 percent year-over-year and recovers by the mid-2000s. Notifications never recover. They also confirm that, conditional on merger activity, newly-exempt notifications account for effectively all of the drop. These fall abruptly from over 2,000 in the year prior to the amendment to 0—or very close to it—in the years subsequent to the amendment.<sup>16</sup> Outside this drop, though, other pre/post-amendment comparisons are similar to one another. Ratios of post-2001 to pre-2000 never-exempt mergers, never-exempt notifications, and newly-exempt mergers are all between 0.85 and 0.93.

Note that 32 percent of HSR-related investigations from 1994 to 2000 examined mergers whose transaction size fell below \$50 million, rejecting the notion that exempt deals do not substantially reduce competition. This is lower than the proportion of total merger activity that these deals account for, which squares with the notion that smaller deals are on average less damaging, but is nonetheless striking. If investigations provide an unbiased measure of harm, then the amendment could blind the authorities to nearly one-third of all anticompetitive mergers—even before one allows for an equilibrium response by firms, which will increase this proportion. In fact, this understates the harm derived from exempt deals if “mega-mergers” receive widespread media attention and thus are more carefully scrutinized.<sup>17</sup>

### III. Empirical Framework

#### A. Investigations

The agencies are not restricted to examine only deals for which they’ve received a premerger notification. Any deal can be challenged, regardless of size or completion status. Since an increase in agency actions taken outside the purview of the Act can, at least in theory, compensate for a drop in those taken within it, the effect of the amendment and of the thresholds more generally is still unclear. Thus, one empirical question is whether and by how much investigations vary based on whether the competition authorities receive advanced warning of an impending deal.

To measure the effect of prospective merger review on investigations, I exploit variation provided by the amendment, which eliminates premerger notification requirements for a well-defined set of prospective mergers in the data. First, I compare investigations pre- and post-amendment for newly-exempt mergers. Second, I compare this change to one based on never-exempt mergers. Previewing the result somewhat, the differences reported in the following section are rather stark, so I omit a lengthier discussion of identification and inference here.

<sup>16</sup>In the year that the amendment took effect, they total 300. This is roughly consistent with sub-\$50 million transactions being required for just over a month in that year.

<sup>17</sup>The AT&T-Mobile, Nasdaq-NYSE, and Aetna-Humana proposed mergers are all recent examples.

## B. Mergers

In the event that the amendment compromises detection, firms may respond by attempting precisely the types of mergers that would otherwise be blocked on competitive grounds were they subject to more careful scrutiny. In other words, antitrust enforcement may have strong deterrent effects. Thus, the key empirical question is whether and by how much parties contemplating an anticompetitive merger are more likely to follow through when no premerger notification is required of them.

To answer this, I rely on variation provided by the amendment.<sup>18,19</sup> I also exploit the fact that horizontal mergers—transactions in which the target and acquirer operate in the same narrowly-defined industry—are more likely to reduce rivalry. This view is shared by the US competition authorities, who since as early as 1992 have formally titled the US merger evaluation procedures *Horizontal Merger Guidelines*.

I employ two identification strategies. A DD design compares the number of newly-exempt horizontal and non-horizontal mergers before and after the amendment. The DD estimating equation is given by

$$(1) \quad \ln Mergers_{it} = \beta I_i^H I_t^{Post} + \gamma I_i^H + \sum_{t=1994}^{2011} (\zeta_t I_t + \eta_t I_i^H I_t) + \epsilon_{it}.$$

The variable  $i$  indexes the merger type, which is either horizontal or non-horizontal;  $I_i^H$  takes a value of one for horizontal mergers and zero otherwise. The variable  $t$  indexes the year, so  $I_t$  denotes year dummy variables;  $I_t^{Post}$  takes a value of one if  $t > 2001$  and zero otherwise. The coefficient of interest is  $\beta$ .

Unbiased DD estimates require error in the model to be uncorrelated with the interaction between  $I_i^H$  and  $I_t^{Post}$ . The existence of factors aside from the amendment that yield relatively more horizontal mergers post-2001 violate this condition. A DDD design, however, helps rule out confounding factors. Intuitively, it compares the DD estimates obtained on newly-exempt mergers to those obtained on never-exempt mergers. To illustrate, suppose that horizontal mergers increase relative to non-horizontal mergers post-amendment equivalently among newly-exempt and never-exempt mergers. In this case, the amendment is an unlikely culprit, since it affects only newly-exempt mergers. If this increase is observed only among newly-exempt mergers, however, this would provide stronger evidence of stealth consolidation. The DDD estimating equation is given by

$$(2) \quad \ln Mergers_{ist} = \theta I_i^H I_s^{Ex} I_t^{Post} + \kappa I_i^H + \lambda I_s^{Ex} + \mu I_i^H I_s^{Ex} \\ + \sum_{t=1994}^{2011} (\phi_t I_t + \chi_t I_s^{Ex} I_t + \psi_t I_i^H I_t) + \nu_{ist}.$$

<sup>18</sup> Recall that the main problem for the agencies, given the cost and difficulty of ex post unwinding, and in particular of trying to “unscramble” assets, is the timing rather than the existence of a disclosure. Thus, there is no *per se* tension in assuming I observe on-average anticompetitive deals in the Thomson Reuters data but that the agencies are unaware of them for the purposes of quickly investigating and potentially blocking the transactions.

<sup>19</sup> The setting tends to preclude a “regression discontinuity” research design for reasons outlined in the online Appendix.

Here,  $s$  indexes the size of the transaction. The term  $I_s^{Ex}$  takes a value of one for newly-exempt mergers and zero for never-exempt mergers. The coefficient of interest is  $\theta$ .

## IV. Findings

### A. Are Investigations Affected?

To assess how and whether detection responds, panels C and D of Figure 2 plot mergers and investigations over time. Most apparent is the devastating effect of the amendment on inquiries into newly-exempt mergers. Among these, HSR-related investigations fall (mechanically) from roughly 150 per year in the late 1990s to near 0 in the second half of the panel—all without any appreciable increase in non-HSR-related investigations.

An overall shift toward infrequent investigations is unlikely to produce this result, since these changes are absent above the amended threshold. Different enforcement preferences across Executive Branch political parties is equally unlikely to drive the result, since no meaningful reversal follows the 2008 election.

### B. Do Firms Stealth Consolidate?

To assess how and whether merger activity responds, Figure 3 plots horizontal and non-horizontal mergers over time. The amendment does not affect reporting requirements above the amended threshold, so the composition of deals there should not change. Panel A confirms this hypothesis. Panel B shows a similar relationship—but only through 2001. At that point, horizontal and non-horizontal mergers diverge noticeably.

Blocked mergers are simply too infrequent to meaningfully contribute to this pattern in the data. Even if the entire 4 merger pre-to-post-amendment change in blocked mergers, reported in Section II, were attributed to newly-exempt horizontal mergers, the difference would still be negligible compared to the roughly 300 merger increase that this divergence represents. Thus, effectively all of the divergence reflects an endogenous response of firms. That is, when advanced warning to the DOJ and FTC is no longer required, as per panel B of Figure 2, resulting in a much lower likelihood of investigation, as per panel D of Figure 2, direct competitors are much more likely to merge.

To quantify these differences, I turn to Table 1. The first 2 columns report estimates from equations (1) and (2), respectively. Newly-exempt horizontal mergers increase about 20 log points relative to the control group. Estimates are significant at the 1 percent level, and model fit is very good.<sup>20</sup> DD and DDD estimates are close. To see why, and to more precisely rule out that panel B of Figure 3 reflects an exaggerated version of panel A, column 3 reports an estimate analogous to the one in column 1 but is based on never-exempt rather than newly-exempt mergers. As opposed to column 1, here we see a small and statistically insignificant coefficient.

<sup>20</sup> Additional specifications that assess robustness are provided in the online Appendix.

TABLE 1—PARAMETER ESTIMATES

Variables	Newly-exempt (1)	All mergers (2)	Never-exempt (3)	Newly-exempt (4)	All mergers (5)	Never-exempt (6)
$I_i^H \cdot I_t^{Post}$ (Newly-exempt)	0.186 (0.0457)			324 (87.4)		
$I_i^H \cdot I_s^{Exempted} \cdot I_t^{Post}$		0.218 (0.0504)			253 (54)	
$I_i^H \cdot I_t^{Post}$ (Never-exempt)			−0.0322 (0.0377)			71.1 (77.2)
Observations	36	72	36	36	72	36
$R^2$	0.988	0.997	0.993	0.96	0.995	0.947

*Notes:* The dependent variable counts the number of deals each year by transaction type. Log values of the variable are used in columns 1–3; level values are used in columns 4–6. Columns 1 and 4 report the difference-in-difference estimate specified by equation (1), while columns 2 and 5 report the triple-difference estimate specified by equation (2). Columns 3 and 6 report an estimate analogous to the ones in columns 1 and 4, respectively, except that the underlying sample comprises never-exempt rather than newly-exempt mergers. The mean of the outcome variable equals 6.70, 6.56, 6.42, 901, 795, and 689 for the 6 columns, respectively. Robust standard errors are reported in parenthesis.

The last three columns report results analogous to the first three, except that the left-hand side is measured in level rather than log values. DD and DDD estimates are again close. The latter, for example, indicates an additional 324 newly-exempt horizontal mergers each year on a pre-amendment base of only 634. Over the 10-year post-amendment period, the threshold increase induces 3,240 competition-reducing business combinations—*transactions that represent stealth consolidation*.

### C. Potential Impact

To assess how much output is associated with mergers induced by the amendment, I take two approaches.<sup>21</sup> The first involves multiplying the aforementioned 3,240 mergers by the average revenue of target firms associated with them, which I assume equal to the average revenue of all target firms associated with newly-exempt horizontal mergers (in which Thomson Reuters records target firm revenue). This approach implies \$53.0 billion of gross consolidation (in constant 2018 currency). The second involves re-estimating equations (1) and (2) in terms of transaction value. It then translates transaction values into target firm revenues using a “price-to-sales” ratio based on sample averages among newly-exempt horizontal mergers.<sup>22</sup> The second approach implies \$60.6 billion of gross consolidation—similar to the figure above.<sup>23</sup>

<sup>21</sup>A straightforward approach involves re-estimating equations (1) and (2) in terms of target firm revenues, though as Section II explains, this often goes unrecorded by Thomson Reuters.

<sup>22</sup>Specifically, the ratio equals the average transaction value among newly-exempt horizontal mergers (in which Thomson Reuters records target firm revenue and transaction value) divided by the average revenue of target firms involved in newly-exempt horizontal mergers (in which Thomson Reuters records target firm revenue and transaction value).

<sup>23</sup>The online Appendix provides step-by-step calculations underlying this and the other statements made in this subsection.

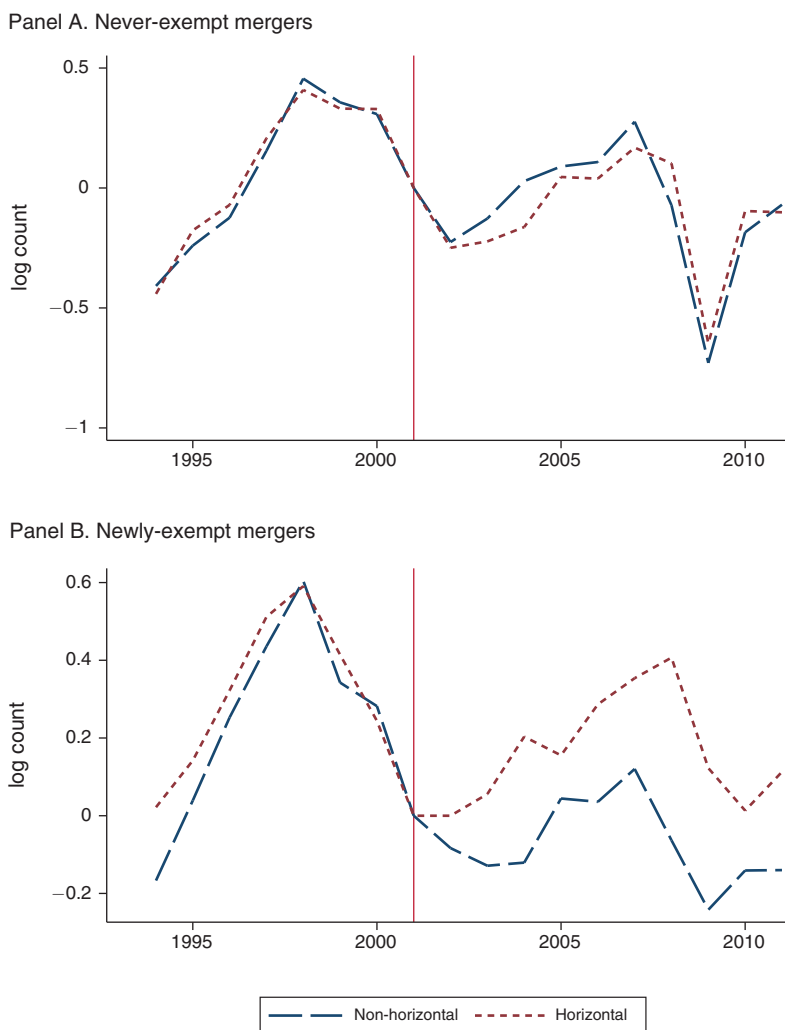


FIGURE 3. NEWLY-EXEMPT HORIZONTAL MERGERS INCREASE FOLLOWING THE AMENDMENT

*Notes:* These graphs plot the log of the number of horizontal and non-horizontal mergers over time. Panel A is based on never-exempt mergers, while panel B is based on newly-exempt mergers. In both, a vertical line marks 2001, the year the Act was amended to raise the size-of-transactions threshold. To facilitate comparisons, all plotted values are reduced by the value they take in that year (so that the lines that connect them intersect  $y = 0$  in 2001).

To assess approximately how much output is affected by *all* horizontal exempt mergers over the full panel, I need to account for always-exempt mergers as well as the baseline level of newly-exempt mergers. I compute the average revenue of target firms associated with both groups of transactions (in which Thomson Reuters records target firm revenue), multiply these averages by the number of always-exempt and newly-exempt mergers, respectively, and sum the resulting products. This approach implies that horizontal exempt mergers consolidate \$407.0 billion in output over the full sample. The caveats required to accurately equate these numbers to economy-wide changes in market structure are too numerous to list. Nonetheless, if the acquiring companies involved in these deals are the industries' largest firms, and

if entry barriers in their respective industries are high enough to preclude subsequent entry, then these mergers could account for 30 percent of the total change in four-firm revenue concentration over the panel.<sup>24</sup>

#### *D. Incidence across Industries*

For a sense of effected markets, I turn to Table 2, which lists industries in which horizontal exempt mergers are most common. Panel A sorts by proportion. Services dominate the list. Most are difficult to transport, consistent with the idea that segmentation—in particular, the type imposed by geography—leads to smaller firms and facilitates stealth consolidation. This does not imply, though, that only local- or service-oriented businesses are affected. This is apparent from panel B, which sorts the industries by number rather than proportion. Many geographically concentrated and/or manufacturing oriented industries top the list, including thousands of deals among medical device, pharmaceutical, and semiconductor producers.

Healthcare deals are over-represented, which are of particular concern since the sector accounts for a large, increasing share of public spending, was already highly concentrated at the time of the amendment, and is home to research showing market power impacts not just price but quality of care.<sup>25</sup> There is recent evidence of this among hospitals (Gowrisankaran, Nevo, and Town 2015; Dafny, Ho, and Lee 2016) as well as dialysis centers (Eliason 2017; Eliason et al. 2018), both of which appear in panel A, and growing interest in post-acute care services, (Eliason et al. 2016; Einav, Finkelstein, and Mahoney 2017), several of which appear in panel B. Similarly represented are the “domestic outsourcing” industries, which have grown with the fissuring of the US workforce (Katz and Krueger 2016).

Perhaps most striking, though, is that (aside from legal services) the top two industries are home to highly-publicized antitrust investigations. In packaged ice, for example, 80 percent of deals are horizontal and exempt, and almost all involve Reddy Ice or Arctic Glacier. According to court documents, these deals contributed to a far-reaching price fixing conspiracy in which the two firms, along with a third co-conspirator, acquired smaller, independent rivals and subsequently allocated customers among themselves. Executives of both companies pleaded guilty to violations of the Sherman Act.

In the death care industry, as another example, state-level regulators have been critical of horizontal exempt mergers since the late 1990s. A Florida Senate report states, for example, “The consolidation of the funeral and cemetery industry in Florida has been characterized as ‘creeping expansion’ whereby a larger corporation buys one small or independent business at a time until the corporation’s acquisitions represent a substantial presence in a particular region.” It goes on to state, “Due to

<sup>24</sup> Briefly, I arrive at 30 percent by dividing \$407.0 billion by \$1.4 trillion. The denominator is the approximate change in US revenue accrued by the four largest firms in each six-digit NAICS industry from 1994 to 2011, and it equals the sum of the changes in six sectors—manufacturing, retail, wholesale, services, utilities/transportation, and finance. To compute each change, I multiply the sector’s percentage change in four-firm revenue concentration, reported in Figure 4 of Autor et al. (2017), by the sector’s revenue, reported in the 2002 Economic Census, which was administered near the midpoint of the panel. I remove from the Census data firms operating in industries excluded from the paper’s analysis or holding a tax exempt status. For a sense of scale, revenue for the 6 sectors totals \$21.3 trillion.

<sup>25</sup> See, e.g., Gaynor, Ho, and Town (2015).



TABLE 2—HORIZONTAL EXEMPT MERGERS BY INDUSTRY

Industry	Prop.	Industry	Count
<i>Panel A. Sorted by proportion of total</i>		<i>Panel B. Sorted by count</i>	
Legal services	82%	Prepackaged software	4,016
Ice manufacturing	78%	Insurance agents, brokers, and service	845
Cemeteries and crematories	74%	Crude petroleum and natural gas	663
Uranium, radium, vanadium ore mining	72%	Business services (NEC)	538
Credit unions	70%	Pharmaceutical preparations	467
New car dealers	68%	Refuse systems	458
Exterminating and pest control services	67%	Semiconductors and related devices	451
Elementary and secondary schools	67%	Hospitals: general, surgical, and NEC	442
Architectural services	65%	Radio broadcasting stations	420
Golf courses and country clubs	65%	Telephone communications (not radiotelephone)	404
Limousine service	63%	Management consulting services	400
Public relations agencies	63%	Retail-eating places	400
Fuel dealers	62%	Real estate agents and managers (for others)	365
Water supply	62%	Other management consulting services	345
Plumbing, heating, and AC contractors	61%	Investment advice	345
Dental laboratories	61%	Other accounting services	340
Cosmetology and barber schools	61%	Life insurance	330
Fitness and recreational sports centers	58%	Gold ore mining	329
Insurance agents, brokers, and service	56%	Legal services	327
Other accounting services	56%	Computer facilities management services	315
Motion picture theaters (ex. drive-ins)	55%	Periodicals: publishing or publishing and printing	291
Kidney dialysis centers	53%	Advertising agencies	284
Gold ore mining	53%	Engineering services	273
Travel agencies	51%	Surgical and medical instruments and apparatus	261
Passenger car rental	50%	Radiotelephone communications	260
Hospitals: general, surgical, and NEC	50%	Cable and other pay television services	256
Retail-grocery stores	50%	All other misc. ambulatory health care services	256
Retail-eating places	48%	New car dealers	252
Employment agencies	48%	Employment agencies	249
Collection agencies	48%	Home health care services	247

*Notes:* This table reports 30 industries with the most horizontal exempt mergers in the post-amendment period. Panel A sorts the industries by the proportion of all mergers that are horizontal and exempt, and it reports those proportions in its second column. Panel B sorts instead by the number of horizontal exempt mergers, and it reports those figures in its second column. “NEC” stands for “not elsewhere classified.” Note that in a prior draft (Wollmann 2017), a small number of pest control and fuel dealer mergers were omitted when constructing panel A (though not omitted elsewhere in the paper).

the small amount of assets involved in these individual buy-outs, the transactions do not trigger automatically any federal or state antitrust laws.” The effects of these deals are measurable. Court documents from one related lawsuit state, “Records of the [FTC] ‘clearly show that [Loewen] has consistently raised prices in almost every instance’ in which it established market dominance.”<sup>26</sup>

## V. Conclusion

Many direct competitors would merge but for the costly enforcement actions they would face, so legislators should expect an endogenous response to relaxing anti-trust law. In particular, as the probability of detection falls, the likelihood that rivals pursue mergers rises. An important case is legislation that increases prospective merger review thresholds, which blinds government agencies to impending deals.

<sup>26</sup> See *Jeremiah O’Keefe, Sr. et al. v. The Loewen Group Inc., et al.*, No. 91-67-423 (Circ. Ct., Hinds Co., Miss. 1995).

Since many industries are highly segmented, this prompts small but frequent mergers that concentrate output. In other words, stealth consolidation ensues.

Transactions exempt from prospective merger review consolidated hundreds of billions of dollars in output since the mid-1990s in the United States alone. This figure, in part, reflects thousands of deals induced by an amendment to the country's antitrust laws. Similar numbers could obtain abroad, since thresholds have been rising worldwide. More work is needed, of course, to know how and how much stealth consolidation affects market power, consumer welfare, wages, and related real outcomes. This is left to future research.

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