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INNOVATION, EXIT, AND RESTRICTIONS ON TECH MERGERS AND ACQUISITIONS

Abstract: Antitrust reform advocates view the acquisition of small innovative companies by large technology “platform” companies as a primary competitive problem in digital markets. To remedy this perceived problem, these advocates recommend restrictions on mergers and acquisitions including market-share presumptions. In this BULLETIN, we find that statutory restrictions on acquisitions by the large platforms adversely affect investments in innovations and alter the innovator-investor exit strategy, incentivizing innovators to transfer their innovations to dominant firms in even earlier stages to avoid antitrust scrutiny. These statutory prohibitions may encourage innovators to choose this early exit strategy despite it being inefficient, and will additionally drive more in-house innovation at the big firms and less external innovation. Similarly, these prohibitions on later-stage acquisitions are shown to reduce the returns to innovation, reducing technological advancement in the industry.

I. Background

Investors in the early development of technological innovations are keenly attuned to their exit strategy, at which point most or all the return on investment is obtained.¹ Many

¹ See, e.g., S. Chan, *Best Advice from a Venture Capitalist on Your Exit Strategy*, INDVSTRVS (October 29, 2020) (available at: <https://indvstrvs.com/best-advice-from-a-venture-capitalist-on-your-exit-strategy>) (“The main way investors get paid back is through an exit event”); A. Schwienbacher, *Venture Capital Exits*, in VENTURE CAPITAL: INVESTMENT STRATEGIES, STRUCTURES, AND POLICIES (D Cumming ed.) (2010) (“Venture capitalists invest important funds in start-up companies for which typically they obtain an equity position in the company. These shares are usually highly illiquid in the initial phase so VCs tend to hold them for a few years before selling them. Moreover, (Footnote Continued....)”).

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innovations are developed with the specific intent to sell out (a “liquidity event”) to well-established firms that can exploit value-creating network effects.² Yet recent proposals to increase antitrust scrutiny and regulation of the tech sector seek to raise barriers to the acquisition of burgeoning tech firms by established platforms, reducing merger and acquisition activity in the technology sector and foreclosing exit options for many innovators.

For example, the recent Majority Staff Report of the Subcommittee on Antitrust, Commercial and Administrative Law of the Committee on the Judiciary, entitled *Investigation of Competition in Digital Markets* (hereinafter “*Staff Report*”) views the acquisition of small innovative companies by larger platforms as a primary competitive problem in digital markets.³ To limit such acquisitions, the *Staff Report* argues for “the creation of a statutory presumption that a market share of 30% or more constitutes a rebuttable presumption of dominance by a seller, and a market share of 25% or more constitutes a rebuttable presumption of dominance by a buyer.”⁴ Similarly, a report from the Stigler Center of the University of Chicago suggests that all mergers

since most ventures do not generate positive cash flows during their first years that would allow the payment of dividends to shareholders, the main way for VCs to earn money from their investments is to sell the shares they hold in their portfolio companies.”); D. Cumming and S.A. binti Johan, *Preplanned Exit Strategies in Venture Capital*, 52 EUROPEAN ECONOMIC REVIEW 1209-1241 (2008).

² For example, noted tech entrepreneur Mark Cuban famously sold his company Broadcast.com in 1999 to Yahoo! for \$5.7 Billion (K. Swisher and E. Ramstad, *Yahoo! to Announce Acquisition of Broadcast.com for \$5.7 Billion*, WALL STREET JOURNAL (April 1, 1999) (available at: <https://www.wsj.com/articles/SB922916873273123235>)) and Google bought YouTube for \$1.65 Billion in 2006 (Andrew Ross Sorkin and Jeremy W. Peters, *Google to Acquire YouTube for \$1.65 Billion*, New York Times (October 9, 2006) (available at: <https://www.nytimes.com/2006/10/09/business/09cnd-deal.html>)).

³ Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf. Calls for statutory prohibitions on small firm acquisitions are not limited to the *Staff Report*. For example, both Senator Elizabeth Warren and Representative Alexandria Ocasio-Cortez have also called for such prohibition. *See Watch: Elizabeth Warren & Alexandria Ocasio-Cortez Call for A Merger Moratorium to Protect Small Businesses*, Warren Democrats (April 28, 2020) (available at: <https://elizabethwarren.com/news/warren-aoc-merger-moratorium>).

⁴ *Id.* at 395. It is important to recognize that because the antitrust laws are laws of general applicability, the proposed acquisition restrictions discussed herein would reach far beyond the four firms (namely Apple, Google, Facebook and Amazon) highlighted in the *Staff Report*. L.J. Spiwak, *The House Staff Antitrust Report Will Negatively Affect More Than the Tech Industry*, FEDERALIST SOCIETY BLOG (November 6, 2020) (available at: <https://fedsoc.org/commentary/fedsoc-blog/the-house-staff-antitrust-report-will-negatively-affect-more-than-the-tech-industry>). For example, Comcast Corporation has a subdivision called “Comcast Ventures,” whose stated purpose is to Comcast Ventures is to be “a returns-focused fund, investing in companies across consumer, enterprise, and frontier technology sectors and partnering with founders through every stage of growth.” (see <https://comcastventures.com>). Depending on how one defines the market (a glaring shortcoming of the *Staff Report*), it is entirely possible that Comcast Ventures would be considered a “dominant firm” and thus fall under the proposed statutory acquisition restrictions. Other large Internet Service Providers such as AT&T (AT&T Ventures) and Verizon (Verizon Ventures) have similar operations and would likewise be exposed.

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“between dominant firms and substantial competitors or uniquely likely future competitors should be presumed to be unlawful, subject to rebuttal by defendants.”⁵ These proposed presumptions imply that combinations involving firms with larger market shares always reduce competition from emerging platforms and disincentivize innovation and are therefore inherently anticompetitive.

In this BULLETIN, we examine the economic effects of potential limitations/prohibitions of small firm acquisitions by “dominant” firms in digital markets. Using a three-stage game with three actors (the innovator, a dominant platform, and a non-dominant platform), we scrutinize the decisions of innovators and technology platforms both with and without a statutory restraint on acquisitions by large platforms. Such restraints may alter the timing of an investors’ exit, affecting the incentives for innovation.

Central to our theoretical argument is the assumption that under the *Staff Report’s* recommended amendments to the Clayton Act (and similar constraints offered by others), a dominant digital platform may acquire an innovation early in its development—prior to the public availability of the innovation—to avoid triggering antitrust review, such as by acquiring the human resources (or other assets) necessary for the innovation’s development.⁶ Statutory restrictions on acquisitions by the large platforms are shown to adversely affect investments in innovations and alter the innovator-investor exit strategy, incentivizing innovators to transfer their innovations to dominant firms in even earlier stages so as to avoid antitrust scrutiny. These statutory prohibitions may encourage innovators to choose this early exit strategy despite it being inefficient, and will additionally drive more in-house innovation at the big firms and produce less external innovation. Similarly, these prohibitions on later-stage acquisitions are shown to reduce the returns to innovation, thus reducing technological advancement in the industry.

II. Economic Model

We consider an extensive-form game with three players, an innovator “A” who can develop a new application, a dominant incumbent platform “D” who can integrate the application into

⁵ George J. Stigler Center for the Study of the Economy and the State, The University of Chicago Booth School of Business, Committee for the Study of Digital Platforms - Market Structure and Antitrust Subcommittee, REPORT (01 July 2019) at 78 (available at: <https://research.chicagobooth.edu/-/media/research/stigler/pdfs/market-structure-report.pdf>).

⁶ Since anti-poach agreements are generally frowned upon by antitrust agencies, the acquisition of the human resources required for an innovation are unlikely to draw antitrust attention. *See, e.g.*, United States Department of Justice, “No-Poach Approach,” *Division Update 2019* (available at: <https://www.justice.gov/atr/division-operations/division-update-spring-2019/no-poach-approach>).

its platform, and a new platform company “N” who might enter into competition with the dominant incumbent.

Actions occur over three rounds. In the first round, the innovator A decides whether to invest in a new application. If the innovator A invests, then it develops a product (an “app”) to an incomplete degree, and this immature app is available in Round 2. At this point, A can be acquired by D and the app can be completed and integrated into D’s platform. Firm A, however, is not compelled to sell the app to D and can instead wait until the app is fully developed in Round 3. In Round 3, A can sell the app to a platform, either to the dominant incumbent D or to a new platform N which enters with some probability.

In other words, in Round 1 the innovator decides whether to innovate. In Round 2, the innovation is in an early stage and not available to the public, and the dominant platform may purchase it, without triggering antitrust review, and complete development internally. This decision requires that the dominant firm strike a bargain with A. The dominant platform D’s decision to acquire A in this early stage relieves D of the risk that there will be a competitive bidder (N) for the innovation in Round 3, thereby potentially reducing the acquisition price. If D does not acquire A in Round 2, then it may do so (if permitted by antitrust law) in Round 3, potentially facing the new rival.

The value of the app initially developed by A depends on how its development is completed. We assume that the app, if completed by A outside of the dominant platform, is more valuable than if it is completed within the dominant firm. In other words, the innovator A has an advantage over the dominant platform with respect to innovation. On the other hand, integration of the app into a platform does create a positive network externality for that platform which gives the platform an economic incentive to acquire the innovation. These stylized facts roughly correspond to what is usually assumed about the innovation process in Silicon Valley: apps provide network effect benefits for platforms, but platforms are stodgy and not the best developers of novel apps, so platforms often acquire apps developed by others, a fact of which app developers are aware.

Our goal is to derive and characterize the profit-maximizing behavior of A and D and evaluate that behavior for its welfare properties. We ask the following questions:

- (1) Under what conditions will A invest to create an app?
- (2) Would D seek to acquire A and its app “early,” before the app is fully developed and before drawing potential antitrust scrutiny?
- (3) Will A opt to resist being acquired until the app is fully developed and potential competition for the app between D and an entrant N could take place?

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- (4) How would these decisions be affected if a new statute is able to prohibit the dominant platform from buying a developed app?

As we show below, the behavior of A and D will be affected by the presence of a prohibition on acquisitions and this altered behavior can reduce social welfare. We will show that prohibitions on acquisition will reduce the incentives for innovation, and further that such restrictions will lead to apps being developed inefficiently within the dominant firm.

A. *The Unregulated Environment*

Formally, the innovator A can begin app development by incurring a sunk cost of F . A will do this only when its expected proceeds from innovation exceed F . Having entered, A can bargain with D for the app, which D can integrate into its platform. Let V be the stand-alone (unintegrated) value of the app if developed to completion by A and let Δ be the additional value created by integrating the app into a (any) platform.

Consistent with our assumption that app development is best done by the app developer (and not the dominant firm), let L be the loss of value of the app if its development is completed within the dominant firm. Thus, if D acquires A and completes app development internally, then D earns a payoff in Round 3 of $V + \Delta - L$. A's payoff in this case is whatever D pays A for the app.

If D does not acquire the app in its early development (in Round 2), then it might do so when it is fully developed in Round 3. In Round 3, however, there is an exogenous probability p that a rival platform N might be present. The presence of two bidders for the app greatly benefits A.

We will assume that, should there be no second platform, bargaining between A and D will result in a typical Nash bargaining outcome in Round 3. In particular, the sale price x^* maximizes the Nash product

$$NP_1 = [(V + \Delta - x) - 0][x - V]. \quad (1)$$

Thus $x^* = V + \Delta/2$. In contrast, if there are 2 bidders (D and N) for the app, then we assume the sale price is driven up to $V + \Delta$, which is the common value of the app to both bidders.

We can now use these results to examine the bargaining problem between D and A in Round 2, when the app is not completely developed, and D would need to complete development with the efficiency penalty L . From A's point of view, declining to strike a bargain in Round 2 gives him the expected payoff in Round 3 of

$$(1 - P)(V + \Delta/2) + P(V + \Delta) = V + (1 + P)\Delta/2. \quad (2)$$

This serves as A's disagreement payoff for the Round 2 bargain. For D, the expected Round 3 payoff is just $P \cdot 0 + (1 - P)\Delta/2 = (1 - P)\Delta/2$ since D earns a zero payoff if it must bid against N and the gain is shared evenly between A and D in the other case.

Let b^* be the price paid by D to A in Round 2. Then b^* maximizes the Nash product:

$$NP_2 = [(V + \Delta - L - b)\Delta/2][(b - (V + (1 + P)\Delta/2))], \quad (3)$$

so we obtain,

$$b^* = V + (1 + P)\Delta/2 - (1/2)L. \quad (4)$$

We may now state the first result.

Result 1: The app is not sold to D in Round 2.

Since $b^* < V + (1 + P)\Delta/2$, the innovator A prefers to wait until Round 3. Note that this result arises from the fact that $L > 0$; the completion of app development within the dominant platform is less efficient than completion by the innovator "on the open market." Further, early acquisition of the app by D is socially inefficient for the same reason.

Having concluded that no sale will occur in Round 2, we can now go to Round 1 and A's entry decision. The innovator A will enter if the sunk cost of innovating, F , is less than the expected payoff from innovation, $V + (1 + P)\Delta/2$: innovation occurs if $V + (1 + P)\Delta/2 - F > 0$.

B. *The Regulated Environment*

Having solved for the agents' behavior in the "unregulated" environment, we now examine the effect of a prohibition on the sale of the app to a dominant platform D in Round 3. We still allow the app to be acquired by D in Round 2, when it is assumed to be "below the regulator's radar."

The prohibition of the sale of the app to D in Round 3 implies that the only means for the developer to realize some share of the network externality value Δ is through competition in Round 3 (N can buy the app since N is nondominant). Therefore, A's expected payoff in Round 3 is just $V + P\Delta/2$. The dominant platform D is prohibited from buying in Round 3, so its expected payoff is 0. We maximize the Nash product for the Round 2 bargain under regulation with price agreement b_r^* ,

$$NP_r = [(V + \Delta - L - b_r) - 0][b_r - (V + P\Delta/2)]. \quad (5)$$

which yields,

$$b_r^* = V + (1/2)(\Delta + P\Delta/2 - L). \quad (6)$$

One compares b_r^* to $V + P\Delta/2$ to conclude that the innovator A will sell the innovation “too early” in Round 2 whenever $(1 - P/2)\Delta > L$. This early sale creates a social loss of L , a negative welfare effect of the regulation: in the absence of the regulation, A never sells out in Round 2 (Result 1). We have:

Result 2: Under the regulation, A sells the app to D in Round 2 whenever $(1 - P/2)\Delta > L$.

The probability of an inefficient early sale rises when the network effect Δ is larger, and when the probability of Round 3 competition P is smaller (that is, platform D’s dominance is relatively secure). Of course, if the inefficiency of the dominant firm in completing the app, L , is very large, no early sale will occur for the obvious reason. But if the dominant firm is only somewhat less efficient (or perceives itself to be so), then early sale becomes more likely.

C. Effects on Innovation

We see that the hypothetical regulation barring the dominant platform from buying the developed app encourages early sales of the innovation, incurring the social loss arising from the dominant platform’s relative inefficiency as an app innovator. This result, however, is not the only negative welfare consequence of the rule. To see this, we turn to Round 1 and consider the initial decision by the app developer to begin innovation.

The specific nature of the decision facing the innovator in Round 1 depends on whether he will sell out to the dominant firm in Round 2—i.e., it depends on the comparison between b_r^* and $V + P\Delta/2$. Regardless of which condition prevails, though, the incentive to enter and innovate is reduced by the prohibition on Round 3 sales to the dominant platform.

Recall that, without the regulation, the innovator enters whenever $V + (1 + P)\Delta/2 > F$. Let $E = V + (1 + P)\Delta/2 - F$, so the innovator enters when $E > 0$. Then we have the following:

Result 3: Under regulation, if the innovator will sell early, then he enters if $E - P\Delta/2 > 0$. If the innovator will not sell early, then he enters if $E - (1/2)(L + P\Delta/2) > 0$. Both conditions are more severe than that applicable without the regulation.

Result 3 highlights a second channel by which the proposed regulation can negatively impact social welfare. Regardless of whether the innovator expects to sell out early to the dominant platform, innovative entry is reduced below that level seen without regulation. In other words, innovation is made less profitable by the prohibition on the sale of the mature app to the dominant platform, leading to less innovation.

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D. Caveats

An important element to the funding of innovations in the tech sector is how investors obtain a return, which often involves the sale of the innovation to established firms. If such sale is foreclosed or made more difficult by statute, then investment incentives are curtailed. The focus of this analysis is on such enhanced antitrust or regulatory scrutiny of exit, which is shown to lead to both the inefficient development of innovations (by premature sale), and to reduced entry by innovators. These are potentially important and undoubtedly undesirable consequences of some of the recommended changes to the antitrust laws, including those in and like the *Staff Report's* proposals.

There are, of course, other considerations not analyzed here. For instance, our model does not address competitive consequences to platform competition, nor do we model how the probability of disruptive entry by N is affected by the regulations in the market. We must leave these concerns, among others, to future research.

III. Conclusion

The acquisition of innovations by established firms often is viewed as a shield against future competition by squelching innovation.⁷ Facebook's purchase of Instagram, for instance, is taken to be such a case, and a lawsuit brought by the Federal Trade Commission and several states are now seeking divestiture.⁸ Yet, exit by sale is a primary means by which investors in technology make a profit, and many innovations are developed specifically with the hope of selling out to well-established firms due to the profits provided by positive network external effects. Raising barriers to the acquisition of burgeoning tech firms by established platforms, which is the same thing as limiting exit strategies for investors, seems certain to impact investment behaviors in early-stage projects.

In this BULLETIN, we model the decisions of innovators and technology platforms in a three-stage game and compare behavior with and without a regulatory or statutory restraint on mature acquisitions by large platforms. Such restrictions are shown to attenuate innovative activity. Also, the restrictions alter the timing of the exit strategy, leading to the transfer of early-stage development to established firms to avoid antitrust scrutiny despite the associated

⁷ PRESS RELEASE: *FTC Sues Facebook for Illegal Monopolization – Agency Challenges Facebook's Multi-Year Course of Unlawful Conduct*, Federal Trade Commission (December 9, 2020) (available at: <https://www.ftc.gov/news-events/press-releases/2020/12/ftc-sues-facebook-illegal-monopolization>).

⁸ See, e.g., T. Spangler, *FTC and States Sue Facebook, Seeking to Force Divestitures of Instagram, WhatsApp*, VARIETY (December 9, 2020) (available at: <https://variety.com/2020/digital/news/ftc-states-sue-facebook-monopoly-divest-instagram-whatsapp-1234849764>).

inefficiencies. This pre-mature exit may reduce the value of the fewer innovations that do occur.

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