

## **Acquisitions of Startups and Entry in Software Markets: A Research Proposal**

*(Slightly redacted version)*

During the past decades, large digital technology firms have continuously engaged in acquiring very young, highly innovative companies. The so-called GAFAM (Google, Amazon, Facebook, Apple and Microsoft) and their subsidiaries alone acquired 562 firms between 2010 and 2019<sup>1</sup>. Other dominant players in the digital tech industry such as Cisco, Intel or Salesforce have been similarly engaged with acquiring early-stage companies. A commonly observed feature of these acquisitions is that the much smaller target firms are still in the process of developing a product at the time of the acquisition, generating very low revenues if any, and thereby typically not meeting the revenue threshold at which they should be subjected to a rigorous antitrust investigation. Until now, none of the acquisitions carried out by the GAFAM have been blocked in any country in the world.

To date, it is not clear how antitrust practitioners should think of these acquisitions of highly innovative, small firms. Whereas static merger effects are possibly of limited concern since the acquirees often have very small market shares, the acquisitions could impede competition from a dynamic perspective. Given that many of the target firms are highly innovative, is it possible that these acquisitions inhibit innovation in the longer term? Could this possibly cement the market power of the large incumbents by reducing entry of young firms? If so, what types of changes to the current antitrust regime could adequately address these concerns in the future?

This research intends to shed light on these questions by empirically investigating the implications of acquisitions on entry and product placement behavior by startups (by “startups”, I refer to young, venture capital funded firms with a high growth potential). I intend to employ novel data of enterprise software products, enabling me to define narrow market niches. I plan to explore two complementary empirical strategies. The first strategy is based on so-called reduced-form analysis, using plausibly exogenous changes to the business environment that might have affected the likelihood of acquisitions. Anecdotal evidence points to a few recent policy changes that might have increased acquiring companies’ costs of engaging in certain types of acquisitions, or in other ways changed startups’ preferred exit routes. If my data reflect that any of these changes indeed affected the number of startup acquisitions, and any other confounding factors can convincingly be ruled out, an instrumental variable strategy could be applied. The causal effect of these acquisitions on entry and product positioning could be estimated using the policy changes as instruments for the acquisitions.

However, the feasibility of this strategy is not certain. Moreover, even if this approach is feasible, an economic model will give helpful guidance for interpreting any findings. I will therefore complement this approach by setting up a model of startup entry, allowing for acquisitions by dominant incumbents and reflecting specificities of the market environment. The model parameters are then estimated using data on observed entry and product placement behavior. In the end, the estimated parameters along with the assumptions on firm

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<sup>1</sup> Author’s calculations, using data from *Crunchbase*.

behavior enable to trace out what entry and innovation would look like in a counterfactual setting with stricter merger enforcement.

I believe this topic to be of high importance to antitrust practitioners. To my knowledge, there is only relatively limited empirical evidence surrounding the innovation effects of mergers. At the same time, the GAFAM have grown to be the largest companies in the world and dominate global markets. There is empirical research on mergers and innovation in the pharmaceutical industry (e.g. Cunningham, Ederer and Ma 2020), where data on project development and adequate proxies for innovation are available. Software markets, however, function very differently, so that empirical evidence on pharmaceuticals might only to a limited extent be applicable here. Software markets are characterized by winner-take-most competition. Often, only one or very few large incumbents prevail, as they benefit from direct and indirect network effects. Economists have pointed out the importance of ensuring sufficient competition *for* the market in this setting. The threat of entry by startups is deemed to be crucial for disciplining incumbents to continuously innovate and to offer high-quality products to consumers. I therefore believe that linking the acquisitions with the dynamics of entry, product placement and growth of startups is a fruitful and important area of study.

While prior scientific literature has explored the topic of acquisitions of early-stage firms by big tech incumbents theoretically (e.g. Fumagalli, Motta, Tarantino 2020; Motta and Peitz 2020; Cabral 2018), empirical research has so far mostly descriptively characterized these acquisitions (Argentesi et al. 2021; Gautier and Lamesch 2020). Kamepalli, Rajan and Zingales (2021) do study the effect of big tech acquisitions on startup growth, and find suggestive evidence for a decline in venture capital investment in social media startups subsequently to an acquisition by Facebook or Google in that market. However, these acquisitions might be endogenous to the evolution of venture capital funding in those industries. Moreover, a recurring topic in competition economics is the question of how to find out which firms are truly competing. I can circumvent this issue of market definitions using granular data on enterprise software that enables me to precisely define substitutes to a given product and learn about companies' product placement behavior. Moreover, data on startups' funding rounds allow me to measure growth and project development.

### **Theoretical Insights**

Horizontal mergers typically pose antitrust concerns because a merging firm removes a competitor, potentially resulting in the remaining firms obtaining too much market power, which can be detrimental for consumers. In the case of a big tech incumbent acquiring a small startup, however, this is not the main concern, as the target firm may not even sell a marketable product yet. Instead, as noted above, dynamic effects may be at work, for instance the following:

- **The acquirer may remove a potential entrant.** The acquired startup might not yet be an entrant into the incumbent's market, but digital markets evolve very fast. Had the startup not been acquired, it could have grown to be significant competitor of the incumbent in the future, posing a serious threat to its dominance.
- **An "innovation for buyout" incentive may encourage entry – but favor "incremental", as opposed to "radical", innovation.** If a startup is acquired, its shareholders are paid out. Therefore, entrepreneurs and investors may be incentivized

to grow a startup in anticipation of its future acquisition. As Cabral (2018) shows theoretically, this can increase the rate of innovation. However, as entrepreneurs internalize the usefulness of their innovations to potential acquirers, it might focus its innovative strategies on products that are complementary to the incumbent's, as opposed to being disruptive and becoming a new leader. Allowing for these acquisitions, one may therefore end up with types of "me-too" innovations that are of limited usefulness to consumers.

- **The prospect of merger may reduce early adoption, lowering incentives to grow a startup.** If, on the other hand, startups and their investors fear that incumbents' acquisition spree makes it more difficult for an emerging startup to attract early adopters, benefit from network effects and grow, this might lead to a kill zone in certain market segments, as Kamepalli, Rajan and Zingales (2020) show.

The question of which of these effects are dominant in the market for enterprise software ultimately warrants an empirical investigation. I will consider firm entry decisions and product placement decisions, to be able to capture the creation of "disruptive" versus "incrementally innovative" products. Moreover, I will keep track of whether acquired products stay available, or are ultimately removed from the market ("killer acquisition"), as this will influence other companies' reactions to the acquisition.

### **Method**

Mergers are endogenous decisions taken by firms under careful consideration of the market environment and the short and long term benefits and costs. Therefore, simply comparing market outcomes before, and after the consummation of a merger is subject to endogeneity concerns. However, certain policies that altered the market environment might have made acquisitions temporarily more, or less likely. I will investigate whether any of three candidate policy changes indeed had a sufficient effect the number of types of mergers, and whether they can be viewed as exogenous.

As a complementary approach, however, I will set up a structural model that explicitly endogenizes firms' decisions of whether to enter a certain market and whether to acquire another firm, and estimate the costs and benefits of these actions. Given these estimates, a researcher can counterfactually simulate what startups' entry and product placement decisions would be if mergers were prohibited or were costlier, informing policymakers about the likely effects of such an antitrust reform.

I plan to use two data sources. First, I obtained access to a registry of firms worldwide, many of which are active in the digital economy. It documents all mergers and acquisition activities as well as venture capital funding rounds of highly innovative startups and is a standard database used by venture capital investors. This panel of firms allows me to track young companies as they move from one funding round to the next, until they eventually reach an IPO, are acquired, or shut down. The entry and expansion of a startup could thus be proxied by the observed funding rounds. Secondly, I plan to use data from an online comparison tool for different business software products. The website carefully categorizes business software into over 800 narrow niches. Based on these categories, I will be able to delineate distinct markets and quite accurately define which software is a competitor to a given product.

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