Serial Acquisitions in Tech*

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Abstract

We examine serial acquisitions in the technology sector from 2010 to 2023, using a granular industry taxonomy from S&P. We identify four key patterns. First, serial acquisitions account for 24–37% of all majority control tech deals during this period. Second, while serial acquisitions are often associated with private equity (PE), 54–55% are conducted by publicly traded non-PE firms, and another 21% by private non-PE firms. Third, serial acquirers tend to be older and better resourced than other acquirers, and their targets in follow-on deals are typically larger and more mature than those in initial deals. This is in contrast with patterns observed in PE activity. Fourth, GAFAM firms (Google, Amazon, Facebook/Meta, Apple, Microsoft) exhibit distinctive behavior: they engage more frequently in serial acquisitions, expand more beyond core categories, and disproportionately target younger, VC-backed private firms. Given that most serial acquirers are public firms, we examine the implications of their serial acquisition strategies. We find positive correlations between forming a series and both market capitalization and the private value of innovation, but no meaningful association with other innovation outcomes or with measures of market competitiveness faced by the serial acquirer.

Keywords: M&A; antitrust; technology ventures; serial acquisitions.

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1. Introduction

Serial acquisition is defined by the OECD as "a pattern and/or strategy of undertaking sequential acquisitions of a series of small companies by the same firm over time, in the same or adjacent markets, which it then consolidates into a larger, potentially dominant, company" (Abate and Lyon 2023).[1]

While serial acquisitions are not a novel phenomenon, and have been observed across various sectors and countries, antitrust agencies have increasingly expressed concerns about their potential competitive implications for two primary reasons. First, serial acquisitions have exhibited a growing trend, encompassing not only private equity (PE) acquirers motivated by short-term profits but also PE and non-PE firms pursuing long-term strategic goals such as industry consolidation (Hearn et al. 2022; Mehta et al. 2022; Pitchbook 2023). Second, many serial acquisitions fall below the reporting thresholds for merger review or appear benign when assessed individually. However, the cumulative effect of these transactions may enable an acquirer to rapidly gain significant market share, restrict competition, and potentially monopolize markets (Hearn and Shaban 2022; Abate and Lyon 2023). Consequently, these acquisitions may evade antitrust scrutiny, at least early on, and contribute to what has been termed "stealth consolidation" (Wollmann 2024).

In response, policymakers worldwide have introduced or considered introducing measures to address concerns about serial acquisitions. For instance, the U.S. Department of Justice (DOJ) and Federal Trade Commission (FTC) updated their merger guidelines in December 2023 to include provisions specific to serial acquisitions.[2] Similarly, the European Union's Digital Markets Act (DMA) now mandates "gatekeeper" firms to report any planned mergers or acquisitions of significant digital services, regardless of transaction size.[3] Additionally, the UK's Digital Markets, Competition, and Consumers

[1]This definition includes roll-ups by private equity (PE) firms, which traditionally aim to acquire, restructure, and manage companies before selling them for profit. However, it excludes staggered acquisitions, where an acquirer incrementally buys shares of the same target firm through multiple small transactions.

[2]Guideline #9 of the 2023 Merger Guidelines states, "When a Merger is Part of a Series of Multiple Acquisitions, the Agencies May Examine the Whole Series." Full guidelines are available at https://www.justice.gov/atr/merger-guidelines and related press release at https://www.justice.gov/opa/pr/justice-department-and-federal-trade-commission-release-2023-merger-guidelines.

[3]DMA Article 14 outlines reporting obligations for gatekeepers: "A gatekeeper shall inform the Commission of any intended concentration within the meaning of Article 3 of Regulation (EC) No 139/2004, where the merging entities or the target of concentration provide core platform services or any other services in the digital sector or enable the collection of data, irrespective of whether it is notifiable to the Commission under that Regulation or to a competent national competition authority under national

Act, effective January 1, 2025, requires firms with "Strategic Market Status" to report M&A transactions under lower-than-usual notification thresholds.[4] Beyond the US, EU, and the UK, South Africa amended its Competition Act in 2019 to provide the competition authority the ability to address serial acquisitions, and Germany's Federal Court of Justice acknowledged the potential harm of serial acquisitions in 2008.[5]

Recent high-profile antitrust cases illustrate the growing concern over serial acquisitions. In 2020, the FTC alleged that Meta/Facebook used acquisitions, including Instagram (2012) and WhatsApp (2014), to eliminate competitive threats and consolidate its monopoly power.[6] Retrospectively and in combination, the two deals may constitute a series of acquisitions that allegedly helped Facebook (now Meta) to eliminate threats to its monopoly. The FTC is asking the Court to order Meta to divest Instagram and WhatsApp and to require the firm to seek prior approval for any further acquisitions. The case went on trial in April 2025, with the court decision pending.

In January 2023, the US DOJ sued Google for monopolizing digital advertising technologies, "through serial acquisitions and anticompetitive auction manipulation."[7] In particular, DOJ questioned Google's acquisition of DoubleClick in 2008 and AdMeld in 2011, alleging that the integration of DoubleClick and Google's own ad exchange were part of a strategy to monopolize digital advertising technologies, and by buying and shutting down AdMeld, Google prevented a potential rival from developing innovative ad technologies that could challenge Google's market position.[8] In April 2025, the District

merger rules." Full content is available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022R1925.

[4]See https://www.whitecase.com/insight-alert/uk-expands-its-merger-control-regime-and-cmas-powers-digital-markets-competition for a summary of the legislation; its full content is available at https://www.legislation.gov.uk/ukpga/2024/13/enacted.

[5]Abate and Lyon (2023), pp. 21-22, offer a brief description of the institutional changes in South Africa and Germany.

[6]Details of the FTC's case against Meta are available at https://www.ftc.gov/news-events/news/press-releases/2020/12/ftc-sues-facebook-illegal-monopolization. The FTC in fact reviewed and approved both deals at the time of acquisition, when Instagram was a 13-person startup with roughly 30 million users prior to its $1 billion acquisition and Whatsapp had 55 employees and 400 million users prior to its $19 billion acquisition. (Sources: Dealmakers's summary available at https://dealmakers.co.uk/the-story-of-instagrams-1billion-acquisition/), The Guardian (2014/2/19) available at https://www.theguardian.com/technology/2014/feb/19/facebook-buys-whatsapp-16bn-deal#:~:text=10%20key%20numbers,Telecoms., and the Conversation (2014/2/20) available at https://theconversation.com/whatsapp-bought-for-19-billion-what-do-its-employees-get-23496#:~:text=With%20only%2055%20employees%2C%20WhatsApp's,US%241%20billion%20in%202012..

[7]DOJ press release: https://www.justice.gov/opa/pr/justice-department-sues-google-monopolizing-digital-advertising-technologies.

[8]See https://crsreports.congress.gov/product/pdf/LSB/LSB10956 for a brief summary of the DOJ's position in the Google Ad Tech case; the DOJ's full complaint can be found at https://www.justice.gov/atr/case-document/file/1566706/dl?inline=.

Court judge ruled that Google monopolized two online advertising markets, but did not find Google's serial acquisitions of DoubleClick and Admeld anticompetitive.[9]

In September 2023, the FTC sued U.S. Anesthesia Partners (USAP) and Welsh, Carson, Anderson & Stowe (WCAS), a private equity firm, for using a "roll-up" strategy to buy up nearly every large anesthesia practice in Texas and engage in other anti-competitive practices to monopolize the anesthesiology market in Texas.[10] Going beyond this particular case, Asil et al. (2024) identify 18 similar "roll-ups" in the anesthesia industry, finding that roll-ups increase market concentration and lead to sharp price hikes.

Traditionally, serial acquisitions occur in industries that have fragmented markets but can significantly benefit from economies of scale, wide distribution networks, consolidated buying power, or rapid geographic expansion,[11] but recent advances in information and communication technologies (ICT) have raised new challenges and new concerns regarding serial acquisitions in the tech sector (Abate and Lyon 2023).

In particular, it is often difficult to define targets by market because ICT can be applied to many nascent markets and younger startups may still be exploring which market to enter or avoid. As a result, the targets of serial acquisitions are not necessarily well-established horizontal competitors of the acquirer; rather, they can be nascent competitors, or potential complementors to the acquirer as their upstream supplier, downstream customer, or technological partners that enhance one or more of the acquirer's core business areas. More broadly, the acquirer may rely on serial acquisitions of tech startups to expand its ecosystem or build moats to hamstring or deter future rivals. Moreover, digital technology is not limited by geography, and thus we cannot use geography to define the relationship between the acquirer and the target as readily as in grocery retail or healthcare. Importantly, digital technology often enables business models that feature indirect network effects, data feedback loops, and significant economies of scale and scope. These features imply that serial acquisitions in the tech sector potentially have greater pro- or anti-competitive effects than in other sectors, but the targets in the tech sector are more likely to be smaller and younger, and thus escape the scrutiny of existing merger review protocols.

Concerns about serial acquisitions in the tech sector are further heightened by popular attention on five large digital platforms: Alphabet/Google, Amazon, Meta/Facebook,

[9] See New York Times summary of the court ruling at https://www.nytimes.com/2025/04/17/technology/google-ad-tech-antitrust-ruling.html.

[10] Source: https://www.ftc.gov/news-events/news/press-releases/2023/09/ftc-challenges-private-equity-firms-scheme-suppress-competition-anesthesiology-practices-across.

[11] Historical cases concerning serial acquisitions include business categories such as waste management, mining, beer brewing, grocery retail, healthcare, hotel chains, regional banks, and funeral homes.

Apple, and Microsoft (referred to as GAFAM). For example, Parker, Petropoulos and Van Alstyne (2021) followed all publicly known M&A deals involving GAFAM firms from 1988 to August 2020, finding the total count to be 825. In September 2021, the US FTC released a staff report describing 600+ acquisitions completed by the five GAFAM firms between 2010 and 2019, finding that many of them were not reportable to the US antitrust agencies under the Hart-Scott-Rodino Act (FTC 2021). According to Kwoka and Valletti (2021), nearly 97% of the GAFAM deals have not been assessed by any competition authority worldwide. Of the few that have been assessed, only Meta's 2022 acquisition of Giphy has been prohibited by the UK Competition and Markets Authority, resulting in Meta divesting Giphy to Shutterstock in 2023.[12] Surprisingly, despite this intense spotlight on GAFAM, little is known about how many of GAFAM's acquisitions constitute serial acquisitions.

More generally, there is no systematic definition or description of serial acquisitions in the technology sector. To address this gap, we begin by defining serial acquisitions, utilizing a detailed taxonomy developed by S&P Global Market Intelligence, a go-to database of majority control M&A deals for Wall Street professionals interested in the tech sector. If the same acquirer made multiple acquisitions in the same business category during our sample period (2010-2023), we name these deals a series of acquisitions. We refer to the first deal in a series as the "initial" deal, and all subsequent deals in the series as "follow-on" deals. Based on the information available at the time of the deal, only follow-on deals are serial deals because whether a deal is initial or not can only be determined retrospectively after a follow-on deal occurs. Hence, throughout the paper, we use follow-on deals and serial deals interchangeably, while acknowledging that initial and follow-on deals fall in the same series retrospectively. We refer to deals that do not belong to any series as singleton deals.

Four patterns emerge from the raw M&A data of majority-control deals tracked by S&P in the information, communication and energy technologies (ICET) space. First, follow-on deals account for 24.4-37.2% of all deals in our data, depending on how narrow we restrict acquisitions in a series to belonging to the same business category in the S&P taxonomy. Second, while private equity firms are best known for making serial acquisitions, 53.8-55.3% of serial deals are made by publicly traded non-PE firms, and another 20.8-21.2% are made by private non-PE firms. The pattern persists independently of whether we define a series of acquisitions by narrower or wider categories, suggesting

[12] A historical review of the case can be found at https://www.gov.uk/cma-cases/facebook-inc-giphy-inc-merger-inquiry.

that a focus on PE in ICET misses the big picture on serial acquisitions. Third, serial acquirers are older and more resourceful than singleton acquirers, but across the whole sample, targets in serial deals tend to be older and larger than the initial deal in a series. This is different from the fact that PE acquirers usually begin with a larger target (the so-called 'platform' deal) when they enter a business area and then add smaller targets to the series (Pitchbook 2023). Fourth, GAFAM firms stand out from the rest of the sample, as they engage more in serial acquisitions, expand more beyond the categories of their own core business areas, and focus more on younger, smaller, VC-funded, private targets, especially in the initial and serial deals of a series. This distinctive pattern is consistent with policymakers' growing attention to GAFAM, as highlighted by the two ongoing antitrust cases against Google/Alphabet and Facebook/Meta. That being said, the initial and follow-on deals conducted by GAFAM account for 2.6-3.1% of all initial and follow-on deals observed in the S&P data, suggesting that GAFAM activities are not representative of serial acquisitions in the tech sector.

Given that most serial acquirers in our sample are public firms, we examine the factors associated with their decision to initiate a series of acquisitions, as well as how this strategy relates to firm outcomes—specifically returns, market competitiveness, and innovation—among public non-PE acquirers. Our analysis shows that firms with higher market valuations, greater R&D spending, fewer employees, longer tenure as public companies, and those operating in less concentrated product markets are more likely to engage in serial acquisitions or to complete a greater number of such deals over the sample period.

Moreover, combining Compustat with S&P data, we adopt a difference-in-differences design leveraging the staggered beginning of a series by an acquirer as a source of variation. We find that, following the start of a series, acquirers experience an average 11% increase in market value, along with a 19% rise in the private value of patents, as measured by Kogan et al. (2017). However, using text-based measures of product market concentration and competitive threat (Hoberg, Phillips and Prabhala 2014; Hoberg and Phillips 2016), we find no evidence that serial acquisition behavior is associated with changes in these outcomes. We emphasize that these results should be interpreted as descriptive correlations rather than causal effects. Unobserved factors—such as demand shocks in specific technology categories—may simultaneously drive both the decision to initiate a series of acquisitions and improvements in performance metrics such as innovation output or firm valuation.

To provide further evidence on the relationship between serial acquisitions and firm

outcomes, we construct an instrumental variable using data on executive and board affiliations from BordEx. Specifically, we define the instrument as the share of serial acquisitions among all M&A deals conducted over the past ten years by firms linked to the focal firm through historical affiliations of its current board or executive members. The idea is that exposure to serial acquisition behavior within a firm's network may shape managerial beliefs or strategic norms, thereby increasing the likelihood that the focal firm initiates a serial acquisition strategy. Using this instrument, we find that serial acquisitions are associated with a positive effect on market value and a reduction in perceived competitive threat, although both effects are statistically significant only at the 10% level. We find no statistically significant effects on patenting or other firm outcomes. Again, these results should be interpreted with caution given potential limitations in instrument strength and residual endogeneity concerns.

Overall, our findings indicate some correlation between serial acquisitions and both firm market capitalization and the market's valuation of innovation, while we find no relationship with measures of market competitiveness.

The remainder of the paper is organized as follows. Section 2 provides a brief literature review. Section 3 describes the S&P dataset, and articulates how we use the S&P taxonomy to define initial, follow-on, and singleton acquisitions. We then report summary statistics about these three types of acquisitions for the overall sample and GAFAM deals in particular. Section 4 assesses how serial and non-serial acquisitions correlate with public acquirers' market value. Section 5 examines the drivers of public firms' decisions to engage in serial acquisitions and the impact on performance, market competitiveness, and innovation outcomes. Section 6 concludes with limitations and future research directions.

2. Literature review

This work builds on the extensive literature on mergers and acquisitions (M&As), which explores various dimensions of M&A strategies and their potential impacts on acquirers' performance. For instance, Capron and Shen (2007) analyzed acquirers' preferences for private versus public targets and how target types align with specific acquirer profiles. Similarly, Fine and Gray (1999) and Gupta and Gerchak (2002) investigated the realization of synergies through operational cost reductions and organizational integration. Within this body of work, two closely related streams include private firms' exits via M&A and public acquirers' M&A strategies in relation to firm performance.

Private firms, particularly venture capital (VC)-backed startups, often consider exit as

their ultimate goal (Pisoni and Onetti 2018). While prior research extensively examines the outcomes of VC-backed startups being acquired (Bryan and Hovenkamp 2020; Cotei and Farhat 2018), limited attention has been paid to whether VC-backed startups engage in acquiring other firms and how such M&A activities may influence their own exits. In contrast, private equity (PE) firms, while not primarily driven by exit goals, remain active participants in M&A markets. These firms possess notable advantages, such as achieving higher stock returns in cross-border takeovers (Humphery-Jenner, Sautner and Suchard 2017) and paying lower acquisition premiums compared to public acquirers (Bargeron et al. 2008). Recent evidence highlights how PE firms pursue serial acquisition strategies to consolidate markets they entered, which can lead to significant increases in prices (Asil et al. 2024). However, while the public debate has increasingly focused on serial acquisitions by PE firms, existing studies have not systematically documented the prevalence or patterns of such strategies. This study provides a comprehensive analysis of serial acquisitions completed by private companies and PE firms in the tech sector to address this gap.

Public firms are the most extensively studied acquirers in the M&A literature, partly due to better data availability. Many studies focus on stock market reactions to M&A announcements. For instance, Moeller, Schlingemann and Stulz (2004) found that smaller public acquirers achieve higher acquisition announcement returns. Fuller, Netter and Stegemoller (2002) documented that public acquirers with more than five takeovers tend to gain when acquiring private targets but incur losses when acquiring public targets. Additionally, Golubov and Xiong (2020) showed that public acquirers tend to perform worse operationally compared to private acquirers, while Maksimovic, Phillips and Yang (2013) demonstrated that public acquirers can realize higher gains, particularly during acquisition waves.

Prior literature has also explored how M&A activity can affect innovation in competing ways.[13] On one hand, acquisitions can generate synergies that enhance the acquirer's innovation performance (Zhao 2009; Bena and Li 2014); on the other, they may reduce the novelty of acquired technologies (Seru 2014) or even suppress innovation by eliminating potential competitors (Motta and Peitz 2021; Bourreau and Gautier 2024). Yet, empirical evidence for these so-called "killer acquisitions" remains limited to the pharmaceutical sector (Cunningham, Ederer and Ma 2021). In practice, acquisitions can be motivated by efficiency gains, such as economies of scale and scope, reduction of duplicative R&D, or elimination of double marginalization (Cabral 2021), and may also spur innovation by encouraging entry-for-buyout (Rasmusen 1988; Jin, Leccese and Wagman

[13] See Jin, Leccese and Wagman (2025) for a comprehensive review of the literature.

2024*b*).[14] We contribute to this literature by focusing on serial acquisitions in the tech sector, an increasingly common but underexplored strategy, which has recently drawn attention from antitrust agencies, despite its origins dating back to the 19th century.[15]

Additionally, due to growing attention from competition authorities, recent literature has documented and examined the implications of venture acquisitions by GAFAM firms (Google/Alphabet, Amazon, Facebook/Meta, Apple, and Microsoft) for entry, innovation and venture capital investment (Wen and Zhu 2019; Kamepalli, Rajan and Zingales 2020; Affeldt and Kesler 2021; Prado and Bauer 2022; Jin, Leccese and Wagman 2023). Our study adopts a broader perspective, describing serial acquisitions and examining their role in shaping innovation beyond the handful of GAFAM firms. We contribute to this literature by providing a systematic description of serial acquisition strategies by GAFAM firms, placing them in the broader context of tech-sector M&A dynamics.

Focusing on serial acquisitions, much of the existing literature highlights the potential downsides of serial acquisitions for corporate acquirers. For example, Laamanen and Keil (2008) found that serial acquisitions are negatively associated with post-acquisition performance for public acquirers. Similarly, Aktas, De Bodt and Roll (2011) reported a decline in cumulative abnormal returns (CAR) over successive deals in acquisition programs, although this effect is moderated by the type of CEO leading the acquisitions.

Despite these contributions, the prior literature has several limitations. First, it lacks a precise and consistent definition of serial acquisitions. Second, conclusions regarding the disadvantages of this strategy may not fully account for the increasing prevalence of serial acquisitions in recent years. This paper seeks to address these gaps by proposing a novel definition of serial acquisitions, leveraging a granular taxonomy of the technology industry (Jin, Leccese and Wagman 2023), and providing a comprehensive analysis of serial acquisitions in the technology sector over the past nearly decade and a half. Additionally, we expand the existing literature on public acquirers by investigating how their serial acquisition strategies may influence their performance, market competitiveness, and innovation incentives.

[14] Related to this, Eisfeld (2022) uses a structural model to quantify how entry-for-buyout and kill zone mechanisms affect startup entry, finding that banning venture acquisitions would reduce entry by 8–20%.

[15] See, e.g., Standard Oil Co. v. U.S., 221 U.S. 1, 31–42 (1911); U.S. v. American Tobacco Co., 221 U.S. 106, 157–60 (1911).

3. Definition and Data

3.1. Definition

If one had a clear definition for each relevant market, it would be straightforward to define a sequence of acquisitions that the *same* acquirer made in the *same* market from the beginning to the end of our sample as a series.

As shown in Figure 1, suppose acquirer #1 purchases A, B, and C sequentially in the green market. Thus, A-B-C form a series for acquirer #1 in this market. We call the acquisition of A the initial deal in this series, and B and C the follow-on deals. At the deal time of B and C, A had occurred; thus, all follow-on deals are serial acquisitions. But as of the deal time for A, one cannot anticipate the occurrence of B or C with certainty; hence, we classify A as a non-serial acquisition—even though retrospectively it is the deal that starts the series of A-B-C.

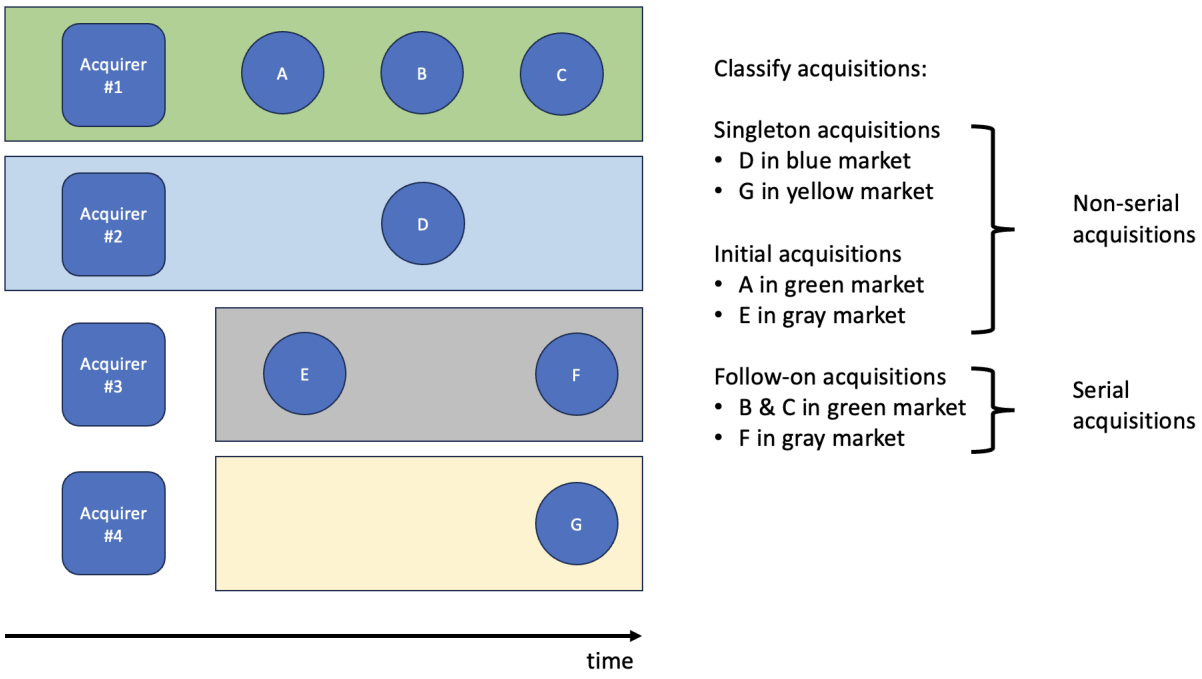
In contrast, in the blue market in the figure, acquirer #2 acquires the target D and only D throughout the sample period; we then refer to D as a singleton acquisition. If acquirer #2 acquires another target in the blue market beyond our sample period, D may become an initial acquisition in the future series but would remain a non-serial acquisition according to our definition. Under this framework, the classification of serial and non-serial acquisitions is time-neutral, whereas the label of initial or singleton deals can be time-dependent. Following the same logic, acquirer #3 acquires E and F in the gray market and acquirer #4 acquires G only in the yellow market; hence, E is an initial deal, F is a follow-on deal, and G is a singleton deal. E and F form a series once F is acquired, but only F is referred to as a serial acquisition. In the proceeding, we use follow-on deal, serial deal, and serial acquisition interchangeably.

It is worth noting that our definition is independent of whether an acquirer is in or out of the market before completing its initial deal, although this distinction might be important for regulators and policymakers. Later on, our data summary will describe whether the acquirer and the initial target are in the same business category as one target attribute. Moreover, the same acquirer could engage in multiple series of acquisitions in different markets. For example, if acquirers #1, #3 and #4 are the same entity in Figure 1, the series of A-B-C acquisitions may have strengthened the acquirer's incumbency in the green market, the singleton acquisition of G enables the acquirer to enter the yellow market, and the series of acquisitions E-F facilitates the acquirer entering and expanding inside the gray market.

Our framework is conservative in the sense that we take the acquirer and target

identities of each M&A deal as recorded and do not incorporate information about the parent company. For instance, if acquirer #1 acquires targets A, B and C in the green market, and then A acquires targets H and I, we do not count H and I as part of the A-B-C series of acquirer #1. Under our definition, H and I could form another series for acquirer A if H and I are in the same market (not necessarily in the same market as A).

FIGURE 1. Definition of Serial and Non-Serial Acquisitions



3.2. S&P data and taxonomy

Our primary data source is a database maintained by Standard and Poor's Global Market Intelligence, called 451 Research (henceforth, S&P). The data tracks majority (control) acquisitions of technology companies since the early 2000s, focusing on information, communication, and energy technologies (ICET). In a majority control acquisition, the acquirer obtains more than 50% of the voting shares of the target. The S&P data is updated on a daily basis and has been widely used by investors and analysts in the financial industry, but we were advised by the firm that the entries prior to 2010 may be less comprehensive due to insufficient or imprecise information. In light of this, our analysis focuses on acquisitions consummated between January 1, 2010 and December 31, 2023. As shown in Jin, Leccese and Wagman (2023, 2024*a*), as far as majority control

acquisitions in the tech sector are concerned, the S&P data is more comprehensive than the Worldwide Mergers, Acquisitions, and Alliances database offered by Refinitiv SDC, although the Refinitiv data is by definition broader than S&P's since it also tracks non-tech targets and includes minority acquisitions.

More importantly, we prefer the S&P dataset because it classifies the acquiring and acquired companies into a hierarchical technology taxonomy with 4 levels, with level-1 being the broadest (resembling an industry, such as "Application Software" and "Internet Content & Commerce," in some cases similar to 4-digit NAICS codes such as 5112 and 5191) and level-4 being the narrowest (resembling a technology business vertical, such as "Benefit and Payroll Management" and "Video-On-Demand Servers"). All level-1 "parent" categories have level-2 "children" categories, but not all level-2 categories have further children levels. In total, there are about two dozen level-1 categories and two hundred level-2 categories, yielding an average of about nine level-2 categories per level-1 parent. We refer to two level-2 categories as "adjacent" if they share the same level-1 parent category.

Each firm in the database is assigned a primary category, representing the firm's core business, which, in the taxonomy, includes a level-1, a level-2, and, if available, level-3 and level-4 classifications. Firms may also be assigned one or more secondary categories (organized analogously in the taxonomy). To avoid confusion, we only use a firm's primary level-1 and level-2 as its categorization in the S&P taxonomy.

The S&P data provides the location of each firm's headquarters, whether a firm is publicly traded, a consummation date for each acquisition, and the founding dates for the firms tracked (available in 90.71% of the transactions for the acquired firms and 92.49% for the acquiring firms). This allows us to compute the age of most target firms as of the time of the consummation of their acquisition. The S&P data also provides the number of employees a firm has and the transaction sizes in dollars, though these are more sparsely populated. In particular, only 23.82% of M&A deals recorded by S&P have information on the target firm's employee size at the deal time, and only 24.21% have deal size because publicly traded acquirers are required by law to disclose the transaction size only if the transaction is material.[16] As detailed in Jin, Leccese and Wagman (2024*a*), the S&P taxonomy is more systematic, more reliable, and more detailed than alternative taxonomies that other researchers have used to study technology mergers.

[16]A deal is "material" is it leads to at least 20% increase in some key metrics of the acquirer, like revenue and assets, though there are other factors to consider (e.g., strategic importance, impact on operations). With acquisitions of smaller ventures, if the deal is not considered material, deal amount is usually not reported to the SEC on an 8-K form.

At the same time, the S&P taxonomy does not necessarily reflect the market definition that antitrust agencies and the courts may adopt in antitrust cases. Antitrust investigators can access confidential information from the defendants and other market stakeholders, but the S&P taxonomy relies on publicly available information to describe business areas. Due to this discrepancy, we summarize serial acquisitions in the S&P data according to two definitions: our "narrow" definition requires targets in the same series to belong to the same level-1 and level-2 categories in the S&P taxonomy (henceforth, Level-1/Level-2), whereas our "wide" definition considers targets as belonging to the same series if they share the same level-1 categorization (henceforth, Level-1). Labeling targets in the same level-1 but different level-2 as "adjacent," the wide definition counts adjacent targets in the same series, which by definition labels more acquisitions as follow-on or serial deals and can increase the length of a series.

It is difficult to gauge how our narrow and wide definitions compare with the definition of serial acquisitions in antitrust cases. In the tech sector, only two recent U.S. cases involve serial acquisitions in the tech sector: FTC vs. Facebook/Meta (2020) and DOJ vs. Google/Alphabet on ad tech (2023). While the FTC alleges that Facebook's acquisition of Instagram and WhatsApp is a series, the S&P taxonomy classifies Facebook as "Internet Content & Commerce" in Level 1 and "Social Networking & Collaboration" in Level 2, Instagram as "Mobility" (Level 1) and "Applications" (Level 2), and WhatsApp as "Mobility" (Level 1) and "Messaging" (Level 2). This means the two deals would only form a series under our wide definition but not the narrow definition. Conversely, as far as the DOJ's allegation that Google's acquisitions of DoubleClick and Admeld form a series, the S&P taxonomy classifies Google/Alphabet as "Internet Content & Commerce" in Level 1 and "Search" in Level 2, DoubleClick as "Internet Content & Commerce" (Level 1) and "Online Advertising" (Level 2), and Admeld as "Internet Content & Commerce" (Level 1) and "Online Advertising" (Level 2). The two deals would be considered a series under both narrow/wide definitions. However, because DoubleClick was acquired in 2008, and our sample period ranges from 2010 to 2023, these two deals would not be counted as a series in the summary statistics reported later in this section.

Interestingly, despite the above differences, the Facebook-WhatsApp deal is still classified as a follow-on/serial deal even by our narrow definition because Facebook had acquired a target by the name of Beluga Inc. in the same level-1 and level-2 categories before it acquired WhatsApp. Google did not acquire any other targets in the same level-1/level-2 categorization as Admeld between 2010 and 2023. Therefore, Google's acquisition of Admeld does not belong to any series in our data sample. This highlights

the fact that the starting point of the time horizon for consideration of serial acquisitions also matters when defining a series.

In short, these examples suggest that our narrow definition of serial acquisitions based on the S&P taxonomy tends to be more conservative than what the FTC alleged in the case against Meta, but our definitions are more comprehensive within the sample period, as we follow all M&A deals by the same acquirer in the S&P data.

4. Stylized Facts About Serial Acquisitions

In this section, we leverage the S&P dataset to document four facts about serial acquisitions in the technology sector.

4.1. How prevalent are serial acquisitions?

Table 1 reports the composition of singleton, initial, and follow-on deals in our full sample of 2010-2023.[17] The first panel follows our narrow definition which limits deals in the same series to the same level-1 and level-2 categories; the second panel is based on the wide definition where deals in the same series are only required to belong to the same level-1 category.

Of the total 57,804 M&A deals in the S&P data, 24.37-37.16% are follow-on deals (and thus serial acquisitions), depending on which of the narrow or wide definitions we employ. Naturally, the percent of initial deals is slightly higher under the wide definition (15.04% vs. 12.39%) because some series may only involve follow-on deals that belong to the same level-1 but a different level-2 from the initial deal. In the last column, we report the average number of follow-on deals in the same series as of the end of our sample period. To compute this average, we first count follow-on deals in each series and then average it across all series. As expected, this average is higher under the wide definition (2.47) than under the narrow definition (1.97), suggesting that, on average, the number of serial acquisitions in a series increases by 25.38% if we count follow-on acquisitions in adjacent level-2 categories.

Conditional on the 24.21% of deals that have reported deal size in dollars, follow-on deals are substantially larger than singleton and initial deals on average. This difference is even greater under our wide definition of serial acquisitions, suggesting that follow-on deals in adjacent level-2s tend to be larger than follow-on deals in the same level-1 and

[17] Figure A.1 in the appendix depicts the time trends of singleton, initial, and follow-on deals for our narrow and wide definitions.

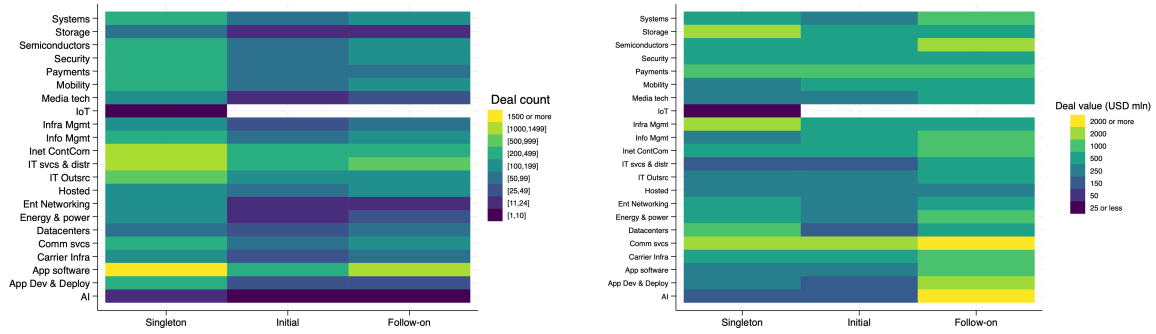
TABLE 1. Summary of Deal Attributes

	Singleton	Initial	Follow-on	Follow-on/Initial
Narrow Definition: Level-1/Level-2				
# of M&A deals	36,552	7,164	14,088	1.97
Percentage of total deals	63.23%	12.39%	24.37%	
Percentage of deals with deal value among same deal type	21.40%	29.91%	28.59%	
Average deal value conditional on having deal value	356.85	324.48	602.38	1.88
	(1,820.25)	(1,438.61)	(2,634.80)	
Median deal value conditional on having deal value	30.00	40.00	60.00	
Wide Definition: Level-1				
# of M&A deals	27,631	8,691	21,482	2.47
Percentage of total deals	47.80%	15.04%	37.16%	
Percentage of deals with deal value among same deal type	19.23%	28.55%	28.85%	
Average deal value conditional on having deal value	291.46	266.21	597.56	2.50
	(1,523.19)	(966.05)	(2,649.54)	
Median deal value conditional on having deal value	25.00	34.33	60.00	

Note: Standard deviations in parentheses where applicable. Deal values in millions of US dollars.

level-2 categories. Notably, this is different from the fact that PE acquirers usually begin with a larger target (the so-called 'platform' deal) when they enter a business area and then add smaller targets to the series (Pitchbook 2023). As shown later, this difference occurs partly because most acquirers in serial acquisitions are non-PE firms.[18] In the last two rows of each panel, we report the standard deviation and median deal values for each type of deal. The standard deviation is more than four times the average, and the median deal size is about 10-12% of the average, both suggesting that the distribution of deal value is highly skewed in all deal types independent of whether we employ a narrow or wide definition.

FIGURE 2. Total number of deals and sum of their values across sectors



[18] We did observe follow-on deals have a smaller deal size on average than initial deals in recent years, if we condition on PE acquirers.

Figure 2 displays significant heterogeneity in both the number and size of deals across technology sectors and deal types. The left panel shows that, beyond large sectors like application software or IT services & distribution, serial acquisitions are particularly common in business areas such as carrier infrastructure, mobility, security, semiconductors, and systems—relative to singleton deals. The right panel, which reports the total value of deals, reveals that high-value follow-on acquisitions occur in several tech sectors, while singleton deals exceed follow-on values only in a few areas, such as datacenters, infrastructure management, and storage. AI and app development & deployment stand out for having relatively modest singleton and initial deal values, yet follow-on acquisitions in these categories are among the most expensive—exceeding $1 billion, on averge. This pattern suggests that sector-specific factors, such as barriers to entry, shape the strategic value of follow-on acquisitions and help explain their prevalence and scale in certain domains.

4.2. Who engages in serial acquisitions?

Table 2 reports various acquirer attributes for singleton, initial, and follow-on deals. Since only follow-on deals are counted as serial acquisitions in our definition, we focus on them first. Classifying acquirers into three exclusive groups—PE, public non-PE (henceforth, public), and private non-PE (henceforth, private)—we find public acquirers account for 53.83-55.25% of all follow-on deals, PE acquirers account for 23.96-24.98%, and the remaining 20.79-21.19% are private acquirers. This pattern is in contrast to the disproportional public attention on PE acquirers as far as serial acquisitions.[19]

Understandably, publicly-traded non-PE acquirers and PE acquirers can more readily engage in more serial acquisitions because they may be able to access more financial resources than private non-PE firms. In fact, conditional on being public, the market value of acquirers of follow-on deals as of the deal time almost doubles that of acquirers of singleton or initial deals. What is more surprising is that many private non-PE firms engaging in serial acquisitions are venture capital (VC) funded startups themselves. Conditional on being private and VC funded, acquirers of follow-on deals tend to raise significantly more money than acquirers of singleton or initial deals.

For acquirers that conduct initial and follow-on acquisitions (henceforth, serial acquirers), the three most common level-1 categories are Application Software, Internet

[19]Since our main analysis treats subsidiaries as independent companies, we conduct a robustness check in which deals completed by subsidiaries are attributed to their parent firms. The overall qualitative pattern remains unchanged, though we observe a higher share of follow-on deals attributed to PE acquirers under this definition—an increase of approximately 8 percentage points.

TABLE 2. Summary of Acquirer Attributes

	Singleton	Initial	Follow-on
Narrow Definition: Level-1/Level-2			
Total number of deals	36,552	7,164	14,088
Percentage if acquirer is private	42.88%	25.57%	20.79%
Percentage if acquirer is public	34.64%	49.09%	55.25%
Percentage if acquirer is PE	22.49%	25.34%	23.96%
Percentage if acquirer is VC funded	16.36%	19.81%	20.49%
Percentage if acquirer's level-1 category is Application software	17.88%	20.48%	21.02%
Percentage if acquirer's level-1 category is IT services & distribution	12.16%	11.93%	12.13%
Percentage if acquirer's level-1 category is Internet content & commerce	11.47%	12.69%	13.05%
Percentage if acquirer's level-1 category is Technology portfolio investors	11.99%	8.86%	8.94%
Percentage if acquirer's level-1 category is not the above four	46.50%	46.04%	44.86%
Acquirer age by merger	23.65	26.30	30.46
Acquirer market value if public	44,824.40	43,241.18	87,424.70
	(165,831.53)	(120,020.52)	(231,426.79)
Acquirer total $ raised if private and VC funded	146.30	182.58	264.66
	(569.57)	(1,015.37)	(623.16)
Wide Definition: Level-1			
Total number of deals	27,631	8,691	21,482
Percentage if acquirer is private	48.39%	28.86%	21.19%
Percentage if acquirer is public	30.60%	45.38%	53.83%
Percentage if acquirer is PE	21.01%	25.76%	24.98%
Percentage if acquirer is VC funded	15.32%	19.46%	20.30%
Percentage if acquirer's level-1 category is Application software	17.83%	19.43%	20.25%
Percentage if acquirer's level-1 category is IT services & distribution	12.23%	11.92%	12.07%
Percentage if acquirer's level-1 category is Internet content & commerce	10.87%	12.33%	13.34%
Percentage if acquirer's level-1 category is Technology portfolio investors	11.56%	9.40%	10.55%
Percentage if acquirer's level-1 category is not the above four	47.51%	46.91%	43.79%
Acquirer age by merger	21.82	25.54	30.58
Acquirer market value if public	28,550.39	31,025.81	85,168.74
	(124,481.19)	(86,037.09)	(229,414.93)
Acquirer total $ raised if private and VC funded	126.13	162.28	273.97
	(499.38)	(883.45)	(749.34)

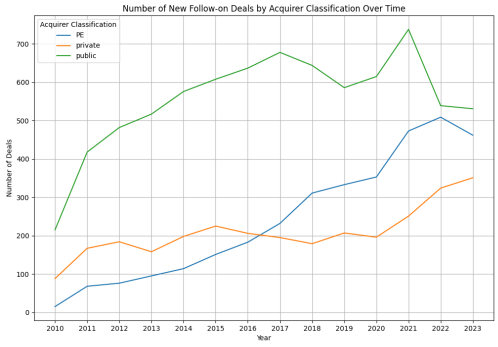
Note: Standard deviations in parentheses where applicable. Deal values in millions of US dollars.

Content & Commerce, and IT Services & Distribution. While Application Software and IT Services & Distribution are also the top two level-1 categories for acquirers of singleton deals, serial acquirers are more common in the level-1 category of Internet Content & Commerce themselves and less common in the level-1 category of Technology Portfolio Investors.

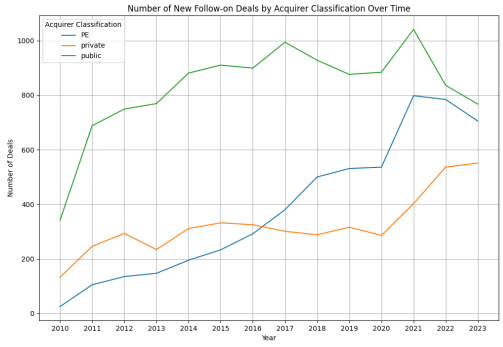
Figure 3 shows the time trend of follow-on deals by acquirer type. Independent of whether we use a narrow or wide definition for follow-on deals, the steady growth in the number of follow-on deals by public (non-PE) acquirers seems to have stopped after 2017; while follow-on deals by PE acquirers continue to grow or even accelerate after 2017, and those by private acquirers begin to have impressive growth since 2020. It is possible

FIGURE 3. Trends in follow-on deals by acquirer type

A. Narrow Definition: Level-1/Level-2



B. Wide Definition: Level-1



that stricter disclosure requirements for public firms, a decline in IPOs over time, greater access to private capital, thicker secondary markets, and low interest rates until 2022 have all made it attractive to stay private when engaging in mergers and acquisitions.

4.3. Which firms are targeted in acquisition series?

Table 3 summarizes target attributes by deal type. Surprisingly, only 9.33-10.5% of all targets were VC-funded, and only 9.66-10.41% of targets were publicly traded as of the deal time. Conditional on being VC-funded, follow-on targets have, on average, raised more dollars than singleton and initial targets as of the deal time. However, conditional on being publicly traded, follow-on targets are, on average, of a smaller market value than singleton and initial deals as of the deal time. As to target age and number of employees, follow-on targets tend to be older and larger than singleton and initial deals.

Table 3 also reports a few variables summarizing the acquirer-target relationship. Overall, 50.43-57.13% of acquirers and targets belong to the same level-1 if the deal is initial or follow-on, and these numbers are substantially higher than those for singleton deals (35.22-37.61%). Similarly, more acquirer-target pairs belong to the same level-1 and level-2 categorization for initial and follow-on deals (27.91-37.17%) than for singleton deals (19.56-22.81%). Interestingly, acquirer-target pairs are less likely to be headquartered in the same country, state or city if the deal is initial or follow-on rather than singleton. While the likelihood of having an acquirer as a minority investor in the target prior to the M&A deal is higher in follow-on deals (0.11-0.12%) than in initial and singleton deals (0.07-0.08%), these percentages are all lower than 1%, suggesting that

TABLE 3. Summary of Target Attributes

	Singleton	Initial	Follow-on
Narrow Definition: Level-1/Level-2			
Total number of deals	36,552	7,164	14,088
Percentage target is VC funded	9.87%	10.50%	9.38%
If VC funded, $ raised	62.67	59.67	81.80
	(682.23)	(485.41)	(666.71)
Percentage target is publicly traded	9.66%	10.33%	10.36%
If publicly traded, market value	41,154.00	35,514.73	35,329.24
	(128,801.11)	(67,031.97)	(64,213.63)
Target age	15.22	16.14	17.17
Target size (# of employees)	672.97	604.78	1,991.70
Percentage acquirer/target in the same level-1 category	37.61%	54.56%	57.13%
Percentage acquirer/target in the level-1 & level-2 categories	19.56%	33.85%	37.17%
Percentage acquirer/target in the country	67.65%	62.49%	55.82%
Percentage acquirer/target in the state	32.94%	25.77%	21.89%
Percentage acquirer/target in the city	9.42%	5.79%	4.42%
Percentage acquirer invested in target before	0.08%	0.08%	0.11%
Wide Definition: Level-1			
Total number of deals	27,631	8,691	21,482
Percentage target is VC funded	9.33%	10.37%	10.25%
If VC funded, $ raised	68.06	53.46	70.58
	(773.85)	(441.21)	(573.60)
Percentage target is publicly traded	9.72%	10.41%	9.97%
If publicly traded, market value	40,721.95	38,707.24	36,747.36
	(139,828.77)	(79,272.96)	(66,788.19)
Target age	14.97	15.91	16.84
Target size (# of employees)	634.58	637.32	1,573.30
Percentage acquirer/target in the same level-1 category	35.22%	50.43%	53.94%
Percentage acquirer/target in the level-1 & level-2 categories	22.81%	28.89%	27.91%
Percentage acquirer/target in the country	68.59%	64.93%	58.07%
Percentage acquirer/target in the state	35.22%	27.96%	22.39%
Percentage acquirer/target in the city	10.34%	6.64%	4.87%
Percentage acquirer invested in target before	0.07%	0.07%	0.12%

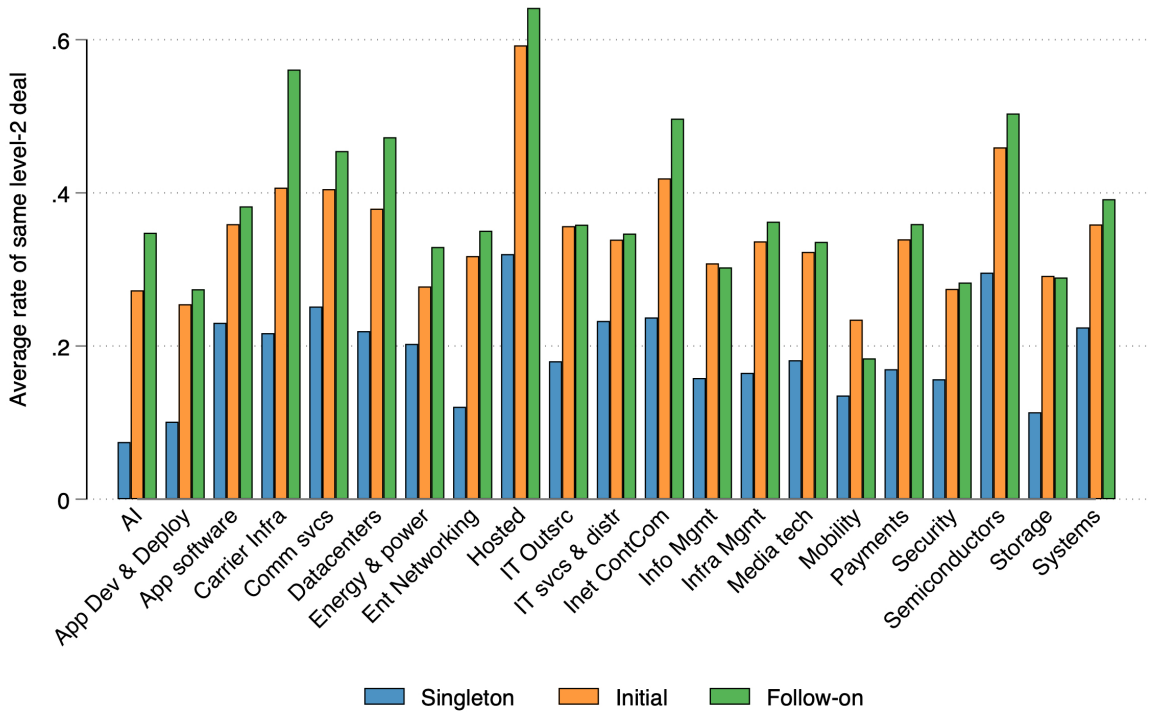
Note: Standard deviations in parentheses where applicable. Deal values in millions of US dollars.

the vast majority of targets are not acquired by their own PE or corporate investors.[20]

In Figure 4, we zoom into acquisitions that occur within the original core level-1/level-2 category of the acquirer and report the average probability of such deals across level-1

[20]Figure A.2 in the appendix depicts how the target age (as of the deal time) changes over time. Independent of deal type and narrow/wide definition, the average target age increases over time, suggesting that acquirers have become more conservative and prefer more mature targets in more recent years.

FIGURE 4. Distribution across level-1s of same-level-2 deals



categories, separately for singleton, initial, and follow-on acquisitions.[21] This breakdown is particularly informative for regulators, as acquisitions within the same category may pose a higher risk of consolidation and monopolization. We find that such same-level-2 serial acquisitions are especially prevalent in Hosted Services, Semiconductors, Internet Content & Commerce, and Carrier Infrastructure. These sectors are often characterized by strong network effects, economies of scale, or technological compatibility, which may increase incumbents' returns from engaging in serial acquisitions.

Next, we examine how acquisition series differ across acquirer types, focusing on follow-on deals. Table 4 shows that, regradless of whether we consider our narrow or broad definition, firms typically have only one series, with an average of about two follow-on acquisitions—rising to 2.5 under the broader definition. Public acquirers tend to have both more and longer series. On average, firms wait nearly two years before making their first follow-on deal, with PE and private firms acting more quickly and public firms taking longer. Among series with multiple follow-ons, the average time

[21] Figure A.4 provides additional detail by showing the full distribution of follow-on deals across level-1 categories for acquirers originating in each level-1.

TABLE 4. Series Attributes

	All	Public	PE	Private
Narrow Definition: Level-1/Level-2				
# of series	1.41	1.62	1.39	1.14
Average length of series	1.99	2.24	1.88	1.61
Time span within series (>=2 follow-on deals)	1117.74	1333.62	894.39	764.51
Time span from initial to first follow-on	705.24	787.61	610.31	640.84
HHI (0–10,000)	8483.57	8036.17	8419.74	9135.97
Wide Definition: Level-1				
# of series	1.34	1.49	1.35	1.14
Average length of series	2.47	2.93	2.40	1.82
Time span within series (>=2 follow-on deals)	1219.89	1493.12	975.14	865.68
Time span from initial to first follow-on	670.65	716.13	596.41	665.40
HHI (0–10,000)	9058.68	8704.21	9053.16	9488.31

Note: Time span measured in days. HHI is the Herfindahl–Hirschman Index (0–10,000 scale).

between successive deals is especially long for public acquirers, exceeding 3.5 years on average. Instead, PE and private firms display more compressed timelines for their series.

Finally, we compute a firm-level Herfindahl–Hirschman Index (HHI) to measure sectoral concentration in follow-on acquisitions:

$$HHI_i = \sum_j \left(100 \times \frac{A_{ij}}{\sum_j A_{ij}} \right)^2,$$

where A_{ij} is the number of follow-on acquisitions made by firm i in sector (level-1 or level-1/2) j between 2010 and 2023. Across the board, acquirers appear highly concentrated, typically focusing on a single sector—likely a reflection of the limited number of series most firms engage in.

4.4. Is GAFAM special?

Given the public and policy attention GAFAM has received as far as serial acquisitions, we next move to explore whether they display different serial acquisition patterns relative to the rest of the firms in our sample.

Consistently with the analyses in previous sections, we only count deals made directly by GAFAM firms, i.e., we do not include those by acquired GAFAM's subsidiaries. For example, Microsoft acquired LinkedIn in 2016. We count LinkedIn as one of Microsoft's

acquisitions, but we do not count the acquisitions made by LinkedIn before or after 2016 as Microsoft's deals (in cases of non-acquired GAFAM subsidiaries, e.g., Google, a subsidiary of Alphabet, and Facebook, a subsidiary of Meta, acquisitions by those subsidiaries are counted). The patterns described below are robust if we count all of the acquisitions made by acquired GAFAM subsidiaries as GAFAM deals (after their acquirers became GAFAM's subsidiaries).[22]

Comparing Tables 1 and 5 suggests that GAFAM firms are much more likely to engage in serial acquisitions than other firms. Although GAFAM firms only account for 582 (1%) of all 57,804 M&A deals in the S&P data, 56.19% of the GAFAM deals are follow-on acquisitions under our narrow definition. This number becomes as high as 84.36% when using our wide definition. The corresponding numbers in the full sample are much lower (24.37% and 37.16%). More interestingly, the length of the series—measured by the average number of follow-on deals per initial deal—is greater for GAFAM firms than for the full sample, especially when we adopt a wide definition of serial acquisitions (7.55 for GAFAM versus 2.47 in the full sample). These stark differences justify the growing attention on GAFAM firms, especially as related to serial acquisitions. That being said, one consistent pattern in the full and GAFAM samples is that follow-on deals, if they have a deal value available in the data, tend to have a larger deal size than initial and singleton deals.

Table 5. Summary of Deal Attributes: GAFAM

	Singleton	Initial	Follow-on	Follow-on/Initial
Narrow Definition: Level-1/Level-2				
# of M&A deals	145	110	327	2.97
Percentage of total deals	24.91%	18.90%	56.19%	
Percentage of deals with deal value among same deal type	15.17%	20.00%	11.93%	
Average deal value conditional on having deal value	2,351.28	1,254.63	3,597.23	1.77
	(5,859.1577)	(3,995.1589)	(12,171.2421)	
Median deal value conditional on having deal value	207.50	209.50	380.24	
Wide Definition: Level-1				
# of M&A deals	26	65	491	7.55
Percentage of total deals	4.47%	11.17%	84.36%	
Percentage of deals with deal value among same deal type	11.54%	15.38%	14.26%	
Average deal value conditional on having deal value	536.86	1,155.95	2,949.31	7.00
	(525.83)	(2,648.51)	(9,824.19)	
Median deal value conditional on having deal value	550.00	119.00	262.50	

Note: Standard deviations in parentheses where applicable. Deal values in millions of US dollars.

Figure A.5 in the appendix shows how the composition of singleton, initial, and follow-

[22]The number of GAFAM deals between 2010-2023 would increase from 582 to 633 if we count the deals made by acquired GAFAM subsidiaries.

on deals changes over time for the GAFAM sample. In contrast to what we observed in the full sample (Figure 3), all three types of deals have decreased for GAFAM firms since 2019, no matter whether we use a narrow or wide definition for serial acquisitions. This may be a direct implication of the increased scrutiny antitrust authorities have paid worldwide to these firms.

TABLE 6. Summary of Target Attributes: GAFAM

	Singleton	Initial	Follow-on
Narrow Definition: Level-1/Level-2			
Total number of deals	145	110	327
Percentage target is VC funded	34.48%	27.27%	30.28%
If VC funded, $ raised	38.61	25.06	25.33
	(141.68)	(31.80)	(48.77)
Percentage target is publicly traded	6.90%	5.45%	5.81%
If publicly traded, market value	138,026.41	142,642.05	79,394.84
	(124,308.91)	(123,524.54)	(101,144.17)
Target age	10.26	9.07	7.84
Target size (# of employees)	2,036.95	63.05	709.98
Percentage acquirer/target in the same level-1 category	15.86%	11.82%	15.29%
Percentage acquirer/target in the level-1 & level-2 categories	1.38%	3.64%	3.67%
Percentage acquirer/target in the country	68.97%	69.09%	69.42%
Percentage acquirer/target in the state	23.45%	34.55%	38.53%
Percentage acquirer/target in the city	1.38%	0.91%	3.06%
Percentage acquirer invested in target before	0.00%	0.00%	0.00%
Wide Definition: Level-1			
Total number of deals	26	65	491
Percentage target is VC funded	26.92%	24.62%	31.77%
If VC funded, $ raised	22.47	23.25	29.88
	(19.11)	(31.92)	(89.23)
Percentage target is publicly traded	11.54%	7.69%	5.50%
If publicly traded, market value	157,558.25	106,947.16	97,663.53
	(136,141.47)	(151,234.49)	(107,925.71)
Target age	12.27	10.29	8.28
Target size (# of employees)	208.33	85.75	1,040.48
Percentage acquirer/target in the same level-1 category	0.00%	9.23%	16.29%
Percentage acquirer/target in the level-1 & level-2 categories	0.00%	3.08%	3.26%
Percentage acquirer/target in the country	65.38%	75.38%	68.64%
Percentage acquirer/target in the state	15.38%	36.92%	34.62%
Percentage acquirer/target in the city	0.00%	1.54%	2.44%
Percentage acquirer invested in target before	0.00%	0.00%	0.00%

Note: Standard deviations in parentheses where applicable. Deal values in millions of US dollars.

Table 6 presents the average target attributes of GAFAM deals.[23] As compared to the full sample (Table 3), GAFAM targets are significantly more likely to be VC funded regardless of deal type (24.62-34.48% for GAFAM vs. 9.33-10.5% for the full sample), and *less* likely to be publicly traded, especially if the deal is initial or follow-on (5.45-7.69% for GAFAM vs. 9.97-10.41% for the full sample).

Furthermore, GAFAM targets tend to be much younger. In fact, within GAFAM deals, the initial and follow-on targets are even younger than singleton targets (7.86-10.29 years old vs. 10.26-12.27 years old depending on our narrow/wide definition), but the opposite is true for the full sample (where initial and follow-on targets are 15.91-17.17 years old and singleton targets are 14.97-15.22 years old as of the deal time). Opposite to the growing target age in the full sample, Figure A.3 shows that the average age of GAFAM targets either remains flat or fluctuates over time.[24]

Somewhat surprisingly, the average employment size of GAFAM's follow-on targets is more than 10 times larger than their initial targets as of the deal time. One explanation is that it is difficult for early movers in technology markets to grow while remaining independent due to pioneering costs (Lieberman and Montgomery 1998). The large percentage of missing values in employment size may also explain the considerable difference, particularly since our sample of GAFAM deals is relatively small.

Another striking difference between GAFAM targets and the full sample is that GAFAM firms are *less* likely to share the same level-1 and/or level-2 categories with their targets, but *more* likely to be headquartered in the same country and state as their targets. The latter is not surprising because GAFAM firms are headquartered in Silicon Valley or the Seattle area and these locations also tend to attract numerous tech startups. A lower level-1/level-2 overlap between GAFAM firms and their targets is more surprising. If the S&P taxonomy categories are somewhat correlated with market definitions in the minds of antitrust enforcers, this pattern suggests that GAFAM may have engaged in initial and serial acquisitions to enter new markets outside their core business areas (and then expand in them), rather than entrench the incumbency in their primary business category. Whether such behavior is pro- or anti-competitive deserves future research.

Next, we turn to the analysis of GAFAM serial acquisitions. Table 7 summarizes how

[23] Table A.1 in the appendix shows some key attributes of GAFAM firms. Because S&P classifies three of the five GAFAM firms as having Internet Content & Commerce as their primary level-1 category (the other two have level-1 categories of Systems (Microsoft) and Mobility (Apple)), more deals appear in the level-1 category of acquirers in the GAFAM sample than in the full sample. Moreover, since our sample starts in 2010 and only Facebook was private at the time, the vast majority of GAFAM deals have a public acquirer.

[24] The greater fluctuation at the end of the sample period is likely due to fewer GAFAM deals in recent years.

TABLE 7. Summary of Serial Acquisitions: GAFAM

	All	Public	Private
Narrow Definition: Level-1/Level-2			
# of series	16.83	19.40	4.00
Average length of series	3.05	3.01	4.00
Time span within series (>=2 follow-on deals)	1,692.91	1,787.79	459.50
Time span from initial to first follow-on	779.52	807.92	91.00
HHI (0–10,000)	1,355.45	1,110.92	2,578.12
Wide Definition: Level-1			
# of series	10.83	12.40	3.00
Average length of series	7.55	7.56	7.33
Time span within series (>=2 follow-on deals)	2,276.88	2,384.94	584.00
Time span from initial to first follow-on	707.69	738.26	76.00
HHI (0–10,000)	2,038.68	1,694.35	3,760.33

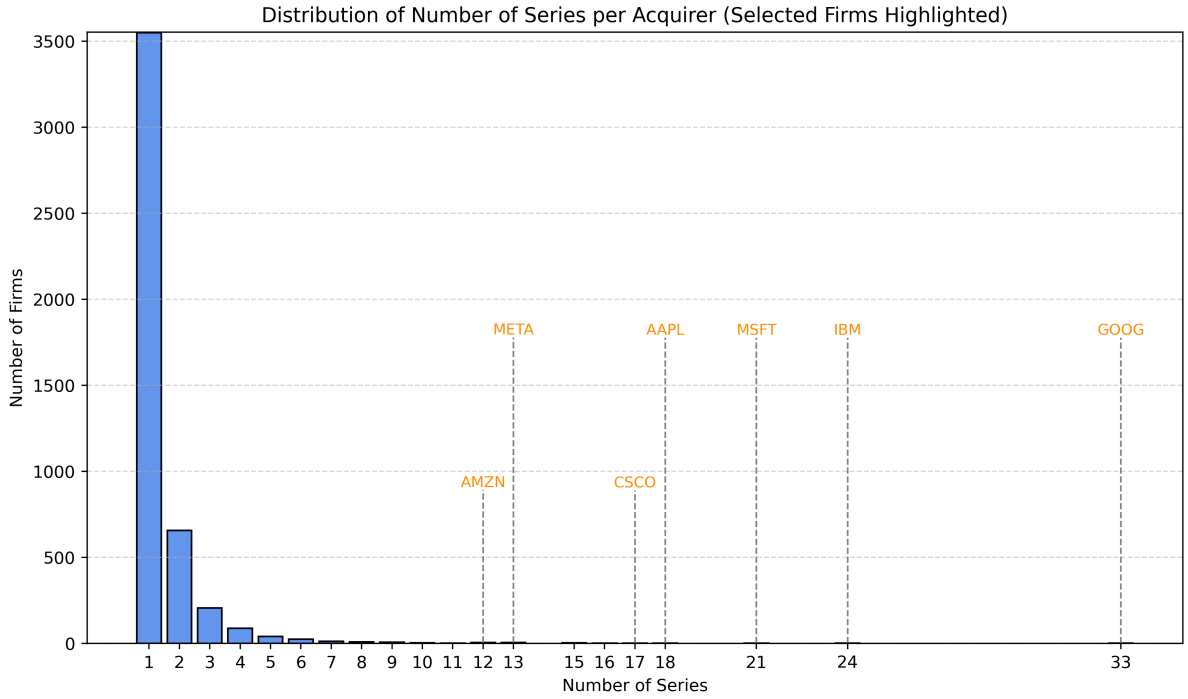
Note: Time spans are measured in days. HHI is the Herfindahl–Hirschman Index (0–10,000 scale).

GAFAM behavior differs between the period when companies were publicly listed and, in the case of Facebook, during its earlier private stage. Among the five, only Facebook was private at any point in our sample. We find that GAFAM firms tend to have longer acquisition series than other public companies. However, the average time between the initial and first follow-on deal, as well as between the first and last follow-on, is comparable to that of other public acquirers. The four acquisition series completed by Facebook while still private stand out: follow-on deals occurred much more rapidly than is typical for either public or private firms in our sample. On average, Facebook made its first follow-on acquisition just three months after the initial deal and completed its series within roughly 15 months. Additionally, we observe substantial dispersion in the categories targeted by GAFAM firms across their series, consistent with prior research showing that these firms pursue technological diversification through an "acquire-adjacent-and-then-expand" strategy (Jin, Leccese and Wagman 2023).

The most striking difference lies in the number of acquisition series GAFAM firms undertake relative to other companies in our sample. While most public firms typically engage in only one or two series, GAFAM firms pursue substantially more. This disparity might raise concerns about consolidation, but it is important to note that our sample includes only tech-related deals and is not restricted to tech acquirers. As a result, average series counts across the board may be diluted by non-tech firms making a small number of acquisitions in a single category to secure specific technologies.

To address this, Figure 5 plots the distribution of series counts among public firms.

FIGURE 5. Distribution of number of series per acquirer



Notes: Selected leading public serial acquirers in the figure are labeled using their ticker symbols.

The figure confirms that GAFAM firms are among the top serial acquirers, but they are not alone. Other tech giants, such as IBM and Cisco—with 24 and 17 series, respectively—also stand out.[25] Among GAFAM firms, Google emerges as the most active serial acquirer, followed by IBM and Microsoft (21), while Apple (18), Amazon (13), and Meta (12) lag slightly behind.

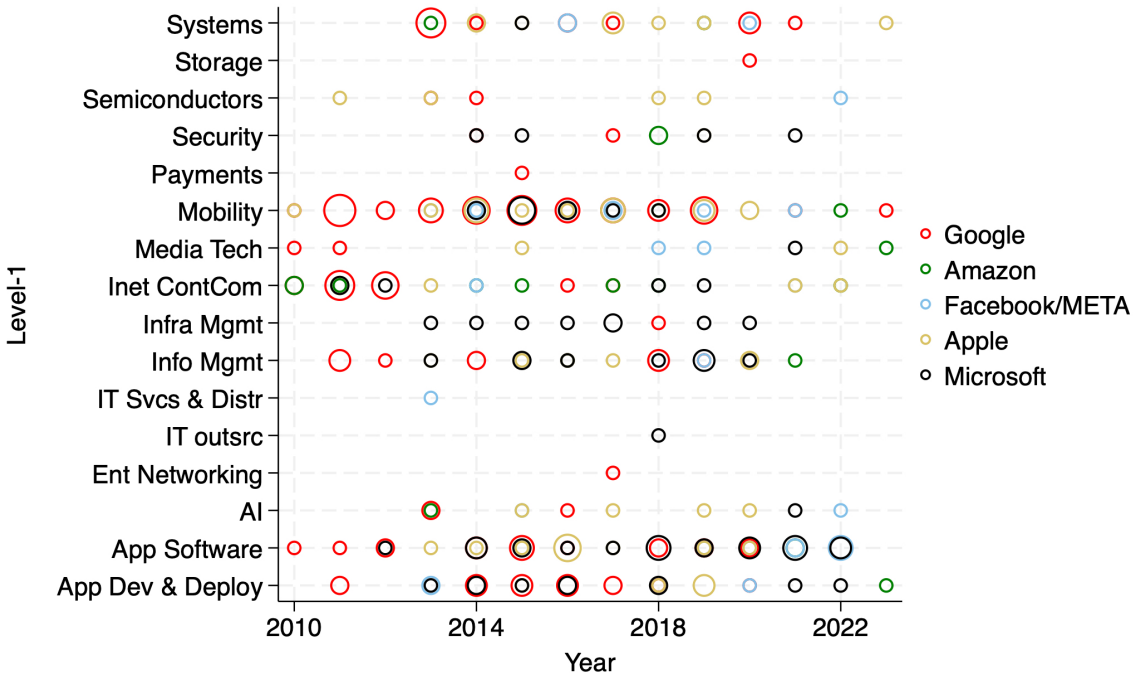
In light of the heterogeneity across GAFAM firms in their serial acquisition behavior, we visualize the distribution of their follow-on deals over time and across technological categories. Specifically, Figure 6 uses the narrow definition of follow-on acquisitions and plots their distribution by level-1 sectors. The size of each circle reflects the number of follow-on deals in a given level-1-year. Several patterns emerge.

First, there is substantial overlap in acquisition activity across GAFAM firms, indicating that these companies often compete within the same technological domains. Most level-1 sectors feature follow-on acquisitions by multiple GAFAM firms, suggesting a convergence in strategic priorities and a shared focus on key technologies. Only a few

[25]There are also four firms with 15 series: Oracle, Accenture, Thoma Bravo, and Volaris Group, and one firm with 16 series (J2 Global).

categories—such as Enterprise Networking, IT Outsourcing, IT Services & Distribution, Payments, and Storage—exhibit follow-on activity by a single GAFAM firm (either Google, Microsoft, or Meta).

FIGURE 6. GAFAM serial acquisitions across level-1s



Notes: The figure shows the distribution of follow-on deals made by each GAFAM firm over time level-1 sectors. The size of the circles reflects the number of follow-on deals in a given level-1-year. Follow-on deals are tagged using the narrow definition, i.e a when they are the second or a subsequent deal completed by a firm in a level-1/level-2 where that same firm had already acquire before.

Second, the timing and intensity of follow-on activity vary considerably. Google initiated serial acquisitions earlier and across a wider range of sectors, consistent with its historically aggressive acquisition strategy. Apple also engages in serial acquisitions across many level-1 categories and has been the first mover in areas such as Mobility and Semiconductors. In contrast, Microsoft and Meta are more concentrated in specific domains—for instance, Microsoft in Infrastructure Management and Meta in Mobility. Amazon has fewer acquisition series overall and, with the exception of Internet Content & Commerce, never engaged in more than two serial deals within the same level-1 category in our sample. In that domain, Amazon was also the first mover.[26]

[26] Alongside Google, Amazon was also among the first GAFAM firms to complete a serial acquisition in Artificial Intelligence and Systems.

To summarize, GAFAM firms differ from the rest of the sample, as they engage more in serial acquisitions, expand more beyond the categories of their core business areas, and focus more on younger, smaller, VC-funded, private targets, especially in the initial and serial deals of a series. This distinctive pattern is consistent with policymakers' growing attention on GAFAM, as highlighted by the two antitrust cases against Google/Alphabet and Facebook/Meta. That being said, the initial and follow-on deals conducted by GAFAM account for 2.6-3.1% (depending on whether we use a narrow or wide definition) of all initial and follow-on deals observed in the S&P data in our sample, suggesting that GAFAM activities are not representative of serial acquisitions in the tech sector. Moreover, we provide evidence of substantial heterogeneity within GAFAM in terms of tech acquisition intensity, sectoral focus, and timing, suggesting that a one-size-fits-all policy approach may overlook important differences in how these firms operate.

5. Serial Acquisition by Public Firms

Because public non-PE acquirers account for more than 50% of serial acquisitions, this section examines how partaking in serial acquisitions relates to the concurrent market value of public acquirers.

5.1. Which public firms engage in serial acquisitions?

We examine what types of public non-PE firms are more likely to engage in serial acquisitions. To carry out the analysis, we merge the S&P data with Compustat data and focus on public non-PE firms that are based in the US and have acquired at least a tech company in 2010-2023—and hence appear as acquirers in the S&P data.[27]

We further merge our sample with the Hoberg-Phillips TNIC3 HHI data from Hoberg and Phillips (2016), which captures the intensity of competition among all public firms. Specifically, using 10-K annual filings, this database identifies a set of competitors for each public firm.[28] Then, based on each firm's share of sales within the set, an HHI is computed. Since each firm has its own set of rivals in a given year, the TNIC3 HHI varies

[27] Most of the public firms in the sample remain public from 2010 to 2023 so we can observe their market value throughout. A few public firms were delisted and became private sometime between 2010 and 2023. We keep their yearly records until their delisting. Similarly, for companies that went public after 2010 (e.g., Facebook/Meta), we collect their information from that year on.

[28] Any pair of firms belong to the same TNIC3 if their cosine similarity based on 10-K annual filings is above a certain threshold. This threshold is chosen so that if one picks two firms at random from the Compustat universe, the likelihood of them belonging to the same three-digit SIC code is the same as the one of belonging to the same TNIC3 (2.05%).

at the firm-year level. By definition, firms with a higher TNIC3 HHI are likely to operate in more concentrated markets and thus face less competition.

Thus, we define two samples. The full sample consists of 10,412 unique U.S. companies that were publicly listed at any point between 2010 and 2023. The tech-acquirer sample is a subset resulting from merging the S&P dataset with Compustat and includes 2,099 companies. We use these two cross-sectional samples to examine the firm-level attributes associated with the propensity to engage in serial acquisitions and the number of such acquisitions completed.

Throughout this analysis, we rely on the narrow definition of serial acquisitions to tag deals. Specifically, we regress either (i) an indicator for whether a firm completed any serial acquisitions between 2010 and 2023 or (ii) the total number of serial acquisitions in the same period, on a set of baseline firm characteristics: the logarithm of market value, the logarithm of R&D expenditure, and the logarithm of number of employees, as well as the firm's age since going public.[29] All covariates are measured at the firm's first post-2010 appearance in our data—typically as of 2010, or the first year the firm appears if it went public later. Because some covariates have missing values, we impute missing observations with zeros and include indicator variables for missingness. We augment the model with 3-digit NAICS code fixed effects and cluster standard errors at the firm level. We estimate a logit model to analyze the likelihood of engaging in any serial acquisitions and a Poisson model to assess the number of serial acquisitions completed. The results are summarized in Table 8.

We find that among firms engaging in at least one tech M&A deal, those with higher market value, fewer employees, a longer public history, and operating in less concentrated markets are more likely to engage in serial acquisitions. Specifically, a 1% increase in market value is associated with an increase in the odds of making any serial acquisition by approximately 0.12%, whereas a 1% increase in the number of employees is associated with a decrease in the odds of making any serial acquisition by approximately 0.17%. Additionally, the coefficient on TNIC HHI suggests that a monopolist has approximately 50% lower odds of becoming a serial acquirer than firms operating in highly fragmented markets with many small competitors.[30] Interestingly, a 1% larger R&D expenditure does not impact the propensity to make any serial deal, but it increases the total number of follow-on deals by 24.11%. Results are similar when considering the number of deals, except for TNIC HHI is not statistically significant at

[29] Throughout the analysis, we add one to variables before log transformation to account for zero values and retain observations in the estimation sample.

[30] However, market concentration does not significantly impact the number of serial deals completed.

TABLE 8. Determinants of Serial Acquisitions

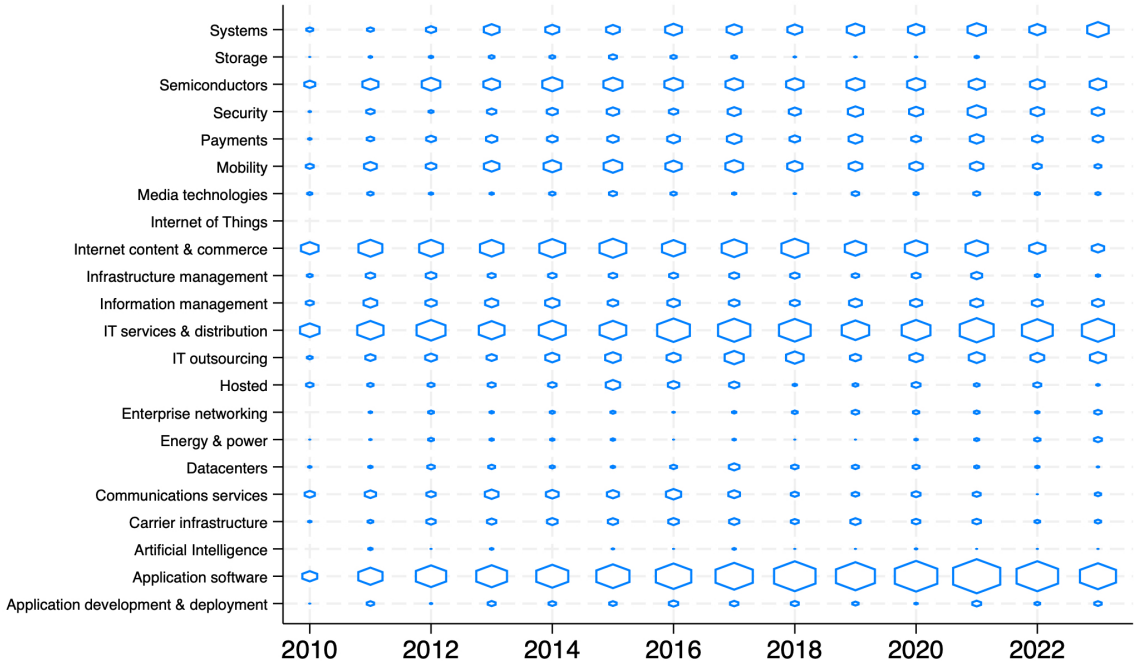
Dep. var.	Any serial deal		Total serial deals	
Sample	Full	Tech-acquirer	Full	Tech-acquirer
	(1)	(2)	(3)	(4)
log(Market Value)	0.298***	0.125***	0.288***	0.179***
	(0.0350)	(0.0407)	(0.0558)	(0.0621)
log(R&D Expenditure)	0.0513	0.0355	0.170***	0.216***
	(0.0358)	(0.0399)	(0.0492)	(0.0566)
log(Employment Size)	-0.0722	-0.171***	0.00705	-0.0289
	(0.0536)	(0.0578)	(0.0718)	(0.0768)
TNIC HHI	-0.354*	-0.701***	-0.240	-0.364
	(0.212)	(0.230)	(0.239)	(0.238)
Public Age	-0.00714*	0.0171***	0.000053	0.0160***
	(0.00385)	(0.00498)	(0.00520)	(0.00543)
Missing Market Value (dummy)	1.316***	1.735***	1.556***	1.949***
	(0.300)	(0.404)	(0.466)	(0.550)
Missing R&D (dummy)	-0.0198	0.0843	0.383*	0.583**
	(0.146)	(0.179)	(0.215)	(0.247)
Missing Employment (dummy)	-0.637***	-0.286	-0.795**	-0.185
	(0.238)	(0.357)	(0.332)	(0.379)
Missing TNIC HHI (dummy)	-1.170***	-1.079***	-1.202***	-1.115***
	(0.168)	(0.190)	(0.195)	(0.208)
Observations	10,412	2,099	10,412	2,099
NAICS 3-digit FE	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm
Model	LOGIT	LOGIT	POISSON	POISSON

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

the 5% level anymore. The Tech-acquirer sample is our preferred one because the full sample includes firms that have never engaged in tech deals in 2010-2023 which makes the existence of systematic differences across types of firms more likely to explain our sample. Yet, we show our results using this sample in columns (1) and (3) of Table 8, and the main qualitative patterns discussed above remain robust.

To further explore the determinants of serial acquisitions, we consider whether firms are influenced by the serial acquisition behavior of others operating in the same technological space. Figure 7 illustrates the distribution of follow-on deals by public firms across level-1 categories over time. Each hexagon's size corresponds to the number of follow-on deals in that sector-year, revealing that serial acquisitions are both persistent and broadly distributed across tech sectors, with consistent activity in areas such as Application Software, IT Services & Distribution, and Internet Content & Commerce.

FIGURE 7. Serial deals across level-1s



The widespread and sustained presence of follow-on activity suggests that public firms systematically rely on serial acquisitions to build or consolidate capabilities in key domains. This pattern is consistent with a form of strategic clustering, whereby firms respond to peer behavior and perceived competitive pressures within specific markets.

5.2. Serial acquisitions, performance, market competitiveness, and innovation

Similarly to Section 5.1, we focus on U.S.-based public non-PE firms that went public before the start of our sample period (2010) and appear in at least one deal in the S&P dataset. We merge this sample with Compustat to obtain annual firm-level information between 2010 and 2023, resulting in a panel dataset of active public acquirers. We then examine a set of outcome variables that reflect firm performance, market competitiveness, and innovation output.

To capture performance, we use market value. For market competitiveness, we include both TNIC3 HHI and product market fluidity, where the latter reflects the extent to which firms modify their product offerings over time. High fluidity indicates more dynamic industries where incumbents face greater competitive threats (Hoberg, Phillips and Prabhala 2014). To assess innovation output, we consider three measures: the number

of patent applications filed, the citations received by those patents, and the private real value of patents filed in a given year, as proposed by Kogan et al. (2017).

To leverage time variations, we consider the start of serial acquisitions—i.e., the date of the first follow-on deal—as the beginning of the "treatment." Cross-sectional variation originates from whether firms ever engaged in serial acquisitions between 2010 and 2023. Thus, the "control pool" includes sampled public firms without any serial acquisitions, almost all of which have made non-serial acquisitions as tracked by S&P between 2010 and 2023. Thus, we can carry out a difference-in-differences (DiD) analysis:

$$Y_{i,t} = \beta_1 \textit{Serial Start}_{i,t-1} + u_i + v_{m,t} + \varepsilon_{i,t}, \tag{1}$$

where $Y_{i,t}$ is one of the dependent variables considered; $\textit{Serial Start}_{i,t}$ is a dummy that is equal to one on and after the year when firm i starts any serial acquisitions. Since firms may make acquisition decisions based on their concurrent market value, rather than the other way around, we include the one-year lag $\textit{Serial Deal}_{i,t-1}$ in the specification; u_i and $v_{m,t}$ represent firm and market by year fixed effects; ε_{it} is the residual. We define a firm's market as the S&P level-1 sector for acquirers classified as tech firms in S&P, and as the NAICS 3-digit industry for non-tech acquirers, since otherwise S&P groups non-tech firms into a residual category labeled "Non-tech sector." We cluster standard errors at the firm level.

We estimate treatment effects via OLS using both two-way fixed effects (TWFE) and the doubly robust estimator developed by Callaway and Sant'Anna (2021) (henceforth CS), which addresses the bias that can arise in TWFE settings with staggered treatment timing due to implicit negative weighting. The CS approach mitigates this issue by constructing appropriate comparisons between not-yet-treated and already-treated units within each cohort-period.

Table 9 reports the estimated effects of initiating a serial acquisition series on firm outcomes, using both TWFE (Panel A) and the doubly robust estimator developed by CS (Panel B).[31] Across both specifications, we find that serial acquisitions are associated with economically meaningful increases in firm performance and innovation outcomes. In particular, the CS estimates indicate that the onset of a serial acquisition series leads to a statistically significant increase in market value (10.8%) and patent value (19%). While the coefficient on patent counts is positive, it is only statistically significant under the TWFE specification. We find no robust effects on product market fluidity or TNIC

[31] Figure A.6 presents event study estimates based on the CS approach, illustrating dynamic patterns around the initiation of serial acquisition series.

Table 9. Serial Acquisitions and Firm Outcomes

Dep. var.	(1) $log(MktValue)$	(2) $log(PatentCounts)$	(3) $log(PatentCites)$	(4) $log(PatentValue)$	(5) Product fluidity	(6) TNIC HHI
Panel A: TWFE						
$Serial\ Start_{it-1}$	0.0508	0.0952**	0.0554	0.172***	-0.0449	-0.00600
	(0.0365)	(0.0381)	(0.0579)	(0.0648)	(0.0801)	(0.00710)
Observations	14,207	14,324	14,324	14,324	12,780	12,827
R-squared	0.962	0.947	0.895	0.922	0.747	0.743
Panel B: CS						
$Serial\ Start_{it-1}$	0.103**	0.0824	0.0504	0.174**	-0.0334	-0.00615
	(0.0437)	(0.0518)	(0.0803)	(0.0875)	(0.0941)	(0.00965)
Observations	14,207	14,324	14,324	14,324	12,780	12,827
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Market*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

HHI, suggesting that serial acquisitions do not measurably alter firms' perceived market positioning or competitive threat. These findings are consistent with serial acquisitions enhancing firm performance primarily through innovation-related synergies rather than by reshaping product market competition.

Table 10. Instrumental Variable Regressions

Sample	(1) tech-acquirer OLS	(2) tech-acquirer 2SLS	(3) tech-acquirer 2SLS	(4) tech-acquirer 2SLS	(5) tech-acquirer 2SLS	(6) tech-acquirer 2SLS	(7) tech-acquirer 2SLS
DV	$Serial\ Start_{it-1}$	$log(MktValue)$	$log(PatentCounts)$	$log(PatentCites)$	$log(PatentValue)$	Product fluidity	TNIC HHI
$Serial\ Start_{it-1}$		1.553*	0.289	0.213	0.619	-4.480*	-0.190
		(0.860)	(0.625)	(1.070)	(1.001)	(2.714)	(0.225)
$Serial\ ShareIV_{it-1}$	0.116***						
	(0.0365)						
Observations	14,324	14,207	14,324	14,324	14,324	12,780	12,827
R-squared	0.766	-0.449	-0.006	-0.002	-0.010	-0.556	-0.102
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered SE	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Under-identification (p-value)		0.000684	0.00114	0.00114	0.00114	0.0108	0.00887
Weak-identification (Kleibergen-Paap F)		11.07	10.15	10.15	10.15	6.239	6.574

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Since unobserved factors—such as demand shocks in specific technology categories—may jointly influence both the decision to initiate a series of acquisitions and firm performance outcomes (e.g., innovation output or valuation), we provide additional evidence by constructing an instrumental variable using executive and board affiliation

data from BordEx. Our instrument for the endogenous regressor *Serial Start* is based on the premise that serial acquisition strategies can be learned through exposure to peers. Specifically, we link each focal firm to other firms where its current board members and executives previously held positions, excluding any linked firms operating in the same 3-digit NAICS industry to isolate learning from competitive effects. The instrument is formally defined as the share of serial acquisitions among all M&A deals conducted by these linked firms over the past ten years. A higher share reflects greater exposure to serial acquisition behavior, which we expect to increase the likelihood that the focal firm adopts a similar strategy.

Table 10 presents IV estimates of the relationship between initiating a serial acquisition series and firm outcomes, using the share of serial acquisitions among board- and executive-linked firms (*SerialShareIV*) as an instrument. Column (1) reports the first-stage regression, confirming that the instrument is a strong predictor of serial acquisition behavior: the coefficient on *SerialShareIV* is positive and statistically significant at the 1% level. The Kleibergen-Paap F-statistic in the second stage exceeds the conventional threshold of 10 in most specifications, indicating that weak instrument concerns are limited, particularly for the market value and innovation outcomes (Columns 2–5).

In the second-stage regressions, we find that serial acquisitions are associated with a statistically significant increase in market value, with an estimated effect significant at the 10% level. This is consistent with our earlier findings and supports the interpretation that initiating a serial acquisition series can enhance firm valuation. The estimated effects on innovation outcomes (patent counts, citations, and patent value) are all positive but not statistically significant, suggesting that the IV approach yields weaker evidence on innovation benefits than the difference-in-differences specifications. We also find a negative and marginally significant effect on product market fluidity, which indicates reduced competitive threats for serial acquirers following the start of a series. There is no significant effect on TNIC HHI, consistent with prior estimates suggesting a limited impact of serial acquisitions on product market concentration.

Overall, the IV results confirm serial acquisition strategies are positively associated with firm performance, particularly in terms of market value, while providing more limited evidence on innovation and market competitiveness effects. These findings should be interpreted with some caution, given the borderline statistical significance and variation in instrument strength across outcomes.

6. Conclusion

With increasing antitrust concerns on serial acquisitions, there is a growing demand to better understand the prevalence and trend of serial acquisitions, as well as which organizations are involved in these acquisitions, why they are involved, and what impact these acquisitions have on related parties and the market as a whole. This paper takes a first step to explore these questions.

In particular, we define and study serial acquisitions in the technology sector from 2010 to 2023, leveraging a granular taxonomy from S&P. We find four key patterns: (1) serial acquisitions account for 24-37% of all majority control deals tracked by S&P; (2) 54-55% of the serial acquisitions are carried out by public non-PE firms, with another 21% by private non-PE firms; (3) targets in serial acquisitions are on average older and larger than those in initial deals of a series; and (4) GAFAM firms are distinctive from the rest of the sample as they engage more frequently in serial acquisitions, expand more beyond their core business categories, and focus more on younger, smaller, VC-funded, private targets, particularly in the serial and initial deals in a series. We also find that for public firms, engaging in serial acquisitions is associated with higher market values and patent private values. Although we do not have sufficient evidence to claim causal effects from these positive correlations, the correlations alone point to the possibility that serial acquisitions can be helpful to the acquiring firms.

Since most serial acquirers are public firms, we further investigate the drivers of their decision to pursue a series of acquisitions as well as how following such a strategy may affect their returns, market competitiveness, and innovation outcomes of public non-PE acquirers. First, we find that higher market valuation, larger R&D expenditure, fewer employees, longer public history, and a less concentrated product market are all associated with either a higher likelihood to engage in serial acquisition or with the number of serial deals completed throughout our sample. Moreover, combining Compustat with S&P data, we adopt a difference-in-differences design leveraging the staggered beginning of a series by an acquirer as a source of variation. To provide further evidence on the relationship between serial acquisitions and firm outcomes, we construct an instrumental variable using data on executive and board affiliations from BordEx. We interpret our results as evidence of a positive correlation between the initiation of a serial acquisition series and a firm's market value and the quality of its innovation output, as measured by the private value of patents estimated by Kogan et al. (2017).

Our study seeks to shed light on serial acquisitions in the tech sector, with a particu-

lar focus on the ICET segment. However, it is important to emphasize that our findings do not address the pro- or anti-competitive implications of serial acquisitions, as we lack precise definitions of antitrust markets and do not observe market-specific outcomes. For the same reasons, we cannot offer recommendations on how antitrust agencies should approach serial acquisitions. Instead, by mapping the landscape of serial acquisitions within the ICET sector, our work serves as a starting point for future research to investigate further the reasons behind serial acquisitions, as well as their effects on market competition and technological innovation.

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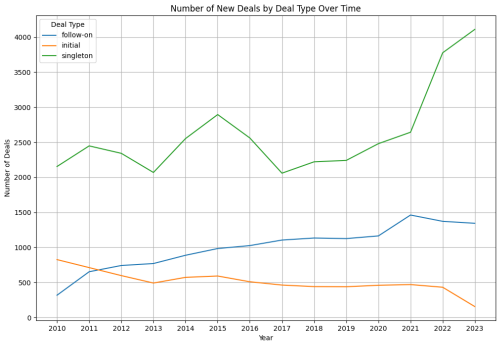
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Appendix A. Additional figures and tables

FIGURE A.1. New Deals by Deal Type Over Time

A. Narrow Definition: Level-1/Level-2



B. Wide Definition: Level-1

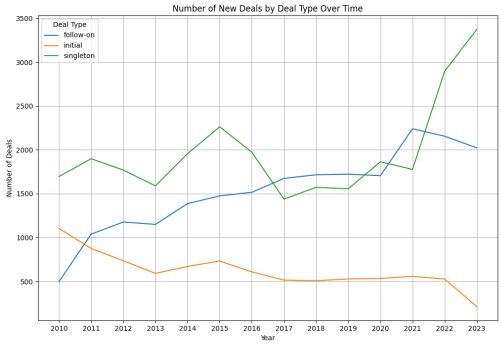
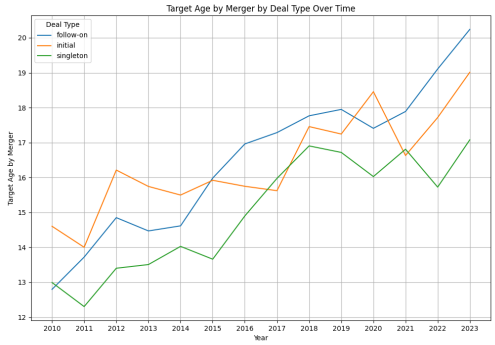


FIGURE A.2. Average Target Age by Deal Type Over Time (Full Sample)

A. Narrow Definition: Level-1/Level-2



B. Wide Definition: Level-1

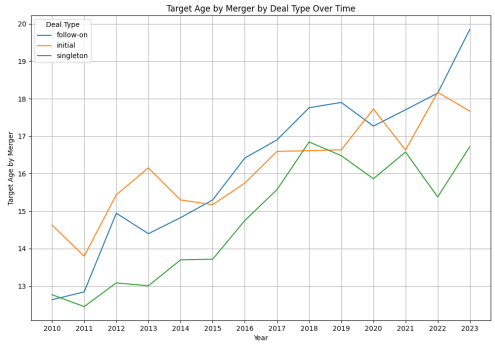


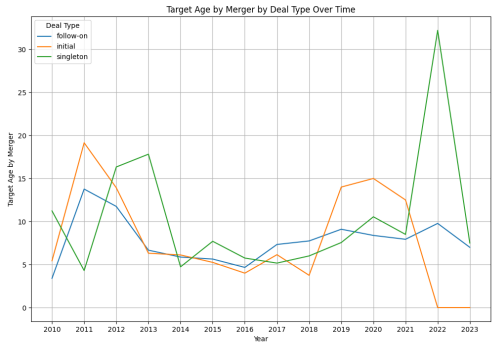
Table A.1. Summary of Acquirer Attributes: GAFAM

	Singleton	Initial	Follow-on
Narrow Definition: Level-1/Level-2			
Total number of deals	145	110	327
Percentage if acquirer is private	7.59%	3.64%	4.89%
Percentage if acquirer is public	92.41%	96.36%	95.11%
Percentage if acquirer's level-1 category is Internet content & commerce	66.21%	61.82%	57.80%
Percentage if acquirer's level-1 category is Systems	21.38%	20.00%	22.32%
Percentage if acquirer's level-1 category is Mobility	12.41%	18.18%	19.88%
Acquirer age by merger	20.34	23.21	28.44
Acquirer market value if public	643,224.03	359,549.30	675,720.59
	(598,193.41)	(280,621.65)	(496,123.33)
Wide Definition: Level-1			
Total number of deals	26	65	491
Percentage if acquirer is private	23.08%	4.62%	4.48%
Percentage if acquirer is public	76.92%	95.38%	95.52%
Percentage if acquirer's level-1 category is Internet content & commerce	69.23%	63.08%	59.88%
Percentage if acquirer's level-1 category is Systems	19.23%	20.00%	22.00%
Percentage if acquirer's level-1 category is Mobility	11.54%	16.92%	18.13%
Acquirer age by merger	17.73	19.81	26.66
Acquirer market value if public	892,730.76	291,222.39	636,552.13
	(783,534.25)	(216,760.14)	(501,159.41)

Note: Standard deviations in parentheses where applicable. Deal values in millions of US dollars.

Figure A.3. Average Target Age by Deal Type Over Time (GAFAM No Children)

A. Narrow Definition: Level-1/Level-2



B. Wide Definition: Level-1

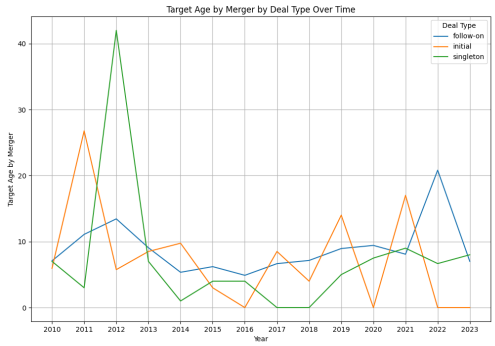


FIGURE A.4. Distribution across acquirer-target level-1s

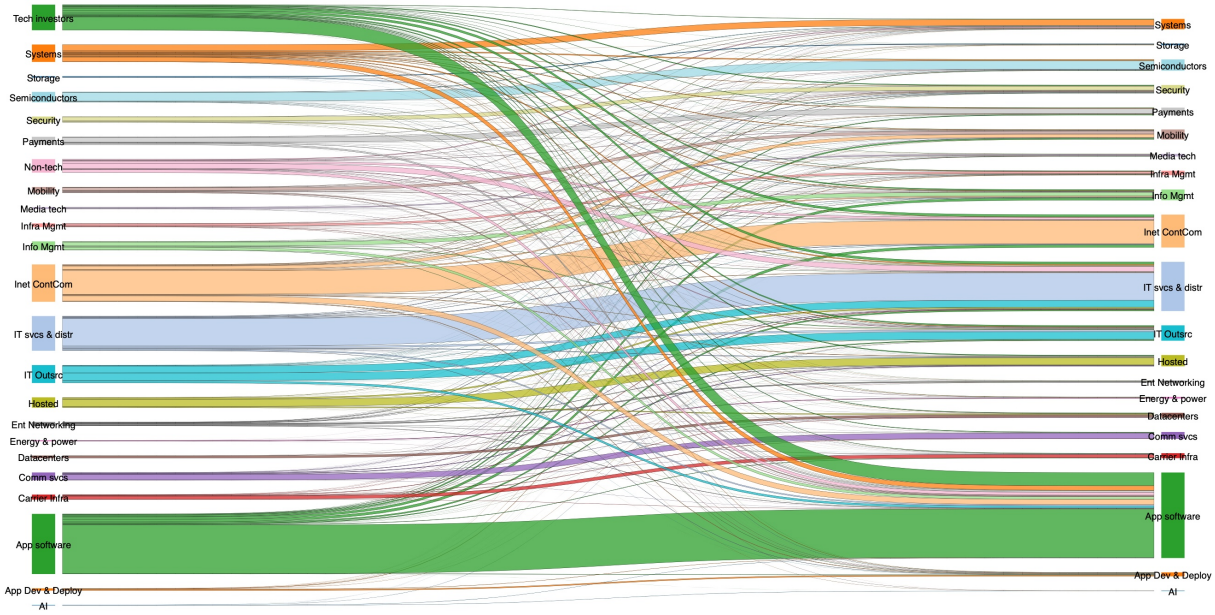
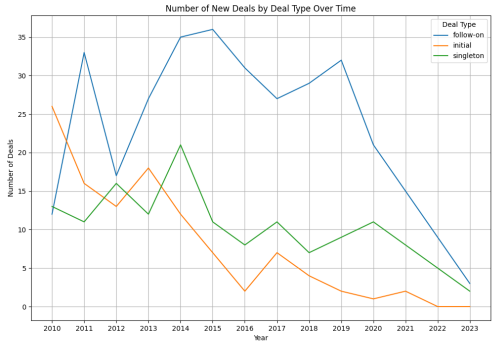


FIGURE A.5. New Deals by Deal Type Over Time (GAFAM No Children)

A. Narrow Definition: Level-1/Level-2



B. Wide Definition: Level-1

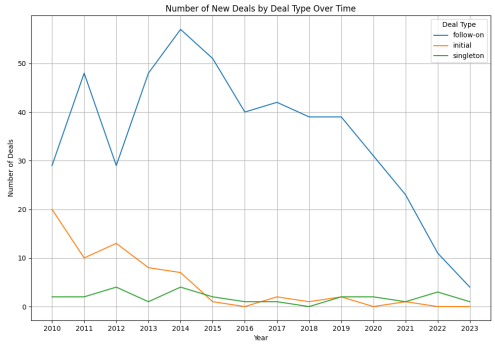


FIGURE A.6. Event-study Analyses

