

Private Equity and Industry Competition

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Abstract

This paper studies how different types of ownership shape industry structure, with a special focus on private equity. Using ownership and financial data for UK public and private firms from 2002 to 2021, we decompose changes in the Herfindahl index exactly into contributions from ownership reallocation, differential growth, and net entry, and attribute each contribution to private equity-owned, listed, and non-listed firms. The decomposition shows that ownership reallocation raises concentration but is more than offset by differential growth, while net entry is small in the aggregate. Private equity-owned and listed firms contribute similarly to ownership-driven consolidation, despite private-equity owned firms holding 40% less market share on average. Meanwhile relative growth among non-listed firms is the main countervailing force. Industry markup changes are associated with growth and net entry, mainly among non-listed firms, but not systematically with ownership-driven consolidation. Observed concentration therefore masks substantial and offsetting changes in ownership and firm dynamics.

Key Words: Private Equity, Corporate Ownership, Buyouts, Industrial Organization, Consolidation

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1 Introduction

The level of competition in an industry matters for the distribution of welfare, and recent work has raised concerns that competitiveness may have declined over recent decades (De Loecker et al. 2020). Yet it is unclear how much different competitive forces contribute to changes in industry concentration, a common proxy for competitiveness. Observed concentration can mask underlying competitive dynamics, since different forces need not move in the same direction. In this paper, we separate three channels and study how ownership reallocation through mergers and acquisitions, differential growth among incumbents, and the entry and exit of firms have contributed to the evolution of industry concentration.

Ownership changes are a particularly important channel because they mechanically reshape market shares at a given point in time and can drive changes in markups, particularly when deals fall below standard antitrust notification thresholds (Wollmann 2019; Kepler et al. 2023). At the same time, the organic growth of superstar firms has received widespread attention due to its implications for aggregate labor shares and markups (Autor et al. 2020). More broadly, market structures may evolve through both mergers and acquisitions or organic growth, which can be harder to detect by antitrust agencies (Bresnahan and Reiss 1991; Aghion et al. 2021). Finally, reallocation of market shares is further shaped by the entry and exit of firms.

Crucially, these forces need not move concentration in the same direction. An industry can experience substantial ownership consolidation while concentration remains stable or falls because smaller continuing firms grow faster, or because entry and exit change the distribution of activity. We refer to the combined contribution of growth and net entry as *firm dynamics*. Our baseline decomposition measures these contemporaneous offsets. Separating the channels is economically important because the observed change in concentration can conceal substantial restructuring underneath a modest net movement. The significance of ownership consolidation should therefore be evaluated together with the firm dynamics occurring in the same industries to understand whether these contributions reinforce or offset one another.¹

A central contribution of this paper is to bring ownership identity into the analysis of industry concentration. We differentiate between the types of owners behind these concen-

¹In extension of this argument, the drivers may also respond to the information or expectations, but have differential effects on concentration. For example, strong industry growth prospects may attract entry and M&A, while both may have opposing effects on concentration in expectation.

tration drivers by classifying firms as listed, private equity-owned, or non-listed non-PE. This distinction is particularly relevant for private equity, which has grown substantially as an asset class and has become an increasingly active participant in the market for corporate control. In leveraged buyouts, private equity firms acquire controlling stakes and actively restructure firms, affecting growth, acquisition behavior, and exit decisions.² Private equity ownership is more frequently associated with buy-and-build strategies, which mechanically increase concentration through sequential acquisitions, while other PE-driven transactions, such as carve-outs or divestments, can have the opposite effect.³ As a result, changes in industry concentration may reflect not only firm-level performance, but also systematic differences in how ownership types expand, consolidate, or fragment markets.

Whether concentration channels differ systematically across ownership types and whether the contributions of different owner types act as complements or substitutes remain open empirical questions. Previewing our findings, private equity-owned and listed firms make similarly positive contributions within the ownership channel and therefore reinforce one another. Across channels, however, growth among listed and non-listed non-PE firms offsets this ownership-driven consolidation. The findings thus contain both patterns: complementarity within ownership reallocation and substitution between ownership reallocation and firm dynamics.

The study utilizes data spanning two decades (2002–2021) and covers both public and private firms in the United Kingdom. We collect ownership and financial information on over 4.5 million legal entity-years, which we classify at the four-digit NACE industry level. This comprehensive coverage is essential for separating ownership-driven changes in concentration from growth-driven and net-entry-driven dynamics, particularly in fragmented markets where private firms account for the bulk of activity. Detailed ownership links further allow us to distinguish the contributions of private equity-owned, listed, and non-listed firms within the same industry. Our main analysis focuses on non-tradable sectors, where

²Since Jensen (1989), a large stream of literature has shown that private equity ownership is related to improvements in operations (Davis et al. 2014). These improvements may arise from changes in management practices (Bloom et al. 2015) and from the relaxation of financial constraints (Boucly et al. 2011; Cohn et al. 2022). A non-exhaustive list includes Kaplan (1989), Boucly et al. (2011), Acharya et al. (2013), Davis et al. (2014), Lerner et al. (2011), Davis et al. (2019), Edgerton (2012), and Bloom et al. (2015). See Kaplan and Strömberg (2009) on value drivers in leveraged buyouts and Sorensen and Yasuda (2023) for a review of the literature review.

³Concerns about buy-and-build strategies have been raised by antitrust authorities, including the DOJ and the UK CMA. Existing studies mainly focus on firm-level operations and valuations rather than industry-level competition (Hammer et al. 2017; Bansraj et al. 2022). Other PE-driven transactions such as carve-outs and divestments can have the opposite effect by increasing the number of industry participants

domestic firms provide a closer approximation of the relevant competitive environment.⁴

Building on these data, we decompose changes in industry concentration into ownership reallocation, differential growth, and net entry. Intuitively, the ownership component compares concentration when the same economic activity is grouped under the ownership structures observed before and after a change in control. A merger combines previously separate market shares, whereas a divestment separates them. The growth component holds ownership and the set of market participants fixed while allowing their revenues to change. Net entry captures the remaining change from entire ownership structures entering or exiting the market. Because these changes interact through market shares, we calculate each channel’s contribution under every possible ordering and take the average. The resulting components add to the observed change in the Herfindahl. We then attribute each channel to private equity-owned, listed, and non-listed non-PE firms.

Our analysis reveals that changes in industry concentration are shaped by two dominant and opposing forces. Ownership reallocation raises concentration on average, whereas differential growth among continuing firms reduces it by a substantially larger amount. Net entry is close to zero in the aggregate. As a result, average concentration declines modestly despite substantial ownership-driven consolidation. This pattern shows that a small net change in the Herfindahl need not imply limited restructuring, because large ownership and growth contributions can offset one another. While mergers mechanically reallocate market shares, their competitive effects remain heterogeneous and need not translate one-for-one into market power (Ashenfelter et al. 2014).

Decomposing these channels by ownership type yields two central insights. First, private equity-owned and listed firms make similarly positive contributions to ownership-driven consolidation. Their overall contributions nevertheless differ because growth among listed firms reduces concentration, whereas the private equity growth contribution is comparatively small. Second, non-listed non-PE firms stand out as the main countervailing force: their relative growth accounts for most growth-driven deconsolidation. Ownership contributions by private equity and listed firms therefore reinforce one another, while firm dynamics elsewhere in the industry offset much of this consolidation.

Finally, we relate these consolidation channels to changes in markups and other industry

⁴We focus on the United Kingdom because it has an active private equity deal market and stringent reporting requirements for private entities, which enable us to observe financial statements for a large population of private firms. Ignoring smaller private entities may lead to misleading inferences about industry competition, especially in fragmented markets.

outcomes. We find no systematic positive association between ownership-driven consolidation and industry-level markups. Instead, markup changes are positively associated with growth- and net-entry-driven contributions, particularly among non-listed non-PE firms. This result does not imply that the underlying non-listed firms themselves charge higher markups; it describes the industries in which their contributions to concentration occur. At the company level, most estimated associations are small. We therefore interpret these regressions as conditional associations rather than as causal evidence on prices or efficiency.

This paper contributes to the literature on product-market competition, industry concentration, and corporate ownership (De Loecker et al. 2020; Aghion et al. 2013; Wollmann 2019; Kepler et al. 2023). While much of the existing literature studies firm growth, markups, mergers, or ownership separately, we measure how ownership reallocation, differential growth, and net entry jointly shape industry concentration. Constructing the decomposition at the ownership-structure level allows us to measure concentration among firms under common control and to uncover sizeable, offsetting forces behind modest changes in aggregate concentration. We thereby provide a unified account of how ownership and firm dynamics jointly reshape industry structure over time.

Recent work by Barkai et al. (2025) also decomposes changes in industry concentration into contributions from mergers and acquisitions, firm growth, and net entry. We complement this work by measuring concentration at the ownership-structure level, rather than at firm boundaries, and by allowing each channel to differ systematically across owner types.

We further contribute to the literature on corporate ownership. Prior work examines the competitive effects of strategic mergers and, more recently, the role of private equity in product markets, often within particular sectors or transaction types. We instead estimate the ownership, growth, and net-entry contributions of private equity-owned, listed, and non-listed non-PE firms within a common framework. Private equity and listed firms make similar contributions within ownership reallocation but differ once growth and net entry are considered. Moreover, ownership-driven consolidation by one owner type is frequently offset by growth and reallocation elsewhere in the industry. Our findings therefore show why private equity investments should be evaluated within the broader context of ownership and firm dynamics, rather than in isolation.

Lastly, this paper contributes to the literature on the economic consequences of private equity investments, which has largely focused on specific sectors and outcomes (Bernstein and Sheen 2016; Eaton et al. 2019; Gupta et al. 2024; Andonov and Rauh 2024; Fracassi

et al. 2017).⁵ A central takeaway from this literature is that private equity investments can have meaningful effects on prices, quality, employment, or investment, but that these effects vary widely across settings. We provide a structural explanation for this heterogeneity by showing that the industry-level implications of private equity activity depend on how ownership reallocation interacts with firm growth and entry within a given market.

By adopting a multi-sector perspective, we move beyond single-industry analyses and study how private equity ownership reshapes industry concentration through ownership-driven consolidation and growth-driven reallocation across a broad set of markets. Rather than pointing to a uniform competitive effect of private equity, we document substantial cross-sector heterogeneity, with private equity-driven consolidation often offset by growth and reallocation elsewhere in the industry. This perspective highlights that the competitive implications of private equity investments are conditional on underlying industry characteristics, such as initial concentration, regulatory intensity, externalities, and scope for entry. Its effects should therefore be interpreted in the context of broader market structure rather than in isolation. More broadly, the framework developed in this paper provides a tool for disciplining and interpreting sector-specific evidence on private equity by clarifying when ownership consolidation is more likely to translate into durable changes in market structure.

Our findings have implications for competition policy and the regulatory scrutiny of private equity investments. By showing how ownership-driven consolidation coincides with growth and net entry elsewhere in the industry, the analysis demonstrates that changes in aggregate concentration cannot be inferred from ownership reallocation alone. Even when private equity makes a sizeable contribution to ownership-driven consolidation, the overall change in concentration may be modest because other firm dynamics move in the opposite direction. This broader industry perspective is particularly relevant for regulatory assessments that focus on individual transactions or short-run changes in ownership concentration. As emphasized in recent work on “stealth” consolidation (Kepler et al. 2023), buy-and-build strategies often involve a sequence of acquisitions in fragmented markets that individually fall below notification thresholds but may cumulatively reshape industry structure. Evaluating such strategies therefore requires considering cumulative changes in ownership alongside the growth, entry, and exit of other firms in the industry.⁶ More broadly, our framework

⁵A notable exception is Bernstein et al. (2016).

⁶Recent examples include market studies initiated by the UK Competition and Markets Authority (CMA) in sectors that have experienced substantial consolidation alongside increased private equity activity, such as the veterinary services market and the care home sector. See, for example, the CMA’s planned investigation into the veterinary market (Financial Times) and the CMA’s care homes market study (UK CMA).

identifies industries in which private equity-related ownership consolidation is reinforced or offset by other changes in market structure, helping to guide regulatory attention and future sector-specific research.

This paper proceeds as follows. Section 2 introduces a conceptual framework linking private equity ownership and the market for corporate control to industry concentration. Sections 3 and 4 describe the data and document trends in concentration and ownership, and Section 4 develops the decomposition into ownership reallocation, firm growth, and net entry. Section 5 presents the empirical methodology. Section 6 reports the main results, Section 7 provides robustness analyses, and Section 8 concludes.

2 Conceptual framework: ownership types and industry dynamics

2.1 Channels driving industry concentration

Industry concentration reflects the interaction of multiple firm-level processes, including ownership reallocation through mergers and acquisitions, differential growth among incumbents, and firm entry and exit. These forces jointly determine the distribution of market shares and may operate simultaneously and in opposite directions, so changes in concentration capture the net effect of interacting mechanisms rather than the influence of any single driver.

We distinguish three channels through which concentration evolves. First, ownership reallocation redistributes market shares through mergers, acquisitions, divestments, and restructurings. Horizontal mergers and follow-on acquisitions tend to increase concentration, while carve-outs, spin-offs, and divestments can reduce it by increasing the number of independent firms. Second, differential growth among continuing firms affects concentration even in the absence of ownership changes: faster growth of smaller firms reduces concentration, whereas disproportionate growth of large incumbents increases it, as in “superstar” dynamics driven by heterogeneous innovation and productivity (Klette and Kortum 2004; Autor et al. 2020). Third, entry generally dilutes concentration by adding competitors, while exit generally increases concentration by removing competitors. These channels are interdependent: ownership reallocation can alter competitive conditions that shape subsequent growth and entry, while growth dynamics and entry influence incentives for mergers,

acquisitions, and divestments. Consolidation may change scale, productivity, financing conditions, and bargaining positions, affecting competitive interactions even without uniform price effects (Gowrisankaran et al. 2015). As a result, observed concentration changes reflect the combined outcome of interacting adjustment processes rather than a one-to-one mapping from any single channel.

An additional source of heterogeneity arises from ownership structure. Firms with different owners may engage differently in ownership reallocation, growth, and entry, reflecting variation in objectives, governance, access to finance, and strategic horizons. Listed firms, privately held firms, and firms owned by financial investors may therefore differ systematically in their acquisition behavior, growth strategies, and responses to competitive pressure. Distinguishing concentration changes by ownership type helps identify whether industry restructuring is driven by consolidation among incumbents, expansion by smaller firms, or reallocation across owner classes.

This framework raises two distinct questions: first, how ownership reallocation, firm growth, and entry interact to shape industry concentration; and second, whether these interactions differ systematically across ownership types.

2.2 Private equity ownership and industry structure

Private equity represents a distinct ownership type through which both questions become particularly salient. Private equity investments can affect industry structure at three moments: entry into an industry, ownership reallocation during the holding period, and exit. Each of these moments can influence concentration through different channels, and their effects need not reinforce one another.

In a leveraged buyout, a private equity firm acquires a controlling stake in a company and typically undertakes operational and financial restructuring aimed at improving productivity, growth, and profitability (Davis et al. 2014). These improvements may arise from changes in management practices (Bloom et al. 2015) or from the relaxation of financing constraints (Boucly et al. 2011; Cohn et al. 2022). Survey evidence suggests that growth, rather than cost cutting alone, is a primary driver of value creation in private equity (Gompers et al. 2016). Investments are typically held for a finite period, after which firms exit through strategic sales, initial public offerings, or secondary buyouts.

Unlike strategic buyers, private equity firms are not product-market competitors, so

their entry as owners does not mechanically combine market shares. In competitive deal markets, private equity entry may therefore limit immediate increases in concentration by preventing acquisitions by strategic incumbents. Carve-outs associated with buyouts can similarly increase the number of independent firms and reduce concentration.

At the same time, private equity ownership can reshape industry structure directly through ownership reallocation during the holding period. Private equity firms increasingly pursue buy-and-build strategies, in which a platform company executes a sequence of follow-on acquisitions that consolidate fragmented markets. These strategies account for a substantial share of private equity deal activity (Bain&Company 2018; Bansraj et al. 2022; Hammer et al. 2017) and have the opposite mechanical effect on concentration. Carve-outs, divestments, and follow-on acquisitions therefore represent mirror-image ownership strategies with opposing implications for industry concentration.⁷ Whether ownership reallocation under private equity increases overall consolidation depends on what would have occurred in the absence of private equity ownership. Private equity firms may acquire companies that would have consolidated regardless, or they may accelerate acquisition activity by leveraging specialized expertise in deal execution. Empirical evidence indicates that acquisition rates rise under private equity ownership (Bansraj 2022). These ownership decisions directly reshape industry structure contemporaneously, but their ultimate effect on concentration depends on how they interact with firm growth, entry, and subsequent ownership changes.

Private equity exits constitute an additional channel through which ownership reallocation affects industry structure. Exits typically occur through strategic sales, initial public offerings, or secondary buyouts. Within our framework, secondary buyouts preserve private equity ownership, while strategic sales reallocate ownership to operating firms and can mechanically increase concentration. Such reallocation may reflect efficiency-enhancing transfers of corporate assets rather than pure consolidation (Maksimovic and Phillips 2001). Private equity entry may therefore delay consolidation by acquiring targets that might otherwise have been purchased by strategic incumbents, only for concentration to increase later at exit. At the same time, reorganization and innovation under private equity ownership can make firms more attractive acquisition targets (Bena and Li 2014). For example, buy-and-

⁷Assuming that the follow-ons, divestments, and carve-outs belong to the same industry of the platform or of the selling company, but this is not necessarily true. Follow-ons are frequently related to the vertical chain of the platform (Bansraj et al. 2022). Carve-outs outside the core industry of the selling company could also increase competition when the division was before undermanaged. Our decomposition measure is based on legal entity-industry classification and is less likely to pick up these effects if follow-ons continue to publish financial statements and business units published separate statements before the carve-out

build strategies may further assemble firms into platforms that become viable targets for strategic buyers, facilitating ownership outcomes that would not have materialized absent private equity involvement.

Private equity ownership may also influence concentration indirectly through its effects on entry, exit, and firm growth. Importantly, these competitive effects often depend on institutional features and local market structure rather than ownership reallocation alone. Evidence from care-intensive sectors shows that private equity acquisitions affect prices and competitive outcomes through changes in local market structure and bargaining conditions (Liu 2022; Gandhi et al. 2025; Bansraj and Xu 2024). Entry responds to profitability and market structure and can dilute concentration even in highly concentrated markets (Bresnahan and Reiss 1991). Private equity entry may signal favorable market conditions and attract additional entry, while productivity improvements may simultaneously raise effective entry barriers. Exit dynamics are similarly ambiguous: improved performance under private equity ownership may reduce exit rates, while increased competitive pressure or leverage may contribute to firm failure in some cases. Existing evidence suggests that private equity ownership does not generally increase bankruptcy rates and may improve the resolution of financial distress (Bernstein et al. 2016; Hotchkiss et al. 2021; Morris et al. 2025).⁸

Finally, private equity ownership can alter growth dynamics among incumbents. By easing financing constraints and supporting operational improvements, private equity may disproportionately increase the growth rates of its portfolio companies (Boucly et al. 2011). Whether this leads to higher or lower concentration depends on firm size and on how competitors respond. Faster growth of smaller firms reduces concentration, whereas growth concentrated among larger firms increases it. Competitors may also adjust their own growth strategies in response to private equity activity through productivity improvements, expansion, or innovation, further affecting market-share reallocation (Aghion et al. 2005). Growth effects may additionally reflect market expansion rather than pure reallocation of market shares (Hottman et al. 2016), implying that private equity-driven growth can coincide with very different concentration dynamics across markets.⁹

Taken together, the framework highlights why isolating the effects of individual drivers

⁸These interactions unfold within a competitive environment shaped by regulation, financial conditions, and market institutions, which are not exogenous to firm behavior (Gutiérrez and Philippon 2018).

⁹For example, consolidating smaller firms into more productive entities may intensify competition with large incumbents, while buy-and-build strategies targeting already large firms may reinforce concentration.

of concentration is inherently challenging. Ownership reallocation, firm growth, and entry and exit operate simultaneously and can amplify or offset one another. In the context of private equity, these interactions are particularly pronounced because ownership strategies during the holding period, exit decisions, and growth responses by competitors unfold over time and depend on initial market structure. As a result, the relationship between private equity activity and industry concentration cannot be inferred from ownership changes alone. Observed concentration reflects the realized outcome of interacting ownership, growth, and entry processes, and how these interactions vary across ownership types, motivating an empirical approach that separates channels and evaluates their joint contribution to industry structure.

3 Data

We aim to analyze how private equity ownership may change industry structure and subsequently affect mark-ups, productivity, and growth. We focus on the United Kingdom (UK) for collecting company financials due to the UK’s stringent reporting requirements for private companies.¹⁰ The UK represents the largest private equity deal market in Europe (second only to the US), and compared to other countries, private equity investments constitute a larger fraction of the country’s GDP.¹¹

3.1 Ownership structures

Our main source of data is Moody’s Bureau van Dijk (BvD), which provides financial statements and detailed ownership information for legal entities. For each UK entity, we identify its majority shareholder in each year and combine entities under common control into ownership structures. We then link these structures over time using continuity in ownership and operating activity, allowing the legal organization or controlling owner to change without mechanically treating the underlying business as entering or exiting. Appendix B describes the construction and the transition rules in detail.

¹⁰Generally, all companies need to prepare an annual statement, but exceptions exist. In the UK, small companies could prepare abbreviated accounts until 2016 and since then abridged accounts. To qualify as a small company during our sample period, at least two out of three conditions should hold: (a) revenue below £6.5 million, (b) total assets below £3.26 million, or (c) not more than 50 employees on average.

¹¹<https://www-ft-com.eur.idm.oclc.org/content/63b584b5-071b-4653-b91a-06ecff49c4a1>

3.2 Industry classification

We classify companies based on their four-digit NACE codes.¹² This classification is helpful for identifying potential rivals in a product market, but the actual competition also depends on the geographic boundaries of the market. For example, service industries such as elderly care depend much more on local competitors, whereas the competition for the manufacturing of goods such as concrete products (e.g., tiles or bricks) may go beyond a country’s borders. We therefore identify tradable industries as those with either an above-median trade-to-employment ratio or above-median total trade activity, following Mian and Sufi (2014), where trade is the sum of imports and exports. The remaining industries are classified as non-tradable.¹³ According to this classification, most of our tradable industries are in manufacturing, wholesale trade, and retail trade, while non-tradables are in sectors like accommodation and food, healthcare, and education. Overall, the classification corresponds to what one would expect.

We will focus on non-tradable industries to limit the influence of foreign (global) competition, and as a result our sample of domestic firms can be a good approximation of true competition. We further exclude very small industries, namely those with fewer than 61 employees and those with less than \$9.4 million in revenue in the cross-sectional average. This roughly eliminates the smallest 5% industries in our sample.

3.3 Financial statements for ownership structures

We next construct financial statements at the ownership-structure-industry level. We retain legal entities with positive operating revenue and a valid industry code. We prefer unconsolidated accounts because they can be assigned to the reporting entity’s industry. When only consolidated accounts are available, we subtract the statements of subsidiaries

¹²Results are robust to using a standard three- or four-digit NACE classification.

¹³Trade data comes from Eurostat. The literature has proposed two main ways to identify tradable and non-tradable sectors. The first method identifies tradable industries as those that have high levels of import and export. For example, Mian and Sufi (2014) calculate the ratio of trade relative to the number of employees and the total trade of each industry. The estimate is relatively straightforward but requires (detailed) industry-level trade data. Moreover, Hlatshwayo and Spence (2014) note that trade data may only capture actual trades and not the share of the industry that is potentially tradable. The second method looks at geographical concentration, either through a Herfindahl or Gini coefficient (Ellison and Glaeser 1997; Mian and Sufi 2014). Suppliers of non-tradable goods should be located everywhere there is demand, and therefore the Herfindahl of such industries will be lower. Conversely, the geographical Herfindahl of tradable industries tends to be higher, driven by economic benefits related to producing the goods at one location (e.g., scale benefits, specialization, or access to resources).

observed within the same ownership chain to limit double counting.¹⁴ We then sum the resulting entity-level statements within each annual ownership structure and four-digit industry. Entities under common control but operating in different industries therefore remain separate market observations. Figure A.1 illustrates this procedure. In the remainder of the paper, “firm” or “structure” refers to this ownership-structure–industry unit unless stated otherwise.

The ownership data cover 16.5 million distinct legal entities and approximately 62.9 million legal-entity-year observations. Of these entities, 1.21 million report operating revenue during our sample period. After requiring positive revenue in a given year and a valid four-digit industry classification, 1.12 million distinct reporting entities enter the concentration analysis. We group entities linked through common control into ownership structures, while firms without a supported link to another entity remain standalone. This yields 4.18 million ownership-structure-industry-year observations. Table A.1 describes the resulting ownership structures using reporting entities and all legal entities, respectively.

3.4 Ownership types

3.4.1 Identifying ownership types

To identify private equity ownership, we collect completed majority-stake buyouts, secondary buyouts, and follow-on acquisitions from Orbis M&A (formerly Zephyr) between 2003 and 2021. We let the transaction data start in 2003 to have one year of pre-deal financial and ownership data available and map each transaction to the ownership structure containing the target. A structure is classified as PE-owned from the buyout until an observed exit or other change in control, and all reporting revenue within that structure is treated as PE-owned. Follow-on acquisitions become part of the PE-owned structure when they are integrated into the platform. We continue the classification through reorganizations of the same underlying business, but do not allow detached legal entities to retain PE status indefinitely. Appendix B provides the transaction hierarchy and succession rules.

¹⁴An ownership chain consists of companies that are (indirectly) related through direct majority ownership relations. To exemplify, consider Company A that has two subsidiaries, Company B and Company C. Company B has one subsidiary, which is Company D. While Company C and Company D share the same ownership structure, they do not share the same ownership chain. There are two chains in this example: A-B-D and A-C. For the deconsolidation of A, we would subtract the unconsolidated statements of B, D, and C. If B also reports consolidated statements, we would deconsolidate these first using the unconsolidated statements of D, before we deconsolidate A using the deconsolidated statement of B and unconsolidated statement of D.

We end or reset a period of PE ownership using transaction evidence that indicates a change in control, including explicit private-equity exits, relevant management buyouts or buy-ins, qualifying sales to non-PE acquirers, and initial public offerings, all collected through Orbis M&A. If an annual structure identifier disappears without an identified closing event, we carry the PE classification to its dominant observed successor structure. This broader successor rule is our baseline because restructurings and newly incorporated holding companies often change the annual identifier without ending PE control. This structure-level approach prevents detached legal entities from carrying stale PE status indefinitely while preserving the classification through verified reorganizations of the same reporting business.

Given that private equity firms on average hold their portfolio company four to five years, we treat 2002–2006 as a run-up period before we begin the baseline decomposition and outcome analyses. This allows several deal cohorts to accumulate and reduces the influence of missing pre-2003 investments.

We identify listed ownership using Orbis IPO and delisting dates for the legal entities within each ownership structure. If a structure is simultaneously listed and under PE control, we classify it as PE-owned so that the owner categories remain mutually exclusive. Structures that are neither PE-owned nor listed form the non-listed non-PE category. Appendix B provides further details.

3.4.2 Trends in ownership types

Figure 1 shows the average revenue market shares of PE-owned and listed structures. The dotted segments before 2007 indicate the run-up period and the solid segments report the main sample period. From 2007 onward, the unweighted listed share declines to just below 10%, while the PE-owned share rises to a similar level by 2021. Revenue weighting changes their relative importance: listed structures account for close to one-fifth of activity near the end of the sample, compared with just above 5% for PE-owned structures (Appendix Figure F.1). Non-listed non-PE structures nevertheless continue to account for the substantial majority of activity.

[Figures 1 and 2 about here]

PE-owned firms are considerably more active in the market for corporate control than their revenue share alone would suggest. Figure 2 shows that PE transactions account for approximately 10–25% of all completed deals, with PE activity rising while listed-firm

activity declines. Appendix Figures A.5 and A.6 place this activity in a broader context. The revenue footprint of businesses currently or previously linked to PE transactions reaches about 14% in the unweighted sample and 10% in the weighted sample by 2021. Over 2007–2021, the PE share of completed transactions rises from approximately 12% to 23%, while follow-on acquisitions increase from about 3% to almost 18% as a percentage of the number of non-PE M&A deals. Thus, the growing role of PE reflects both a larger economic footprint and a disproportionately high rate of follow-on acquisition activity.

4 Industry concentration and decomposition

4.1 Industry concentration

Using our ownership structure-level financials, we can create measures for concentration. We calculate the Herfindahl and concentration ratios using the largest 5 or 20 companies.¹⁵

In Figure 3, we illustrate the unweighted revenue-based Herfindahl and concentration ratios using the largest 5 and 20 companies in non-tradable industries. Looking at the unweighted figures in panels A and B, we find that non-tradables mostly shows a flattish deconsolidating trend over time before experiencing a mild increase at the end of our sample period.

Overall, the trend in our sample is towards more fragmented markets based on unweighted Herfindahls¹⁶

[Figure 3 about here]

Table 1 reports descriptive statistics for 2,970 non-tradable industry-year observations between 2007 and 2021. The median industry generates \$1.8 billion in revenue and accounts for approximately 9,000 jobs, whereas the corresponding averages are \$11.2 billion and 27,000 jobs. Similarly, the median industry contains 185 companies, compared with an average of

¹⁵Appendix Figure A.2 compares our Herfindahl measure with the CMA series. We revenue-weight industries using the aggregate industry-revenue benchmark and index both series to 2010. Although the levels are not directly comparable because firm coverage and industry aggregation differ, reflecting greater weight on larger firms on our sample, the two series exhibit a broadly similar pattern. concentration increases until around 2010 and declines thereafter. We view the similarity as supportive evidence that we capture the same underlying dynamics despite the differences in levels.

¹⁶See Figure A.3 in the Appendix for a descriptive illustration of concentration dynamics over five-year horizons. Industries that are initially fragmented tend to experience increases in concentration, while initially concentrated industries exhibit declining concentration, consistent with mean reversion in the Herfindahl index. We also find a movement towards more concentrated markets based on the weighted Herfindahl. Thus, while the average smaller industry has become more fragmented, the larger markets have actually become more concentrated over time.

512. Our sample therefore contains many relatively small industries alongside a limited number of very large ones. Concentration is less skewed, although the mean Herfindahl of 1,783 remains above the median of 1,211 because some industries are highly concentrated. The median concentration ratios for the five, eight, and twenty largest companies are slightly higher than their respective means and show that leading firms account for a substantial share of activity in the typical industry. Non-listed non-PE firms remain the dominant owner type, with an average market share of 84.2%. Listed firms account for 10.0% of industry revenue on average, compared with 5.8% for PE-owned firms. For both owner types, the median market share is much lower than the mean, indicating that their activity is concentrated in a subset of industries.

[Tables 1 about here]

4.2 Decomposition of the Herfindahl

A key feature of our approach is that concentration is measured at the level of *ownership structures* rather than individual legal entities. An ownership structure groups all legal entities under common control in a given year. We follow these structures consistently over time as described in Section 3; Appendix B provides further details.

Let $R_{g,t}$ denote the revenue of ownership structure g in year t and let $s_{g,t} = R_{g,t} / \sum_h R_{h,t}$ denote its market share. The Herfindahl index is

$$\text{HHI}_t = \sum_{g=1}^{G_t} s_{g,t}^2. \quad (1)$$

The change in the Herfindahl between two years can reflect three distinct processes. First, the same economic activity can be regrouped across owners through acquisitions, divestitures, or other changes in control. Second, ownership structures can grow at different rates, changing their relative market shares even when ownership and market participation remain fixed. Third, the set of market participants can change through entry and exit. We refer to these channels as ownership reallocation, growth, and net entry, respectively.

To illustrate the construction, take the observed market in $t - 1$ as the reference and consider one possible ordering in which ownership changes are introduced first, growth second, and net entry last. Let H^0 denote the observed Herfindahl in $t - 1$. Let H^{Own} denote the Herfindahl obtained by regrouping the same initial economic activity according to the own-

ership observed in year t , without changing revenues or market participation. Let $H^{\text{Own,Gr}}$ additionally update revenues while retaining the same set of market participants. Entry and exit sizes remain fixed until the final step. Finally, let H^1 denote the observed Herfindahl in year t , after entering structures have been added and exiting structures removed. For this ordering,

$$H^1 - H^0 = \underbrace{(H^{\text{Own}} - H^0)}_{\text{Ownership reallocation}} + \underbrace{(H^{\text{Own,Gr}} - H^{\text{Own}})}_{\text{Growth}} + \underbrace{(H^1 - H^{\text{Own,Gr}})}_{\text{Net entry}}. \quad (2)$$

The first comparison changes only ownership; the second changes revenues while holding ownership and market participation fixed; and the third changes the set of market participants. Because market shares are recalculated after entrants are added and exiters removed, net entry includes the associated rescaling of every surviving structure’s market share. Entry will therefore generally reduce concentration and exit will generally increase it, although neither sign is imposed.

The contribution assigned to a channel can depend on the order in which the three changes are introduced. For example, introducing entry before growth changes the market total used to calculate the growth contribution. We therefore repeat the calculation for all six possible orderings of ownership, growth, and net entry and assign each channel its average marginal contribution. This Shapley decomposition does not depend on an arbitrarily selected ordering, and the three components reproduce the observed change in the Herfindahl exactly. Within the net-entry channel, we subsequently separate entry from exit by averaging the two possible orders in which entrants can be added and exiters removed.

Entry and exit are defined symmetrically at the ownership-structure level. A candidate event requires the appearance or disappearance of an entire structure from observed market activity. We use legal-entity ownership information to identify cases in which the underlying activity continues under another structure; these cases are assigned to ownership reallocation and growth rather than mechanically treated as entry or exit. Changes involving only part of a continuing structure are treated in the same way. We do not impute revenue when an entity does not report, but its ownership information can still reveal whether its observed activity changed owner.

Finally, we attribute each of the three channels to private equity-owned, listed, and non-listed non-PE structures. Changing the ownership, revenue, or participation of one owner type can alter the market shares of the others. We therefore repeat the same averaging

principle across all possible sequences in which the three owner types can contribute to each channel. The owner-specific components add exactly to their corresponding aggregate channel. Appendix C provides the formal equations, weights, entry–exit split, and owner-type attribution. Appendix D presents an application to the fitness sector.

When presenting the results in the next section, we multiply the index and every decomposition component by 10,000 so that reported values are expressed in conventional Herfindahl points.

4.2.1 Statistics and trends of decomposition components

Table 2 reports the decomposition of concentration changes by channel and owner type. Panel A presents annual industry-year contributions. Average yearly changes in the Herfindahl are modest relative to their dispersion across industries and time. Ownership reallocation raises concentration on average for PE-owned and listed firms, whereas ownership changes attributed to non-listed firms reduce it. A negative ownership contribution can arise, for example, when assets are divested from a larger ownership structure to a smaller or stand-alone firm. Growth among PE-owned firms has little average effect on concentration, while growth among listed and especially non-listed firms is concentration-reducing. This indicates that, within these groups, smaller structures tend to gain market share relative to larger ones, or that larger structures contract. The owner-specific net-entry contributions largely offset one another. The residual is zero up to numerical precision, confirming that the components form an exact accounting identity.

[Table 2 about here]

Panel B aggregates the components within markets over 2007–2021. Concentration declines by about 241 HHI points on average, despite positive ownership contributions of 77 points from PE-owned firms and 70 points from listed firms. This ownership-driven consolidation is more than offset by the growth contributions of listed and non-listed firms and by negative non-listed ownership and net-entry contributions. The total PE contribution is therefore positive, the total listed contribution is close to zero, and non-listed firms account for most cumulative deconsolidation. The central pattern is not an absence of consolidation, but the coexistence of a concentration-increasing market for corporate control and concentration-reducing firm dynamics elsewhere in the industry.

The aggregate signs do not, however, establish whether these offsetting contributions

occur within the same markets. We therefore focus on markets with a positive cumulative PE ownership contribution. By 2021, 61.5% of these markets have at least one opposing growth or net-entry contribution, and in 59.4% the positive PE ownership contribution is fully or more than fully offset. In magnitude, these opposing contributions absorb 73.2% of the gross positive PE ownership contribution. The pattern is similar when we condition on a positive total PE contribution: 61.3% of markets contain an opposing component and 53.8% are fully or more than fully offset. The central offset therefore occurs within many of the markets in which PE contributes to consolidation, rather than arising only from cancellation across unrelated industries.

Figure A.4 places these changes in the context of the distribution of concentration across industries. Panel A reports the distribution of Herfindahl levels, while Panel B shows the distribution of cumulative changes over the sample period. The average cumulative decline of approximately 240 Herfindahl points is modest relative to the differences in concentration levels across industries, but remains meaningful compared with the median Herfindahl in our sample. More importantly, the wide distribution in Panel B shows that the modest average decline conceals substantial consolidation and deconsolidation in individual industries. The net change in concentration therefore provides an incomplete picture of the underlying reallocation.

Table 3 places these contributions on a common absolute-magnitude scale. For each year, the denominator is the sum of the absolute aggregate owner or channel contributions, rather than the absolute observed HHI change. Over 2007–2021, non-listed firms account for 66% of the absolute owner contributions and reduce concentration on average; PE-owned and listed firms account for 19% and 15%, respectively, and raise it. By source, growth accounts for 69% of absolute contributions and is concentration-reducing, ownership accounts for 28% and is concentration-increasing, and net entry accounts for 3% and is slightly positive. PE-owned and listed firms therefore play a larger role in concentration-increasing ownership reallocation than their market shares alone would suggest, but growth remains the largest source of the average long-run movement.

[Table 3 about here]

Figure 4 presents the cumulative decomposition by source. The two-channel figure combines growth and net entry into firm dynamics and shows the main offset directly: ownership reallocation raises concentration, while firm dynamics reduce it by a larger amount. The

three-channel figure shows that growth supplies most of this countervailing force; net entry is smaller in the aggregate. The modest decline in the observed Herfindahl therefore masks two large movements in opposite directions. The vertical line marks the beginning of the 2007 main sample period.

Figure 5 aggregates the three channels by owner type. PE makes a positive cumulative contribution, whereas the total listed contribution is close to zero because concentration-reducing listed growth offsets positive listed ownership and net entry. Non-listed non-PE firms make a large negative contribution. PE-owned and listed firms therefore look similar within ownership reallocation, but not after growth and net entry are included.

Figure 6 shows the same distinction directly. PE and listed firms both make very similar positive ownership contributions. Listed and non-listed growth reduce concentration, with the non-listed contribution largest in magnitude, while PE growth is comparatively small and moves around zero. Net-entry effects are smaller overall, but positive listed entry/exit contributions are offset by negative non-listed contributions.

[Figures 4–6 about here]

Table 4 shows that the aggregate owner pattern is not uniform across sectors. In Panel A, the total PE contribution is positive in nine of the ten sectors and is particularly prominent in accommodation, transport, and education; finance is the exception. Listed contributions are more sector dependent and are sizeable but concentration-reducing in other services, recreation, and utilities. Non-listed firms account for most deconsolidation in education, finance, health, information, and utilities. PE and listed firms therefore make similar positive contributions on average, but they do not consolidate the same sectors to the same degree. PE is especially important in several service markets in which acquisitions can combine meaningful shares, whereas listed firms play a larger and more variable role across professional services, recreation, and utilities.

Panel B shows why the net sector changes can differ. Ownership is the dominant positive source in accommodation, while growth is the main concentration-reducing source in utilities and is important in other services and transport. Net entry is the largest source in several sectors, including education, finance, health, and information, although its sign differs across them. These sectoral results clarify why net entry can be small after aggregation but important within particular markets: positive and negative participation changes cancel across sectors. Within each panel, the signed components reconcile to the sector's

mean cumulative HHI change.

[Table 4 about here]

Table 5 relates the cumulative decomposition components to initial market characteristics.¹⁷ PE ownership consolidation is substantially larger in small than in large markets (135 versus 19 HHI points) and in initially concentrated rather than fragmented markets (141 versus 13). Listed ownership shows the opposite size pattern, with a significantly larger contribution in large markets (121 versus 20), and is also larger in financially constrained industries. These estimates show that PE and listed ownership consolidation need not occur in the same types of markets even though their aggregate ownership contributions are similar.

The PE pattern is consistent with acquisition strategies that combine firms representing meaningful shares of relatively small markets. Part of this pattern reflects the mechanics of concentration: a transaction of a given absolute size produces a larger HHI contribution in a smaller market, while reallocating activity among firms with larger initial market shares produces a larger contribution in a concentrated market. Yet the small-market pattern is not common to all ownership types. Listed firms instead make larger ownership contributions in large markets, while non-listed firms do not display the same systematic differences. The estimates therefore indicate that PE-related ownership changes have particularly large concentration consequences in small and initially concentrated markets, rather than showing that PE acquisitions are necessarily more frequent there. Listed consolidation appears to follow a different model, consistent with larger strategic acquisitions in sectors where scale and access to external finance are important.

The growth channel accounts for much of the variation in total concentration. Non-listed growth is strongly negative in initially concentrated industries but positive in fragmented industries, a statistically significant difference of 841 HHI points. This pattern is consistent with market-share convergence: smaller firms gain relative to dominant firms in concentrated markets, while successful firms can pull away from competitors in fragmented markets. Listed growth is negative in low-growth industries but positive in high-growth industries. Lastly, non-listed net entry is substantially more negative in financially unconstrained industries. Overall, initial market structure is related to both which owners consolidate and whether growth and net entry offset that consolidation.

¹⁷Figure A.7 shows how the size of the decomposition component is related to initial industry concentration and size by ownership type and concentration source.

[Table 5 about here]

5 Regression framework

5.1 Industry specification

To examine how consolidation dynamics relate to industry outcomes, we estimate a long-difference specification over 2007–2021 at the four-digit industry level:

$$\Delta Y_i = \alpha + \sum_{k \in \mathcal{K}} \left(\beta_k^O O_{ik} + \beta_k^G G_{ik} + \beta_k^N N_{ik} \right) + \mathbf{X}_i' \boldsymbol{\theta} + \varepsilon_i, \quad (3)$$

where $\mathcal{K} = \{\text{PE}, \text{L}, \text{NL}\}$. The dependent variable, $\Delta Y_i = Y_{i,2021} - Y_{i,2007}$, is the long change in an industry outcome. We examine markups, total factor productivity (TFP), both measured following De Loecker et al. (2020), as well as the labor-cost share, and the intermediate-input cost share.¹⁸ The regressors O_{ik} , G_{ik} , and N_{ik} are the cumulative ownership, growth, and net-entry HHI contributions of our three ownership types $k \in \{\text{PE}, \text{L}, \text{NL}\}$ over the same period. The vector $\mathbf{X}_i$ contains initial concentration, size, financing constraints, markups, and productivity, together with realized industry growth as control variables. Finally, ε_i is the error term.

We estimate the regressions using the decomposition components in raw HHI points. Interpreting a channel’s economic importance requires distinguishing two quantities. First, the estimated coefficient indicates whether a larger contribution from that channel is positively or negatively associated with the industry outcome. Second, the channel’s average cumulative HHI contribution may itself be positive or negative. To combine these two dimensions, the tables multiply each coefficient by the signed sample mean of the corresponding component. The resulting value is the predicted change in the outcome associated with the average contribution actually made by that owner or channel over the sample period. Its sign therefore reflects both the direction of the estimated association and whether that component raises or lowers concentration on average.

The regressions describe conditional associations rather than causal effects. Ownership reallocation, growth, entry, and industry outcomes are jointly determined, and private equity may select industries based on expected changes in growth, profitability, or market structure. We therefore do not interpret the coefficients as the causal effect of consolidation on markups or productivity.

¹⁸See Barkai (2020) for related evidence on declining labor and capital shares and their interpretation in terms of rising markups and rents. Our measurement follows De Loecker et al. (2020) and allows us to relate these outcomes to ownership and reallocation dynamics at the industry level.

6 Results

6.1 Concentration drivers and industry outcomes

We begin by examining how consolidation dynamics relate to long-run industry outcomes. Because the net change in the Herfindahl captures only part of the underlying process, we relate the separate ownership-, growth-, and net-entry-driven contributions of each ownership type to changes in markups, total factor productivity, and input cost shares between 2007 and 2021. The regressions use components measured in raw HHI points. To facilitate economic interpretation, the tables report each estimated coefficient multiplied by the signed average contribution of the corresponding component.

Table 6 shows no statistically significant association between any of the three ownership contributions and long-run markup changes. The markup results instead arise within firm dynamics and differ by owner. An average PE growth contribution is associated with a small decline in markups, whereas the average listed and non-listed growth contributions are associated with increases. Net entry shows a similar contrast: the listed contribution is associated with lower markups, while the non-listed contribution is associated with a sizeable increase.

The non-listed growth result shows why concentration and markups need not move together. Non-listed growth reduces concentration on average, generally because smaller ownership structures gain market share relative to larger ones, yet this reallocation is associated with a higher industry markup. This does not imply that the growing non-listed firms themselves charge higher markups. Our markup outcome is the revenue-weighted average across all firms in the industry. It can rise because firms with higher markups gain revenue weight, because markups change within firms under any ownership type, or because particular industry conditions simultaneously support the growth of smaller firms and higher markups. The result nevertheless shows that deconcentration through relative firm growth need not coincide with a decline in the average price-cost wedge.

The productivity results help distinguish this pattern from a simple efficiency interpretation. Non-listed growth is associated with higher markups but no detectable change in TFP, while non-listed net entry is associated with higher markups and lower TFP. These markup increases are therefore not accompanied by measurable improvements in productive efficiency. Conversely, listed net entry is associated with lower markups and weakly higher TFP. The cost-share estimates are more mixed and provide no single mechanism

across owners. In particular, the higher labor share associated with non-listed activity does not support a simple interpretation in which higher markups uniformly redistribute income away from workers.

[Table 6 about here]

Table 7 summarizes the same evidence by owner and channel. Panel A shows that the total PE and listed contributions are not significantly associated with markup changes, whereas the total non-listed contribution is positive and statistically significant and is also associated with a higher labor cost share. The total PE and listed contributions are negatively associated with TFP, although through different underlying components: PE through ownership reallocation and listed firms primarily through growth.

Panel B shows that ownership reallocation is not associated with higher markups, while the growth and net-entry channels are. Ownership is instead associated with lower TFP. Net entry is therefore small in the aggregate concentration trend but not economically irrelevant: entry and exit vary considerably across industries, and that cross-sectional variation is associated with both higher markups and a higher labor share. Together, Tables 6 and 7 point away from a uniform PE or listed markup effect. The strongest markup associations arise from changes in the relative scale and participation of non-listed firms, while ownership consolidation is more closely related to productivity than to markups.

[Table 7 about here]

Overall, the results provide little evidence that ownership-driven consolidation itself is systematically associated with higher markups. Instead, the strongest relationships arise through growth, entry, and exit, particularly among non-listed firms. Importantly, the same channel can have different outcome associations depending on the owner behind it. The contrasting listed and non-listed net-entry results also suggest that entry and exit are economically relevant margins of industry adjustment, despite their relatively small average contribution to changes in concentration.

6.2 Markup changes by industry types

The importance of growth raises the question of which owners are able to expand, particularly in industries where access to external finance is limited. Similarly, the role of net entry may depend on the cost of entering or leaving a market. We therefore examine whether the relationships vary with initial industry growth, concentration, size, fixed-asset intensity,

and financial constraints. These characteristics are particularly relevant for PE because its contribution to industry restructuring operates predominantly through ownership reallocation. PE investors’ access to capital and expertise in executing acquisitions may allow them to reshape industries differently where organic expansion or entry is constrained (Boucly et al. 2011; Cohn et al. 2022; Bansraj 2022). The splits therefore test whether the association between PE-driven restructuring and markups is concentrated in particular industry environments.

We next ask whether these associations differ across initial industry conditions. Table 8 splits industries by initial concentration, size, growth, fixed-asset intensity, and financing constraints. Panel A shows a stable difference across owner types: the PE total is negatively associated with markup changes in each below-median group, whereas the non-listed non-PE total is positively associated with markups. However, the corresponding high-minus-low differences are statistically insignificant. The evidence therefore supports a difference across owner types more clearly than heterogeneity across industry characteristics.

Panel B shows how these differences appear at the channel level. The most persistent result appears in net-entry. Its association with markups is positive and significant in every below-median group, and none of the high-minus-low differences is significant. Ownership contributions are negatively associated with markups in small, capital-light, and less financially constrained industries, while growth contributions are positive in low-growth and less financially constrained industries. Only ownership in more financially constraint industries is statistically significant and related to relatively more positive mark ups than in less financially constraint markets. The main heterogeneity is therefore across ownership types and decomposition channels, rather than between high- and low-characteristic industries.

[Table 8 about here]

6.3 Company-level outcomes

We next examine whether consolidation dynamics are reflected in company-level outcomes. This comparison is useful because an industry markup can change through within-firm adjustment or through reallocation of revenue toward firms with different markups. We estimate firm-level regressions relating annual changes in firm outcomes to cumulative industry-level consolidation components, controlling for initial firm characteristics, industry fixed effects, and year fixed effects. We report linear combinations that aggregate effects by

ownership type and consolidation channel.

Table 9 shows that most owner-level combinations are small and statistically insignificant. The listed total is weakly associated with higher TFP, while the non-listed total is weakly associated with a lower labor cost share. By channel, total ownership reallocation is associated with a small increase in firm-level markups, but no individual owner total has a significant markup association. Growth and net entry are not significantly associated with the displayed company outcomes. The strong industry-level associations therefore do not appear as uniform changes within firms. They are more consistent with reallocation across firms and industries, or with heterogeneous firm responses that average out at the company level.

[Table 9 about here]

7 Robustness and further analyses

7.1 Industry definition

In the main analysis, we classify companies based on their four-digit NACE codes. In a robustness test, we make three adjustments. First, we allocate companies to a single industry during the sample period based on the industry code that is most frequently observed within a company.¹⁹ Second, we notice that some four-digit industry codes only reflect a two- or three-digit classification (the codes have either one or two trailing zeroes), while others only describe general activities (7010, 7022, and 8299), even though subsidiaries that mainly generate the revenue do have a more specific code. If Orbis updates the codes in later years to better reflect the business activities, we reclassify these general codes to the more specific ones for individual companies. Third, to better reflect competition, we combine industries if either a high proportion of companies (a) has the same secondary industry code or (b) switch between two industry codes based on their original classification.²⁰ Results are robust.

¹⁹Companies may change industry codes, for example, when the revenue of their secondary activity becomes larger than their primary activity or when the company actually changes its business. It may also be that the Orbis database updates the code from a broad definition to a narrower one based on new information. The aggregate industry sales are affected by companies changing industry codes, which may lead to jumps in the competition measures that do not reflect actual changes in competition. Therefore, we allocate companies to a single industry.

²⁰We use a 30% threshold both ways. That is, at least 30% of the secondary codes of companies in industry A should refer to industry B, and vice versa. Then we combine industry A and B. We use a similar threshold for companies changing between two (or more) industry codes.

7.2 Sector variation

We document substantial variation in concentration trends and decomposition components across sectors. Appendix E reports the full sector-level figures. Healthcare and education deconcentrate over the sample period, whereas Transport becomes more concentrated. The decomposition shows that these differences cannot be summarized as stronger or weaker ownership consolidation alone. In healthcare, positive ownership reallocation is more than offset by concentration-reducing growth and especially net entry. In transport, ownership, growth, and net entry are all positive near the end of the sample and therefore reinforce one another. Sectoral changes in observed concentration consequently depend on whether ownership reallocation is offset or complemented by firm dynamics.

7.3 Industry growth rates

Bernstein et al. (2016) show that private equity activity is positively related to industry growth rates. Private equity firms need to grow their portfolio companies (Gompers et al. 2016) and acquisitions may be particularly important when organic growth opportunities are limited. We extend this research by linking our measures of consolidation drivers to these growth rates.

Table A.2 extends the industry analysis to profitability, employment, and revenue growth. The estimates do not show a general positive relation between ownership-driven concentration and industry expansion. Instead, the clearer associations appear within the growth channel: listed growth contributions are associated with lower profitability and revenue growth, while the PE growth contribution is associated with lower employment growth. The economically scaled combinations in Appendix Table A.3 similarly show that the total listed contribution is associated with lower employment and revenue growth, and that the aggregate growth channel is associated with lower profitability and revenue growth.

The corresponding firm-level combinations in Table A.4 are much smaller. The total PE contribution is weakly associated with employment growth, while the non-listed total and the aggregate growth channel are associated with higher firm revenue growth. These results again suggest that the industry-level relationships reflect reallocation across firms and industries rather than a uniform response within all firms exposed to a given concentration channel.

7.4 Concentration ratios

We repeat the decomposition using the eight- and twenty-firm concentration ratios. The ownership structures are reranked in every year, so the set of firms included in CR8 and CR20 is allowed to change over time. Appendix Figure A.8 shows the same broad pattern as the Herfindahl results. By the end of the sample, ownership reallocation raises both concentration ratios, whereas growth and net entry reduce them. The total contributions of PE-owned and listed firms are positive, while the contribution of non-listed non-PE firms is negative. The main findings therefore do not depend on squaring market shares or on the Herfindahl’s sensitivity to the full market-share distribution.

7.5 Weighted industry outcomes

Our main analysis gives equal weight to each industry. Appendix Tables F.1 and F.2 instead weight industries by operating revenue, placing greater emphasis on economically large industries. Ownership reallocation remains concentration-increasing. Growth is strongly concentration-reducing, whereas net entry is concentration-increasing and offsets much of this decline. Because revenue weighting places greater emphasis on economically large industries, this pattern suggests that exits have greater concentration consequences than entry in larger markets. This need not reflect more exits in number: it may instead arise because exiting structures hold larger market shares, while entrants enter at comparatively small scale.

The weighted outcome regressions sharpen the role of entry and exit. Net entry remains positively associated with markup changes, while the total PE and listed contributions are not. The total PE contribution is negatively associated with changes in TFP, and the listed estimate has the same sign but statistically insignificant. These estimates provide no evidence that ownership consolidation by PE is accompanied by industry-level productivity gains in larger industries. They also show that the unweighted findings are not driven solely by giving small industries the same weight as large ones.

7.6 Tradable sectors

As an additional robustness check, we extend the analysis to tradable sectors, even though domestic consolidation is likely to be less informative in these markets. In tradables, competitive conditions are shaped not only by domestic industry structure but also by for-

eign competition, export opportunities, and global value chains. As a result, domestic ownership- and growth-driven consolidation may reflect broader international trends rather than changes in effective market power. The tradables analysis therefore serves primarily as a check on whether our main patterns are specific to the non-tradable setting, where domestic concentration is more directly linked to competitive outcomes.

Figures G.1–G.4 show that the broad decomposition remains visible in tradable industries: ownership reallocation raises concentration, growth reduces it, and net entry offsets part of that decline. The owner-level totals are smaller and less stable than in non-tradables, consistent with domestic concentration being a less complete measure of competitive conditions when firms also face foreign competition.

Table G.1 provides little evidence that PE or listed contributions are associated with higher markups. At the channel level, ownership is weakly associated with higher markups and TFP, while net entry is associated with lower markups. Total PE and aggregate ownership contributions are associated with lower, rather than higher, employment and revenue growth. The tradable results therefore do not support a general expansion interpretation. More cautiously, they show that the non-tradable markup findings are not mechanically reproduced in sectors where domestic market shares provide a less complete description of competition.

8 Conclusion

This paper studies how industry concentration evolves through ownership reallocation, firm growth, and entry and exit, with a particular focus on private equity. Using comprehensive ownership and financial data on public and private firms in the United Kingdom over 2002–2021, we decompose changes in the Herfindahl index into ownership-driven consolidation, differential growth, and net entry. Ownership reallocation raises concentration on average, while differential growth reduces it by a larger amount and net entry is small in the aggregate. As a result, average concentration declines modestly despite substantial activity in the market for corporate control. These patterns show that observed concentration can mask large and offsetting changes in ownership and firm dynamics.

Owner identity matters within this decomposition. PE-owned and listed structures make similarly positive contributions to ownership-driven consolidation, even though PE has a smaller market footprint. Their total contributions differ because listed growth reduces concentration, while the PE growth contribution is comparatively small. Non-listed non-PE firms provide the main countervailing force through relative growth. These findings place PE within the broader market for corporate control: its ownership contribution is economically important, but the resulting change in industry concentration also depends on how other firms grow, enter, and exit.

Our paper makes three key contributions. The first contribution is to provide a unified, channel-based framework for understanding changes in industry concentration. Existing work emphasizes either mergers and acquisitions, firm growth, or entry as the primary driver of concentration. By separating these channels within a common framework, we show that they need not move in the same direction and that focusing on any one channel in isolation can be misleading. In particular, ownership-driven consolidation frequently coincides with growth dynamics that work in the opposite direction, clarifying why concentration trends may appear modest even during periods of substantial ownership reallocation.

The second contribution is to highlight the role of private equity in shaping industry structure through the market for corporate control. As private equity has grown in scale and expanded its buyout strategies, its influence on ownership reallocation within industries has become increasingly important. Private equity-owned firms indeed contribute systematically to ownership-driven consolidation and exhibit a pattern similar to listed firms within this channel. This similarity is informative: private equity operates as an important consoli-

dating owner alongside public firms rather than as a marginal participant. At the same time, the overall concentration change reflects the contributions of other owners and channels, particularly growth among non-listed firms. The implications of private equity ownership must therefore be interpreted in the context of broader firm dynamics within the industry.

Our third contribution is to relate these consolidation channels to measures of market power and firm performance. The industry-outcome results provide little evidence that ownership-driven consolidation is systematically associated with higher markups. Markup changes are instead more closely related to growth and net entry, particularly among non-listed firms, showing that industry outcomes depend on how ownership changes interact with reallocation elsewhere in the market. The productivity results offer no corresponding evidence of efficiency gains. Overall, the results do not support a simple account in which ownership consolidation either raises markups or generates broad industry-level productivity gains.

Several avenues for future research follow naturally from our findings. First, extending the analysis to a broader European or global setting would allow researchers to exploit cross-country variation in merger regulation, financial development, and market institutions to better understand how ownership-driven consolidation interacts with growth and entry across comparable industries. Second, future work could investigate the mechanisms underlying the observed interactions between ownership reallocation and firm dynamics, including competitive responses by incumbents and entrants that operate through growth, entry, and exit decisions; more evidence is needed on how strategic responses, information frictions, and financing conditions mediate these effects in the context of private equity investments. Third, linking the consolidation components to consumer- and worker-level outcomes—such as prices, service quality, wages, and employment—would help quantify when changes in ownership and market structure translate into first-order welfare effects, especially in sectors where quality is difficult to observe and externalities are salient. Finally, applying the decomposition framework within specific sectors could discipline and interpret sector-focused studies by clarifying when ownership consolidation is more likely to translate into persistent changes in market structure.

References

- Acharya, V. V., Gottschalg, O. F., Hahn, M., and Kehoe, C. (2013) Corporate governance and value creation: Evidence from private equity, *The Review of Financial Studies* **26**, 368–402.
- Aghion, P., Van Reenen, J., and Zingales, L. (2013) Innovation and institutional ownership, *American economic review* **103**, 277–304.
- Aghion, P., Bloom, N., Blundell, R., Griffith, R., and Howitt, P. (2005) Competition and innovation: an inverted-u relationship, *Quarterly Journal of Economics* **120**, 701–728.
- Aghion, P., Jones, B. F., Jones, C. I., Sporn, B., Van Reenen, J., and Zingales, L. (2021) Competition, markups, and the state of the economy, *Journal of Economic Perspectives* **35**, 3–28.
- Andonov, A. and Rauh, J. D. (2024) *The shifting finance of electricity generation*. Available at SSRN <https://ssrn.com/abstract=4287123>. Accessed: 2024-30-07.
- Ashenfelter, O., Hosken, D., and Weinberg, M. (2014) Did robert bork understate the competitive impact of mergers? evidence from consummated mergers, *Journal of Law and Economics* **57**, S67–S100.
- Autor, D., Dorn, D., Katz, L. F., Patterson, C., and Van Reenen, J. (2020) The fall of the labor share and the rise of superstar firms, *The Quarterly Journal of Economics* **135**, 645–709.
- Bain&Company (2018) *Global private equity report 2018*. Available at <https://www.bain.com/insights/global-private-equity-report-2018/>. Accessed: 2018-09-15.
- Bansraj, D. (2022) How does private equity ownership affect acquisition performance?, *Working Paper*.
- Bansraj, D., Smit, J., and Volosovych, V. (2022) Private equity as strategic buyers, *Working Paper*.
- Bansraj, D. and Xu, D. (2024) How does private equity shape childcare? implications for competition, pricing, and quality. Working paper.
- Barkai, S. (2020) Declining labor and capital shares, *Journal of Finance* **75**, 2421–2463.
- Barkai, S., Karger, E., and Loring, S. (2025) *M&a and the rise in industry concentration*. Tech. rep. First version November 2024; this version July 2025. Working Paper.
- Bena, J. and Li, K. (2014) Corporate innovations and mergers and acquisitions, *Journal of Finance* **69**, 1923–1960.
- Bernstein, S., Lerner, J., Sorensen, M., and Strömberg, P. (2016) Private equity and industry performance, *Management Science* **63**, 1198–1213.
- Bernstein, S. and Sheen, A. (2016) The operational consequences of private equity buyouts: Evidence from the restaurant industry, *The Review of Financial Studies* **29**, 2387–2418.
- Bloom, N., Sadun, R., and Van Reenen, J. (2015) Do private equity owned firms have better management practices?, *American Economic Review* **105**, 442–46.
- Boucly, Q., Sraer, D., and Thesmar, D. (2011) Growth LBOs, *Journal of Financial Economics* **102**, 432–453.
- Bresnahan, T. F. and Reiss, P. C. (1991) Entry and competition in concentrated markets, *Journal of Political Economy* **99**, 977–1009.
- Cohn, J. B., Hotchkiss, E. S., and Towery, E. M. (2022) Sources of value creation in private equity buyouts of private firms. *Review of Finance* **26**, 257–285.

- Davis, S. J., Haltiwanger, J., Handley, K., Jarmin, R., Lerner, J., and Miranda, J. (2014) Private equity, jobs, and productivity, *The American Economic Review* **104**, 3956–3990.
- Davis, S. J., Haltiwanger, J. C., Handley, K., Lipsius, B., Lerner, J., and Miranda, J. (2019) *The (heterogenous) economic effects of private equity buyouts*. Working Paper 26371. National Bureau of Economic Research.
- De Loecker, J., Eeckhout, J., and Unger, G. (2020) The rise of market power and the macroeconomic implications, *The Quarterly Journal of Economics* **135**, 561–644.
- Eaton, C., Howell, S. T., and Yannelis, C. (2019) When investor incentives and consumer interests diverge: Private equity in higher education, *The Review of Financial Studies*.
- Edgerton, J. (2012) Agency problems in public firms: evidence from corporate jets in leveraged buyouts, *Journal of Finance* **67**, 2187–2213.
- Ellison, G. and Glaeser, E. L. (1997) Geographic concentration in us manufacturing industries: a dartboard approach. *Journal of Political Economy* **105**, 889–927.
- Fracassi, C., Previtro, A., and Sheen, A. W. (2017) Barbarians at the store? Private equity, products, and consumers, *The Journal of Finance* **77**, 1439–1488.
- Gandhi, A., Song, Y., and Upadrashta, P. (2025) Private equity, consumers, and competition: evidence from the nursing home industry. NBER Working Paper No. 34306.
- Gompers, P., Kaplan, S. N., and Mukharlyamov, V. (2016) What do private equity firms say they do?, *Journal of Financial Economics* **121**, 449–476.
- Gowrisankaran, G., Nevo, A., and Town, R. (2015) Mergers when prices are negotiated: evidence from the hospital industry, *American Economic Review* **105**, 172–203.
- Gupta, A., Howell, S. T., Yannelis, C., and Gupta, A. (2024) Owner incentives and performance in healthcare: private equity investment in nursing homes. *The Review of Financial Studies* **37**, 1029–1077.
- Gutiérrez, G. and Philippon, T. (2018) How eu markets became more competitive than us markets, *NBER Macroeconomics Annual* **32**, 165–221.
- Hammer, B., Knauer, A., Pflucke, M., and Schwetzler, B. (2017) Inorganic growth strategies and the evolution of the private equity business model, *Journal of Corporate Finance* **45**, 31–63.
- Hlatshwayo, S. and Spence, M. (2014) Demand and defective growth patterns: the role of the tradable and non-tradable sectors in an open economy. *American Economic Review* **104**, 272–277.
- Hotchkiss, E. S., Smith, D. C., and Strömberg, P. (2021) Private Equity and the Resolution of Financial Distress, *The Review of Corporate Finance Studies* **10**, 694–747.
- Hottman, C., Redding, S. J., and Weinstein, D. E. (2016) Quantifying the sources of firm heterogeneity, *Quarterly Journal of Economics* **131**, 1291–1364.
- Jensen, M. (1989) Eclipse of the public corporation, *Harvard Business Review* **67**, 60–70.
- Kaplan, S. N. (1989) The effects of management buyouts on operating performance and value, *Journal of Financial Economics* **24**, 217–254.
- Kaplan, S. N. and Strömberg, P. (2009) Leveraged buyouts and private equity, *The Journal of Economic Perspectives* **23**, 121–146.
- Kepler, J. D., Naiker, V., and Stewart, C. R. (2023) Stealth acquisitions and product market competition, *The Journal of Finance* **78**, 2837–2900.
- Klette, T. J. and Kortum, S. (2004) Innovating firms and aggregate innovation, *Journal of Political Economy* **112**, 986–1018.

- Lerner, J., Sørensen, M., and Strömberg, P. (2011) Private equity and long-run investment: The case of innovation, *The Journal of Finance* **66**, 445–477.
- Liu, T. (2022) Bargaining with private equity: implications for hospital prices and patient welfare, *Available at SSRN 3896410*.
- Maksimovic, V. and Phillips, G. (2001) The market for corporate assets: who engages in mergers and asset sales and are there efficiency gains?, *Journal of Finance* **56**, 2019–2065.
- Mian, A. and Sufi, A. (2014) What explains the 2007–2009 drop in employment?, *Econometrica* **82**, 2197–2223.
- Morris, P., Phalippou, L., and Wu, B. (2025) How deadly is financial leverage? evidence from care homes during the COVID-19 crisis, *Management Science*.
- Sorensen, M. and Yasuda, A. (2023) Impact of private equity, *Forthcoming, Handbook of the Economics of Corporate Finance* **1**.
- Wollmann, T. G. (2019) Stealth consolidation: evidence from an amendment to the hart-scott-rodino act. *American Economic Review: Insights* **1**, 77–94.

9 Figures

Figure 1: Private equity and listed market shares over time

This figure plots the unweighted average industry market shares of PE-owned and listed structures between 2003 and 2021. The orange line represents PE-owned structures and the blue dashed line represents listed structures. Dotted line segments indicate the pre-2007 run-up period and solid segments indicate the 2007–2021 main sample period. The vertical line marks 2007. The sample includes non-tradable industries classified by four-digit NACE codes.



Figure 2: Deal activity by owner type

The stacked bars report annual numbers of completed M&A deals by PE, listed, and non-listed non-PE acquirers between 2003 and 2021. The yellow line reports PE deals as a percentage of all deals, and the red dashed line reports listed deals as a percentage of all deals; both percentages use the right axis. The sample contains transactions linked to non-tradable four-digit NACE industries.

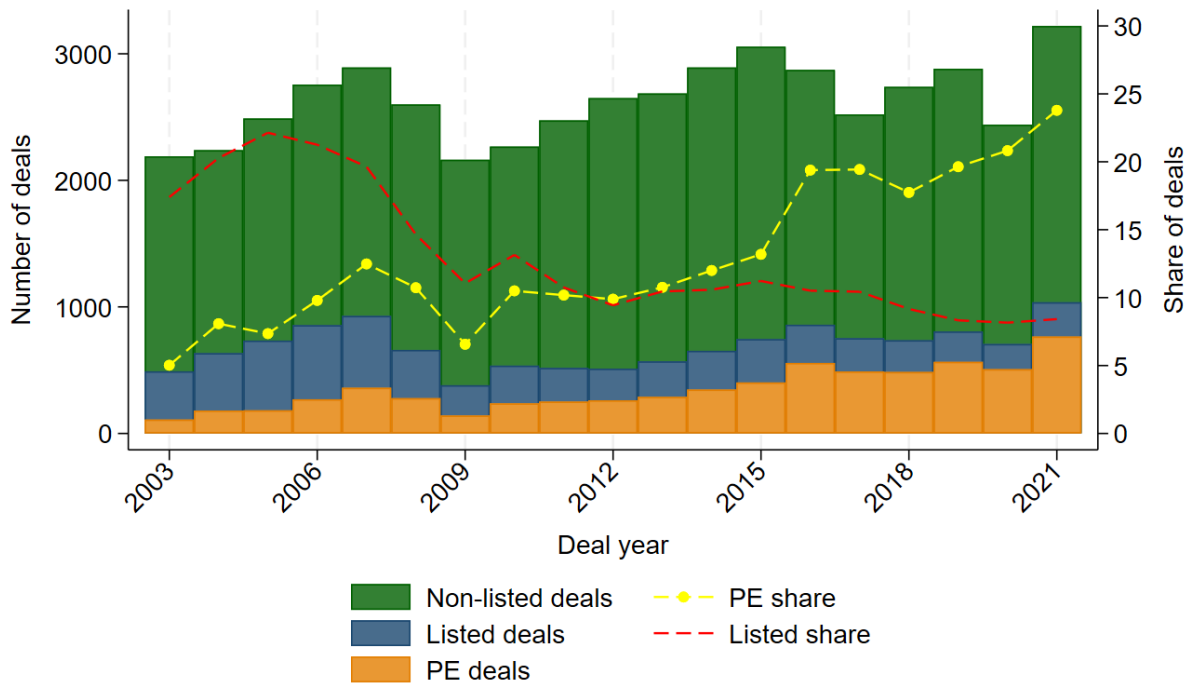
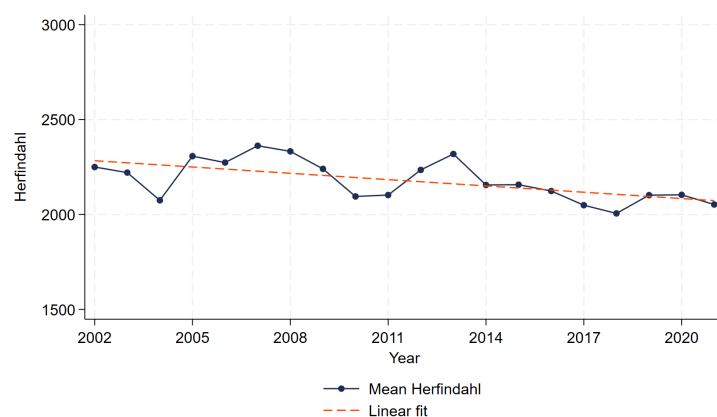
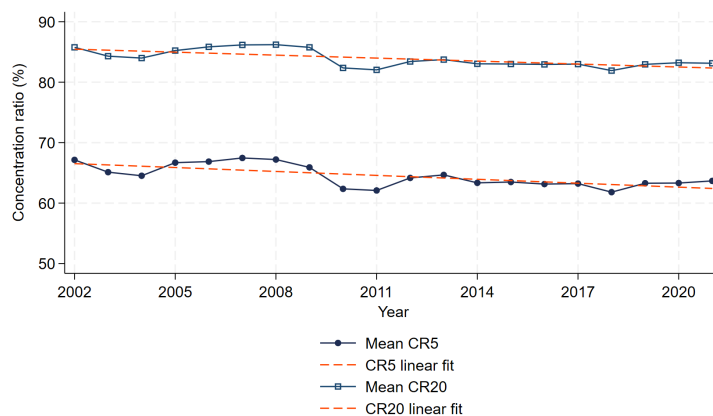


Figure 3: Herfindahl and concentration ratios in non-tradable industries

Panel A plots the unweighted mean Herfindahl index and Panel B plots the unweighted mean concentration ratios for the five and twenty largest ownership-industry structures ranked by operating revenue. The sample covers 2002–2021 and industries are classified by four-digit NACE codes.



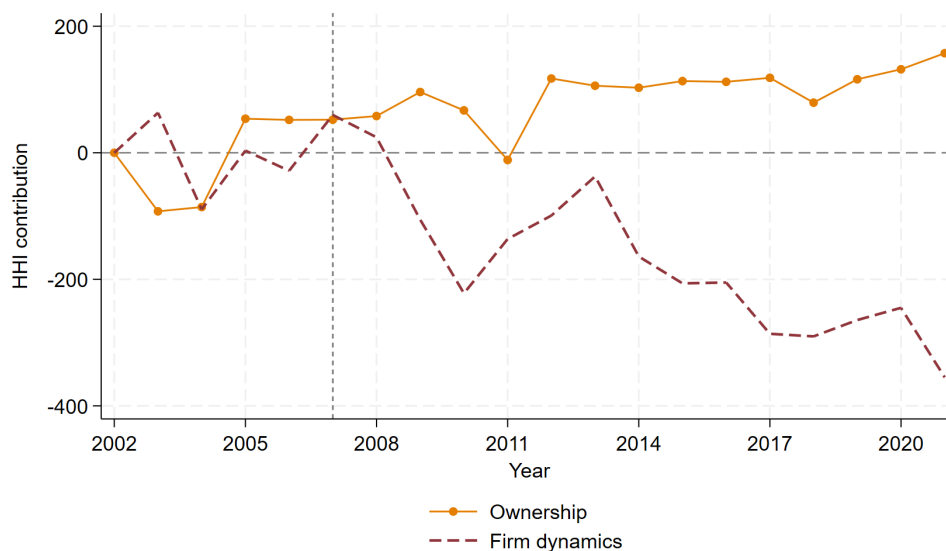
Panel A: Herfindahl



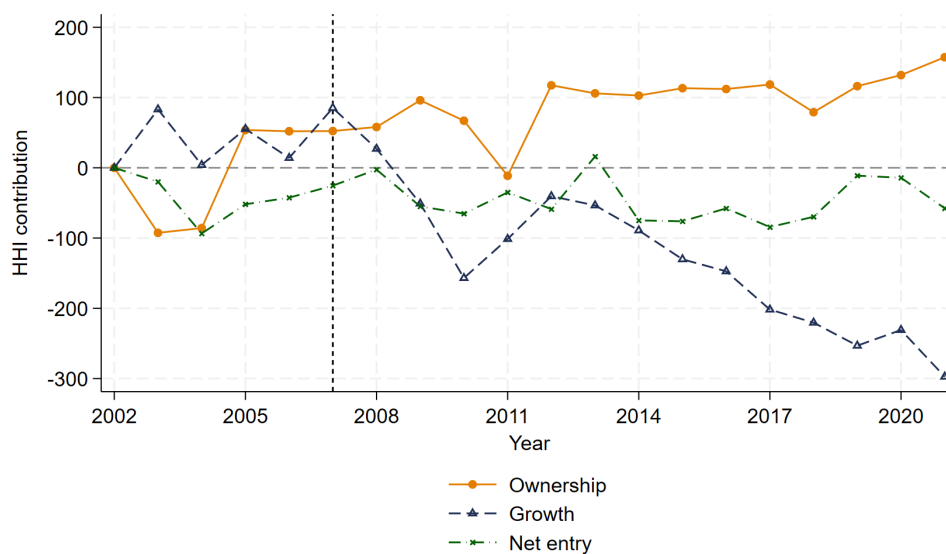
Panel B: Concentration ratios

Figure 4: Cumulative decomposition of industry concentration by channel

Panel A presents the two-channel decomposition, combining growth and net entry as firm dynamics. Panel B separates ownership, growth, and net entry. All series are unweighted means of cumulative HHI contributions across non-tradable four-digit NACE industries. The vertical line marks the beginning of the 2007 main sample period.



Panel A: Unweighted cumulative consolidation – 2 channels



Panel A: Unweighted cumulative consolidation – 3 channels

Figure 5: Cumulative decomposition of concentration changes by ownership type

This figure plots the unweighted cumulative HHI contributions of PE-owned, listed, and non-listed non-PE structures. Each owner series sums its ownership-, growth-, and net-entry-driven components. Positive values increase concentration and negative values reduce it. The sample includes non-tradable industries classified by four-digit NACE codes.

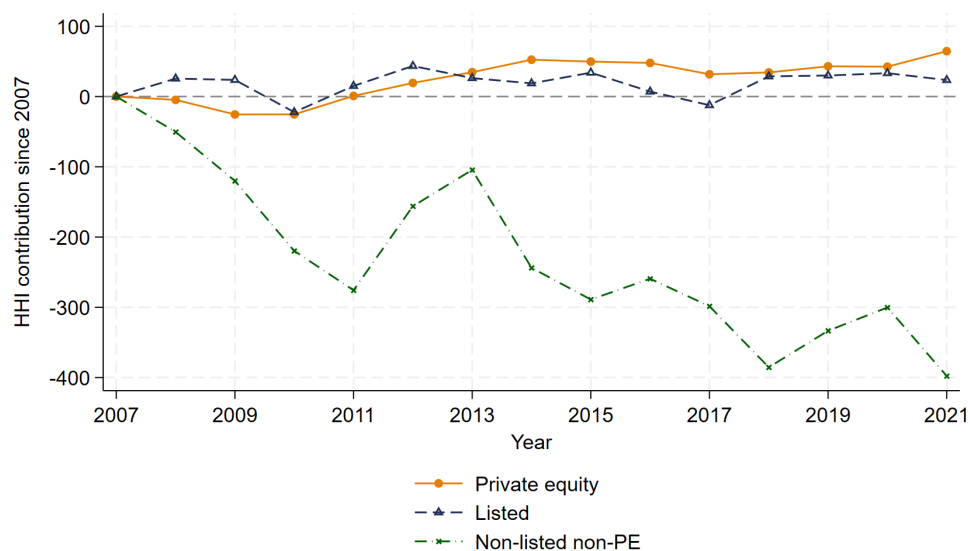
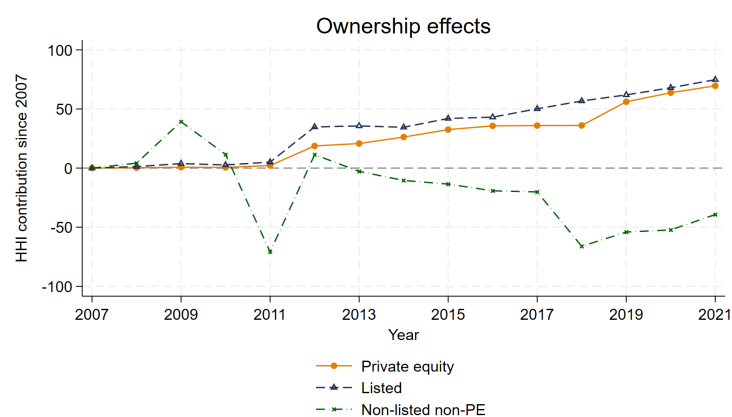
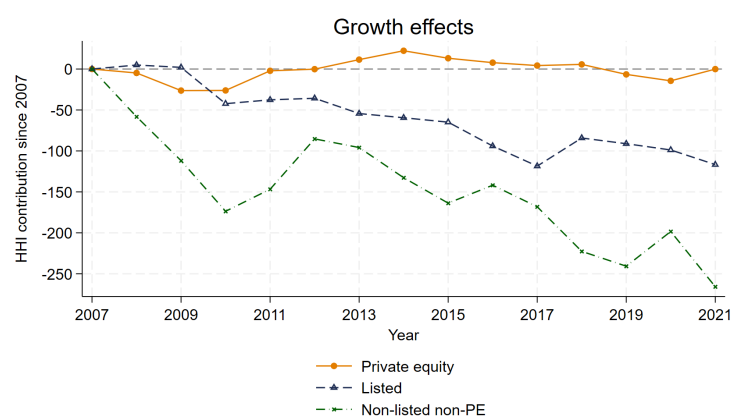


Figure 6: Cumulative decomposition by ownership type and source

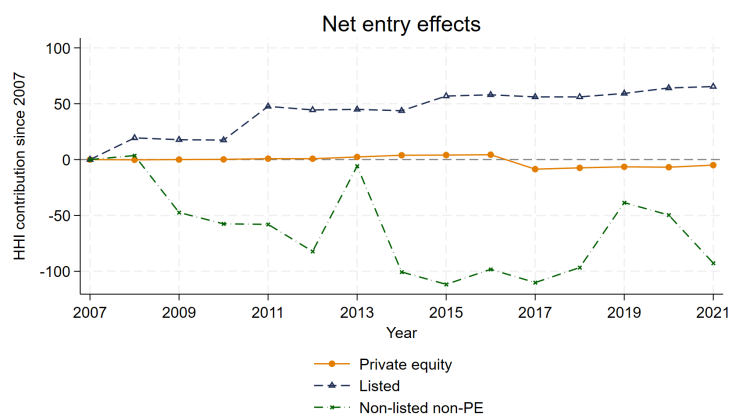
This figure decomposes unweighted cumulative HHI changes by source and owner type. Panel A reports ownership-driven contributions, Panel B growth-driven contributions, and Panel C net-entry-driven contributions. Within each panel, the orange line represents PE-owned structures, the blue dashed line listed structures, and the green dash-dotted line non-listed non-PE structures. Positive values increase concentration and negative values reduce it. The sample includes non-tradable industries classified by four-digit NACE codes.



Panel A: Cumulative ownership-driven consolidation



Panel B: Cumulative growth-driven consolidation



Panel C: Cumulative net-entry-driven consolidation

10 Tables

Table 1: Industry characteristics

This table reports descriptive statistics for non-tradable four-digit NACE industry-year observations between 2007 and 2021. Industry size is measured by operating revenue, employment, and the number of ownership-structure-industry observations. Concentration measures are the Herfindahl index and the revenue shares of the five, eight, and twenty largest units. The final rows report the revenue market shares of PE-owned, listed, and non-listed non-PE structures. Industries are classified according to four-digit NACE codes.

	N	Median	Mean	Std. Dev.	Min	Max
<i>Size characteristics</i>						
Market size (bln)	2,970	1.801	11.244	28.691	0.00	325.54
Number of employees (thousands)	2,970	9	27	48	0	366
Number of companies	2,970	185	512	932	7	10,658
<i>Concentration</i>						
Herfindahl	2,970	1,210.6	1,783.0	1,834.2	21.0	9,917.6
Concentration ratio 5 (%)	2,970	62.3	60.5	24.2	5.5	100.0
Concentration ratio 8 (%)	2,970	72.5	68.7	23.5	7.7	100.0
Concentration ratio 20 (%)	2,970	87.6	81.7	19.5	13.4	100.0
<i>Market share</i>						
PE market share (%)	2,970	1.2	5.8	11.5	0.0	88.4
Listed market share (%)	2,970	2.3	10.0	17.4	0.0	99.8
Non-listed non-PE market share (%)	2,970	91.8	84.2	20.1	0.2	100.0

Table 2: Decomposition of changes in industry concentration

This table reports the exact decomposition of HHI changes into ownership-, growth-, and net-entry-driven contributions for PE-owned, listed, and non-listed non-PE structures. Panel A reports annual industry-year changes and Panel B cumulative 2007–2021 changes by market. The owner-by-channel components sum to the observed HHI change. The sample includes non-tradable four-digit NACE industries.

	Median	Mean	Std. Dev.	Min	Max
<i>Panel A: Yearly changes, 2,970 observations</i>					
Change in Herfindahl	-3.32	-9.94	797.88	-8,187	8,305
Ownership-PE	0.00	5.28	73.89	-944	2,245
Ownership-Listed	0.00	5.01	56.81	-503	1,277
Ownership-Non-listed	0.00	-2.98	179.90	-2,386	3,352
Growth-PE	0.00	0.06	142.86	-2,280	5,036
Growth-Listed	0.00	-4.26	385.30	-8,148	8,121
Growth-Non-listed	-4.03	-13.70	540.09	-4,922	4,996
Net-entry-PE	0.00	0.60	12.39	-117	433
Net-entry-Listed	0.00	3.97	114.65	-635	3,854
Net-entry-Non-listed	0.72	-3.91	363.50	-7,221	8,364
<i>Panel B: Cumulative 2007–2021 changes, 198 markets</i>					
Change in Herfindahl	-158.75	-241.08	1,646.92	-6,032	7,584
Ownership-PE	0.23	77.32	458.41	-137	5,641
Ownership-Listed	0.10	70.40	249.06	-195	2,150
Ownership-Non-listed	-0.97	-38.51	524.00	-5,031	1,614
Growth-PE	0.00	15.15	526.83	-1,669	6,175
Growth-Listed	0.00	-123.50	745.66	-5,967	2,002
Growth-Non-listed	-137.13	-241.54	1,385.53	-7,213	4,414
Net-entry-PE	0.00	9.00	53.92	-117	496
Net-entry-Listed	0.00	54.84	415.12	-609	3,639
Net-entry-Non-listed	7.22	-64.23	1,166.93	-5,332	7,889

Table 3: Yearly decomposition of aggregate concentration contributions

For each year, Panel A aggregates the HHI contributions by owner type and Panel B by source. A component's percentage is 100 times the absolute value of its aggregate contribution divided by the sum of the absolute aggregate contributions within the panel. The percentage is therefore not a share of the absolute observed HHI change. A superscript “-” indicates that the signed aggregate contribution reduced concentration. “Sum absolute contributions” reports the denominator in HHI points and “Mean HHI change” reports the signed mean change. The final row reports the mean annual contribution over 2007–2021.

<i>Panel A: By Ownership Type</i>					
Year	Private Equity	Listed	Non-listed Non-PE	Sum absolute contributions	Mean HHI change
2007	11% -	59%	30%	117	92
2008	12% -	5%	82% -	42	-38
2009	19% -	35%	47% -	36	-11
2010	1% -	30% -	70% -	165	-165
2011	28%	27%	46% -	105	9
2012	17%	23%	60%	137	137
2013	19%	11% -	70%	88	69
2014	14%	4% -	82% -	140	-101
2015	1% -	22%	77% -	99	-56
2016	0%	62% -	38%	86	-20
2017	16% -	40% -	44% -	20	-20
2018	3%	30%	68% -	114	-40
2019	17%	8%	75%	61	61
2020	5% -	18%	78% -	41	-27
2021	24%	20% -	56% -	76	-40
2007–2021	19%	15%	66% -	31	-10
<i>Panel B: By Source</i>					
Year	Ownership	Growth	Net entry	Sum absolute contributions	Mean HHI change
2007	0%	88%	11%	92	92
2008	8%	71% -	21%	89	-38
2009	44%	31% -	25% -	96	-11
2010	20% -	74% -	6% -	165	-165
2011	47% -	34%	19%	172	9
2012	64%	18%	19% -	219	137
2013	14% -	50%	36%	96	69
2014	3% -	65% -	32% -	101	-101
2015	14%	77% -	9% -	78	-56
2016	1%	64% -	35%	70	-20
2017	3%	73% -	24% -	21	-20
2018	69% -	9% -	22%	72	-40
2019	43%	22% -	35%	109	61
2020	27%	64% -	9% -	59	-27
2021	28%	29% -	43% -	91	-40
2007–2021	28%	69% -	3%	26	-10

Table 4: Sectoral decomposition of aggregate concentration contributions

This table aggregates cumulative 2007–2021 HHI contributions within each sector. Panel A reports owner-type contributions and Panel B source contributions. A component’s percentage is 100 times the absolute value of its aggregate sector contribution divided by the sum of the absolute aggregate contributions within that panel and sector. A superscript “–” indicates a negative signed contribution. The final columns report the denominator and the signed mean cumulative HHI change.

<i>Panel A: By Ownership Type</i>					
Sector	Private Equity	Listed	Non-listed Non-PE	Sum absolute contributions	Mean sample HHI change
Prof. Services	11%	49%	40%	243	243
Other Services	11%	48% –	41%	581	28
Transport	34%	32%	34% –	697	222
Accommodation	46%	10% –	44%	371	299
Education	30%	5% –	64% –	2,056	-808
Recreation	6%	50% –	45%	612	4
Finance	14% –	16%	70% –	481	-329
Health	20%	6%	74% –	1,290	-622
Information	17%	30%	53% –	1,384	-76
Utilities	6%	54% –	40% –	1,503	-1,329
<i>Panel B: By Source</i>					
Sector	Ownership	Growth	Net Entry	Sum absolute contributions	Mean sample HHI change
Prof. Services	36%	16% –	48%	353	243
Other Services	28%	46% –	26%	359	28
Transport	10%	38% –	53%	899	222
Accommodation	81%	8% –	12%	352	299
Education	5%	27% –	68% –	895	-808
Recreation	29%	21%	50% –	534	4
Finance	21%	11% –	68% –	570	-329
Health	11%	13% –	75% –	805	-622
Information	32%	9%	58% –	451	-76
Utilities	2%	92% –	6%	1,580	-1,329

Table 5: Decomposition contributions by initial market characteristics

This table reports mean cumulative 2007–2021 HHI changes and decomposition contributions across markets split by initial size, growth, concentration, and financing constraints. Each characteristic is divided at its sample median. “Difference” is the second-group mean minus the first-group mean. Asterisks denote the significance of this difference at the 10%, 5%, and 1% levels. The sample contains non-tradable four-digit NACE industries.

	Small Market	Large Market	Diff	Low Growth	High Growth	Diff	Concen.	Frag.	Diff	Unconstr.	Fin. constr.	Diff
Change in Herfindahl	-132	-351	-219	-426	-57	369	-701	218	919***	-445	-37	408*
<i>Ownership contribution</i>												
PE ownership effect	135	19	-116*	102	53	-49	141	13	-128**	99	55	-44
Listed ownership effect	20	121	101***	87	54	-33	89	52	-38	33	108	76**
Non-listed ownership effect	-1	-76	-74	-98	21	118	-84	7	92	-60	-17	42
<i>Growth contribution</i>												
PE growth effect	39	-9	-48	35	-4	-39	19	12	-7	49	-18	-67
Listed growth effect	-42	-205	-164	-270	23	293***	-193	-54	139	-90	-157	-67
Non-listed growth effect	-315	-168	148	-341	-142	199	-662	179	841***	-270	-213	57
<i>Net entry contribution</i>												
PE net-entry effect	13	5	-7	11	7	-5	12	6	-7	14	4	-10
Listed net-entry effect	7	102	95	23	86	63	44	66	22	78	32	-46
Non-listed net-entry effect	12	-141	-153	25	-153	-178	-66	-62	4	-298	169	467***

Table 6: Industry outcomes and decomposition components

This table reports long-difference regressions of industry outcomes between 2007 and 2021 on cumulative HHI decomposition components. Ownership, growth, and net entry enter separately for PE-owned, listed, and non-listed non-PE structures. The regressions are estimated using components in raw HHI points; displayed coefficients are signed-mean economic effects, obtained by multiplying each raw slope by the component's signed sample mean. All regressions include controls for initial industry characteristics and realized industry growth. Reported t -statistics use robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	(1) $\Delta\mu$	(2) ΔTFP	(3) $\Delta\text{Cost Emp.}$	(4) $\Delta\text{Cost Goods}$
<i>Ownership-driven</i>				
PE	-0.006 (-0.90)	-0.017** (-2.39)	-0.001 (-0.46)	-0.005 (-1.31)
Listed	-0.001 (-0.22)	-0.004 (-0.87)	0.000 (0.04)	-0.006 (-1.10)
Non-listed	0.000 (0.08)	0.001 (0.27)	0.002** (2.08)	0.004 (1.61)
<i>Growth-driven</i>				
PE	-0.001*** (-2.82)	0.001 (1.07)	-0.001** (-2.38)	0.001** (2.13)
Listed	0.009* (1.66)	-0.016*** (-2.77)	0.002 (0.72)	-0.004 (-1.26)
Non-listed	0.007** (2.08)	-0.001 (-0.10)	0.003* (1.74)	-0.001 (-0.35)
<i>Net entry-driven</i>				
PE	0.004 (1.10)	-0.002 (-0.77)	0.002 (1.35)	0.002 (0.84)
Listed	-0.006*** (-3.05)	0.006** (2.46)	-0.001 (-1.03)	-0.000 (-0.06)
Non-listed	0.022*** (3.62)	-0.014** (-2.30)	0.006*** (2.61)	-0.007 (-1.63)
<i>Controls</i>				
Initial HHI	-0.087*** (-3.55)	0.013 (0.33)	-0.031*** (-3.37)	0.016 (1.20)
Industry growth	0.007 (0.55)	0.013*** (2.99)	-0.001 (-0.25)	0.002 (0.77)
Initial size (log)	-0.029** (-2.26)	0.035 (1.47)	-0.006 (-1.62)	-0.015** (-2.12)
Initial Fin. constraints	-0.017 (-0.32)	-0.061 (-0.97)	0.010 (0.51)	0.031 (1.05)
Initial μ	-0.150* (-1.84)	-0.171* (-1.77)	-0.052* (-1.69)	-0.067 (-1.53)
Initial TFP	-0.186** (-2.28)	-0.446*** (-3.08)	-0.027 (-0.79)	-0.013 (-0.30)
Observations	169	169	169	169
Adj. R-squared	0.111	0.190	0.041	0.053
F-stat	4.253	4.833	6.405	2.080

Table 7: Economic effects by ownership type and decomposition channel

This table reports linear combinations from the regressions underlying Table 6. Panel A combines the ownership-, growth-, and net-entry-driven signed-mean effects within each owner type. Panel B combines the PE, listed, and non-listed signed-mean effects within each channel. Because each term is scaled by its own signed sample mean, the displayed totals are economic-effect linear combinations rather than unweighted sums of raw slopes. Reported t -statistics use robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	$\Delta\mu$	ΔTFP	$\Delta\text{CostEmp}$	$\Delta\text{CostGoods}$
<i>Panel A: Effects by Owner Type</i>				
Total PE	-0.003 (-0.45)	-0.019** (-2.28)	0.001 (0.25)	-0.003 (-0.56)
Total Listed	0.001 (0.20)	-0.014** (-2.18)	0.002 (0.51)	-0.010 (-1.64)
Total Non-listed	0.029*** (3.44)	-0.014 (-1.30)	0.010*** (3.39)	-0.004 (-0.64)
<i>Panel B: Effects by Consolidation Channel</i>				
Total Ownership	-0.006 (-0.92)	-0.020*** (-2.81)	0.001 (0.49)	-0.008 (-1.60)
Total Growth	0.014** (2.04)	-0.015 (-1.61)	0.004 (1.17)	-0.004 (-0.91)
Total Net-entry	0.019*** (2.82)	-0.010 (-1.62)	0.007*** (2.91)	-0.005 (-1.10)

Table 8: Heterogeneous effects of decomposition components on markups by industry characteristics

This table reports heterogeneous effects on markups ($\Delta\mu$) for industries split by initial fragmentation, industry size, industry growth, fixed-asset intensity, and financing constraints (KZ index). Within each panel, coefficients labeled “Low” represent the estimated effect for industries with low values of the characteristic, while coefficients labeled “High–Low” report the difference in effects between high- and low-characteristic industries. Robust standard errors are used to compute t -statistics (in parentheses). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Block	Group	Concentration	Size	Growth	Fixed assets	Fin. constraints
<i>Panel A: Effects by Owner Type</i>						
PE	Low	-0.017** (-2.24)	-0.014*** (-4.50)	-0.010*** (-3.04)	-0.013*** (-3.66)	-0.013*** (-4.17)
	High-Low	0.007 (0.88)	0.018 (1.19)	-0.004 (-0.49)	0.002 (0.34)	0.008 (1.10)
Listed	Low	0.003*** (2.99)	0.004 (1.41)	0.001 (1.32)	0.004*** (2.87)	0.002** (2.53)
	High-Low	-0.002 (-1.37)	-0.003 (-0.95)	0.001 (1.00)	-0.003** (-1.98)	-0.001 (-1.23)
Non-listed	Low	0.039** (2.32)	0.027*** (2.71)	0.025*** (2.75)	0.035*** (2.87)	0.032*** (2.96)
	High-Low	-0.016 (-0.83)	-0.002 (-0.13)	0.000 (0.01)	-0.017 (-1.18)	-0.020 (-1.47)
<i>Panel B: Effects by Consolidation Channel</i>						
Ownership	Low	-0.013 (-0.59)	-0.013* (-1.71)	0.002 (0.19)	-0.015* (-1.74)	-0.017* (-1.89)
	High-Low	0.012 (0.56)	0.018 (1.33)	-0.012 (-0.91)	0.019 (1.47)	0.024* (1.87)
Growth	Low	0.020 (1.42)	0.011 (1.37)	0.012* (1.94)	0.014 (1.60)	0.017** (2.33)
	High-Low	-0.006 (-0.36)	0.005 (0.46)	0.002 (0.22)	-0.002 (-0.20)	-0.011 (-1.14)
Net entry	Low	0.019** (2.51)	0.018*** (2.81)	0.016*** (3.31)	0.022*** (2.87)	0.020*** (3.21)
	High-Low	-0.004 (-0.39)	-0.006 (-0.92)	-0.003 (-0.29)	-0.012 (-1.38)	-0.010 (-1.38)

Table 9: Company outcomes and industry decomposition components

This table reports signed-mean linear combinations from company-level regressions of annual changes in markups, total factor productivity, the labor cost share, and the cost-of-goods-sold share on cumulative industry decomposition components. Panel A aggregates by owner type and Panel B by decomposition channel. Reported t -statistics use robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	$\Delta\mu$	ΔTFP	$\Delta\text{CostEmp}$	$\Delta\text{CostGoods}$
<i>Panel A: Effects by Owner Type</i>				
Total PE	-0.000 (-0.20)	-0.000 (-1.01)	0.000 (0.92)	-0.000 (-0.21)
Total Listed	0.000 (0.08)	0.000* (1.88)	0.000 (1.43)	-0.000 (-0.53)
Total Non-listed	0.001 (1.25)	-0.000 (-0.07)	-0.000* (-1.79)	0.000 (0.27)
<i>Panel B: Effects by Consolidation Channel</i>				
Total Ownership	0.001** (2.33)	0.000 (0.19)	-0.000 (-0.47)	0.000 (0.51)
Total Growth	-0.000 (-0.86)	0.000 (0.44)	-0.000 (-1.01)	-0.000 (-1.01)
Total Net-entry	0.000 (1.27)	0.000 (0.50)	0.000 (0.19)	-0.000 (-0.15)

Appendices

A Additional Figures and Tables

Figure A.1: Aggregation of financial statements by ownership structure and industry

The figure illustrates how legal-entity financial statements are combined into ownership-industry observations. We use unconsolidated statements where available and deconsolidate consolidated statements to avoid double counting. Revenue is then summed across legal entities that belong to the same annual ownership structure and four-digit industry. Entities in different industries remain separate even when they share a common owner. The orange solid boxes and blue dashed boxes identify two different industries.

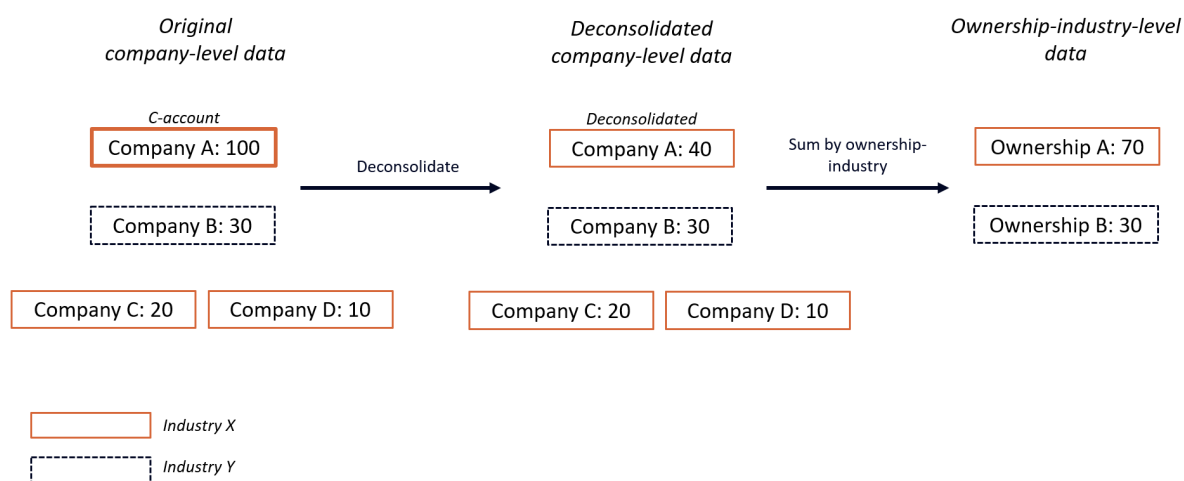
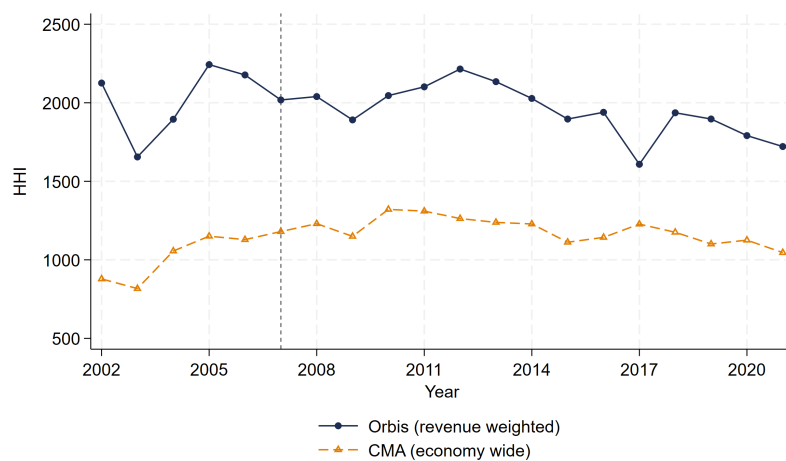
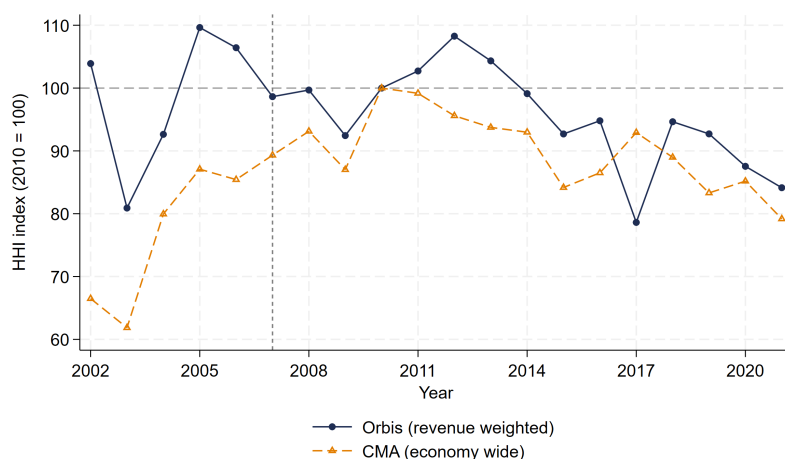


Figure A.2: Comparison of Orbis and official Herfindahl indices

Panel A compares the revenue-weighted average Herfindahl across Orbis industries with the economy-wide Herfindahl reported by the UK Competition and Markets Authority. Orbis industries are weighted using the aggregate industry-revenue benchmark. Panel B indexes both series to 2010 to compare their evolution despite differences in levels, firm coverage, and industry aggregation.



Panel A: Herfindahl levels



Panel B: Herfindahls indexed in 2010

Figure A.3: Five-year changes in concentration by initial concentration

In each year, industries are classified as initially fragmented or initially concentrated according to whether their Herfindahl five years earlier lies below or above that year's median. The bars report the average five-year change in the Herfindahl. The overlapping presentation places increases above zero and declines below zero. Initially fragmented industries tend to consolidate, whereas initially concentrated industries tend to deconcentrate.

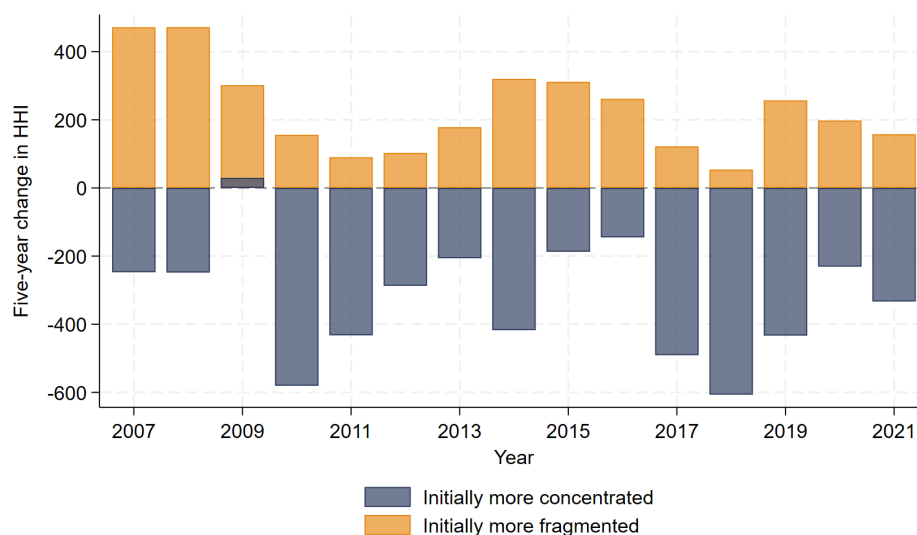


Figure A.4: Distribution of industry concentration over time

The figure plots selected percentiles of the industry Herfindahl distribution between 2002 and 2021. The sample contains non-tradable four-digit NACE industries. The figure shows whether changes in the average Herfindahl reflect a broad movement in the distribution or changes concentrated in particular parts of it.

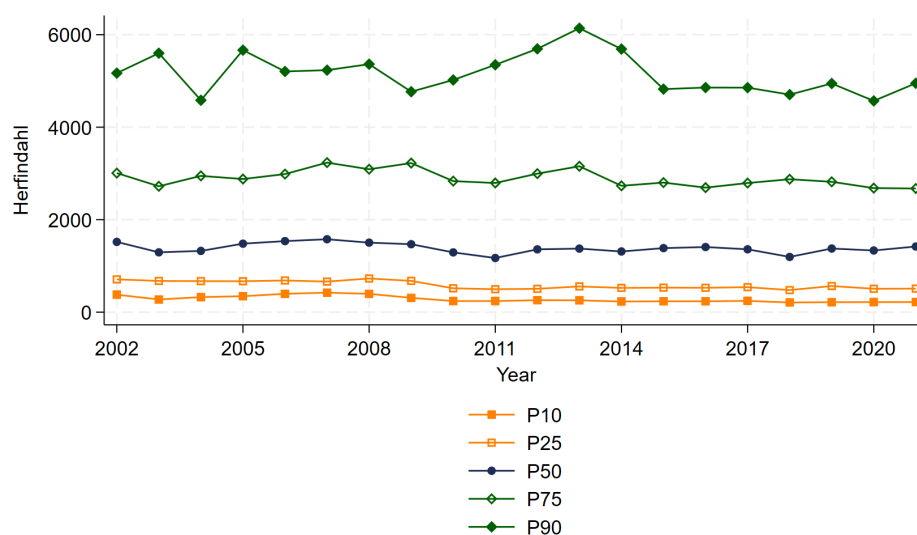
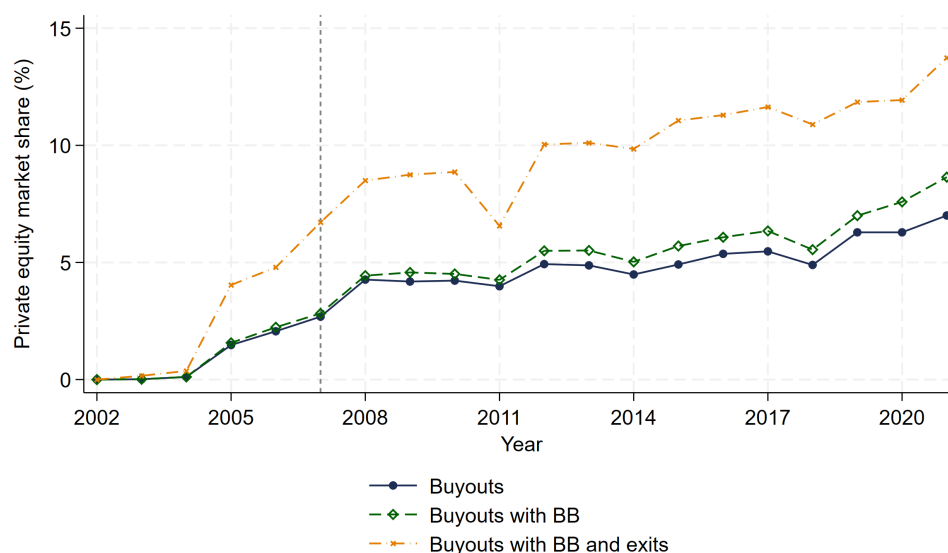
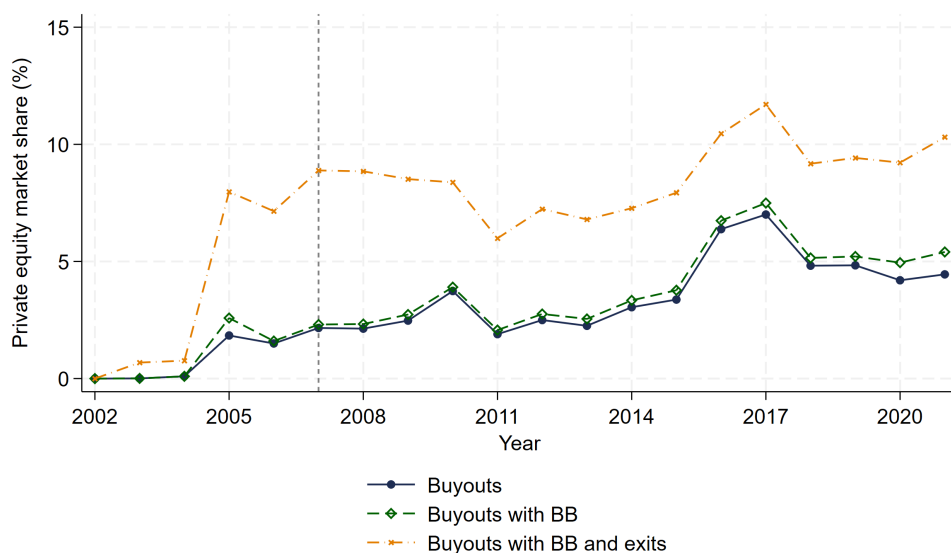


Figure A.5: Market shares of companies linked to private-equity transactions

This figure plots the average revenue market share accounted for by companies linked to private-equity transactions between 2002 and 2021 in non-tradable industries classified by four-digit NACE codes. The blue line includes buyout targets. The green line adds follow-on acquisitions by PE-owned companies. The orange line additionally retains businesses after a recorded PE exit. The orange series therefore measures the broad transaction-linked footprint of private equity rather than current PE ownership. Panel A reports unweighted industry averages. Panel B weights industries by revenue.



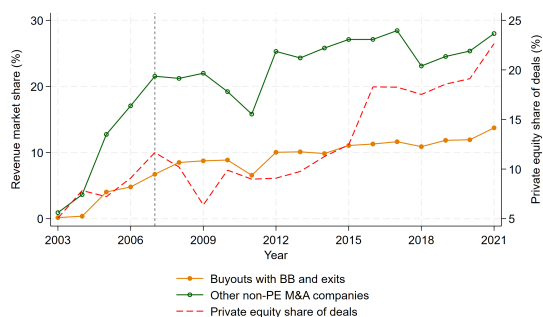
Panel A: Unweighted



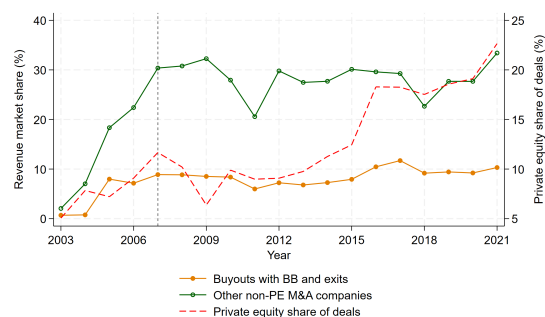
Panel B: Weighted

Figure A.6: Market footprint and deal activity: private equity and other M&A

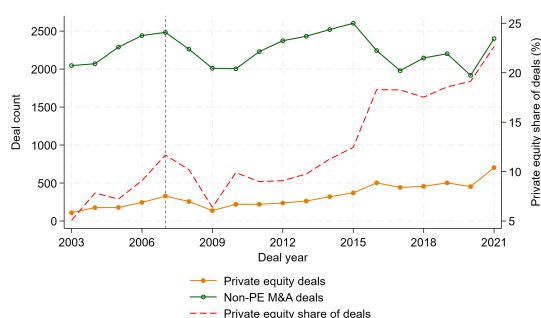
This figure compares private-equity transactions with non-PE M&A between 2003 and 2021 in non-tradable industries classified by four-digit NACE codes. In Panels A and B, the orange line is the revenue market share accounted for by buyouts, follow-on acquisitions, and businesses after a recorded PE exit; the green line is the market share accounted for by companies involved in other non-PE M&A; and the dashed red line, shown on the right axis, is the PE share of all completed deals. Panel A reports unweighted industry averages and Panel B weights industries by revenue. Panel C compares the annual numbers of PE and non-PE deals and reports the PE share of all deals on the right axis. Panel D compares follow-on acquisitions with non-PE M&A deals and reports their ratio on the right axis.



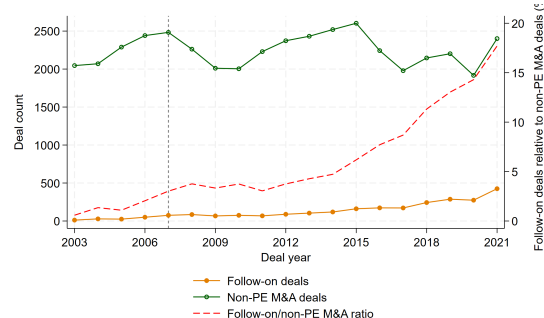
Panel A: Market share



Panel B: Market share (weighted)



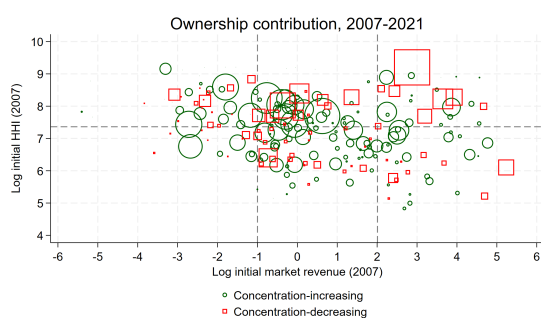
Panel C: All PE deal ratio



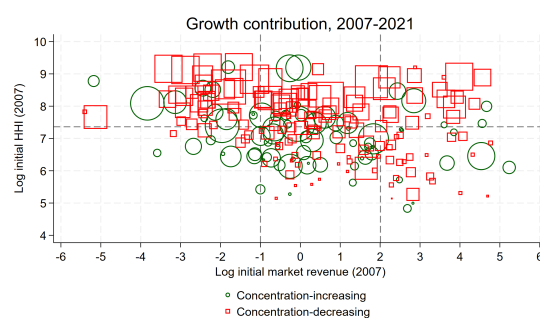
Panel D: Follow-on deal ratio

Figure A.7: Cumulative concentration contributions and initial industry characteristics

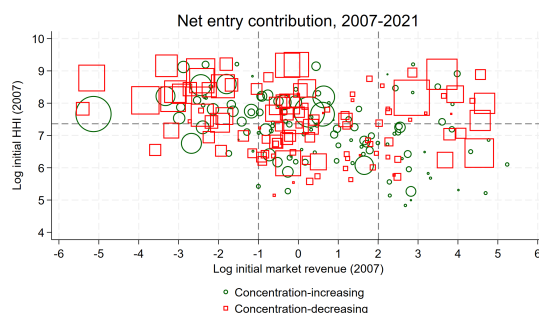
Each observation is a non-tradable four-digit NACE industry. The horizontal axis reports log market revenue in 2007 and the vertical axis reports log initial HHI in 2007. The vertical dashed lines mark the 25th and 75th percentiles of initial market revenue, and the horizontal dashed line marks the median initial HHI. Bubble size is proportional to the absolute cumulative 2007–2021 contribution. Green hollow circles denote concentration-increasing contributions and red hollow squares concentration-decreasing contributions. Panels A–C report ownership, growth, and net-entry contributions, respectively.



Panel A: Ownership-driven consolidation

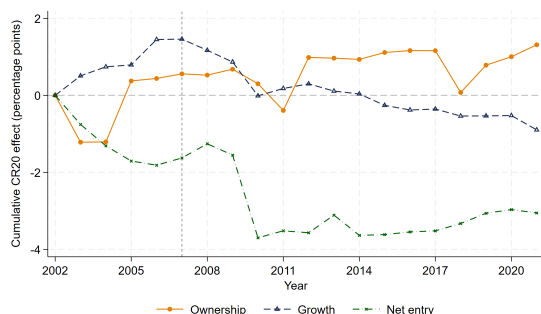


Panel B: Growth-driven consolidation

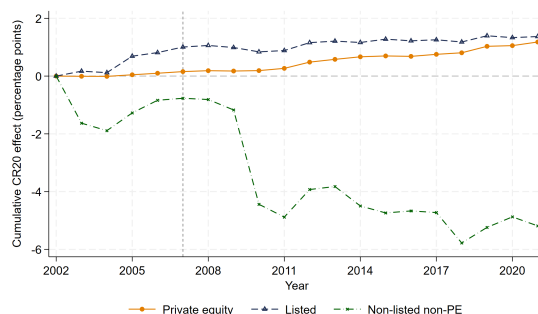


Panel C: Net entry-driven consolidation

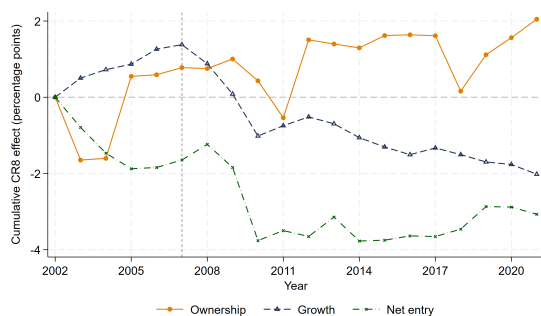
Figure A.8: Decomposition using alternative concentration measures. Panels A and C decompose the cumulative changes in the twenty- and eight-firm concentration ratios into ownership, growth, and net-entry contributions. Panels B and D report the corresponding total contributions by ownership type, combining all three channels. Industries receive equal weight, ownership structures are reranked annually, and contributions are expressed in percentage points. The vertical line marks 2007.



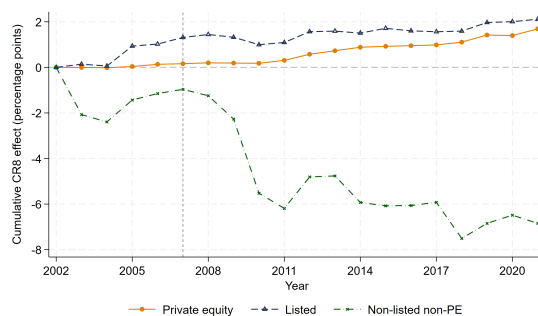
Panel A: CR20 by channel



Panel B: CR20 by ownership type



Panel C: CR8 by channel



Panel D: CR8 by ownership type

Table A.1: Number of entities per ownership structure

The table reports the distribution of reporting legal entities across ownership-industry-year structures, reporting entities across ownership-year structures, and all legal entities across official annual ownership groups. For each size category, the table reports the share of structures, entities, and revenue. The revenue shares are calculated from reporting entities only; non-reporting legal entities contribute to the ownership map but not to revenue.

No. of entities	N structures	Structures (%)	Entities (%)	Revenue (%)
<i>Reporting entities: ownership-industry-year</i>				
1	4,033,668	96.5	89.8	68.2
2	98,126	2.3	4.4	12.6
3	22,520	0.5	1.5	6.3
4+	24,810	0.6	4.3	12.9
Total	4,179,124	100.0	100.0	100.0
<i>Reporting entities: ownership-year</i>				
1	3,649,223	93.9	81.2	44.8
2	140,727	3.6	6.3	9.7
3	40,581	1.0	2.7	6.7
4+	54,139	1.4	9.8	38.8
Total	3,884,670	100.0	100.0	100.0
<i>All legal entities per official ownership group</i>				
1	51	0.0	0.0	0.0
2	22,619,872	85.8	71.9	11.1
3	2,452,478	9.3	11.7	6.4
4+	1,296,354	4.9	16.4	82.5
Total	26,368,755	100.0	100.0	100.0

Table A.2: Additional industry outcomes and decomposition components

The table reports long-difference regressions of industry profitability, log employment, and log revenue between 2007 and 2021 on cumulative ownership, growth, and net-entry contributions for PE-owned, listed, and non-listed non-PE structures. Components enter in raw HHI points; displayed coefficients are signed-mean economic effects. The specifications include the controls used in Table 6. Robust t -statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	(5) Δ Profit.	(6) $\Delta \ln(\text{Emp})$	(7) $\Delta \ln(\text{Rev})$
<i>Ownership-driven</i>			
PE ownership	-0.002 (-0.65)	-0.023 (-1.11)	-0.015 (-1.06)
Listed ownership	0.002 (1.34)	-0.021 (-1.30)	-0.019 (-1.30)
Non-listed ownership	-0.001 (-0.41)	0.011 (1.27)	0.005 (0.75)
<i>Growth-driven</i>			
PE growth	0.001* (1.67)	-0.005** (-2.02)	-0.001 (-0.32)
Listed growth	-0.005** (-2.13)	-0.026 (-1.53)	-0.039*** (-6.13)
Non-listed growth	-0.004** (-2.31)	0.008 (0.95)	-0.007 (-1.08)
<i>Net-entry-driven</i>			
PE net entry	0.001 (0.56)	-0.001 (-0.09)	-0.012 (-0.79)
Listed net entry	0.003* (1.86)	-0.007 (-0.96)	0.000 (0.01)
Non-listed net entry	-0.003 (-0.95)	0.042 (1.28)	-0.000 (-0.01)
<i>Controls</i>			
Initial HHI	0.024 (1.44)	-0.086 (-1.22)	0.046 (0.90)
Industry growth	0.002 (0.80)	0.141*** (4.32)	0.169*** (5.44)
Initial size (log)	0.012* (1.75)	-0.112*** (-4.23)	-0.064*** (-3.74)
Initial financial constraints	-0.019 (-0.49)	-0.465*** (-3.52)	-0.305*** (-2.87)
Initial markup	0.024 (0.57)	0.270 (1.42)	0.311** (2.09)
Initial TFP	-0.062 (-1.22)	0.018 (0.09)	0.023 (0.16)

Table A.3: Combined owner and channel effects for additional industry outcomes

The table reports economically scaled linear combinations from the regressions in Table A.2. Panel A combines the ownership, growth, and net-entry contributions within each owner type. Panel B combines owner-specific contributions within each channel. Robust t -statistics use the full variance-covariance matrix of the corresponding regression and are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	ΔProfit	$\Delta \ln\text{Emp}$	$\Delta \ln\text{Rev}$
<i>Effects by owner type</i>			
Total PE	0.000 (0.03)	-0.029 (-1.18)	-0.027 (-1.39)
Total Listed	0.000 (0.10)	-0.054** (-2.57)	-0.058*** (-3.81)
Total Non-listed	-0.008 (-1.57)	0.061* (1.89)	-0.002 (-0.08)
<i>Effects by concentration channel</i>			
Ownership total	0.000 (0.08)	-0.033 (-1.39)	-0.028 (-1.57)
Growth total	-0.009** (-2.57)	-0.023 (-1.08)	-0.046*** (-4.51)
Net-entry total	0.001 (0.33)	0.034 (1.06)	-0.012 (-0.48)

Table A.4: Combined owner and channel effects for additional firm-level outcomes

The table reports economically scaled linear combinations from firm-level regressions for changes in profitability, log employment, and log revenue. Panel A combines the three concentration channels within owner type and Panel B combines owner-specific contributions within channel. The specifications follow Table 9. Robust t -statistics use the full variance–covariance matrix and are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	ΔProfit	$\Delta \ln \text{Emp}$	$\Delta \ln \text{Rev}$
<i>Effects by owner type</i>			
Total PE	-0.000 (-0.52)	0.001* (1.67)	-0.000 (-0.49)
Total Listed	0.000 (0.72)	0.001 (0.76)	-0.000 (-1.03)
Total Non-listed	-0.000 (-1.22)	-0.000 (-0.06)	0.001** (2.39)
<i>Effects by concentration channel</i>			
Ownership total	-0.000 (-0.12)	0.001 (1.52)	-0.000 (-0.63)
Growth total	-0.000* (-1.75)	0.001 (0.94)	0.001*** (7.00)
Net-entry total	-0.000 (-0.26)	-0.001 (-0.56)	-0.000** (-1.97)

B Mapping ownership structures

For each UK legal entity, we collect majority-ownership links (stakes above 50%) from Orbis. Orbis collects the ownership data from several sources such as annual reports, professional data collectors, and other sources. For the UK, we utilize ownership relations from Jordans, tax returns, annual reports, and Bureau van Dijk’s own efforts to structure the ownership data. When multiple majority shareholders are reported within a year, we retain the most recently recorded link. Missing ownership can represent either a genuine period without majority control or delayed reporting during a reorganization. We fill a gap of at most two consecutive years only when the same majority shareholder is observed on both sides of the gap. In addition, an ownership link dated between January and March is assigned to the preceding year when that year otherwise has no reported link. These rules preserve short reporting gaps without carrying an owner across an observed change in control.²¹ Ownership relations that are reported between January and March (often with annual reports) are used to backfill the previous year.

Within each year, the majority-ownership graph partitions legal entities into annual ownership structures. An entity without an observed majority shareholder is the top entity of its annual structure, and all direct and indirect majority-owned subsidiaries belong to that structure. We then link annual structures across adjacent years using continuity in reporting entities and revenue. These time-consistent links are used to distinguish changes in the legal organization of an existing business from genuine entry or exit.

Next, we collect completed majority-stake investments by private equity firms from Orbis M&A and map them to the annual time-consistent ownership structures. A primary or secondary buyout begins or resets a period of PE ownership for the structure containing the deal target. Because acquisition vehicles may only become visible after the transaction, we also search the target’s verified upstream ownership chain during the post-deal integration window and use newly incorporated acquisition vehicles to connect the transaction to the same PE-owned business. Follow-on acquisitions are linked to the existing period of PE ownership when they enter the corresponding PE-owned structure.

The period of PE ownership ends when we observe transaction evidence of a change in control. Explicit private-equity exits, relevant management buyouts or buy-ins, qualifying

²¹There exists a trade-off. On the one hand, ownership data may be infrequently updated if no changes occur in line with our decision rule. On the other hand, the majority shareholder may have lost its majority stake, and no new majority shareholder may be present. Ownership relations reported between January and March are used to back-fill the previous year if no relation was reported in that year.

non-PE acquisitions involving the deal target or its upstream acquisition chain, and qualifying initial public offerings end or reset PE ownership according to the event hierarchy. A secondary buyout ends the prior sponsor’s ownership period and begins a new period under the incoming PE owner. An IPO is treated as an exit from standard PE control unless subsequent explicit PE-exit evidence indicates that PE control continued beyond the listing.

Annual structure identifiers can change after a reorganization even when the underlying reporting business remains under PE control. If a PE-owned structure disappears without an identified exit or change in control, the baseline carries its PE classification to the dominant observed successor based on reporter and revenue overlap. This broader succession rule captures reorganizations in which a new holding company becomes the reporting or controlling entity. We retain a conservative succession rule, which requires stronger bilateral overlap and a short transition gap, together with five- and seven-year limits on otherwise unresolved PE ownership as robustness specifications.

The classification is applied at the annual structure level. Only reporting entities contribute revenue to market shares and concentration; non-reporting entities can provide ownership-chain and transaction anchors but never add revenue mass. This prevents a detached former subsidiary from transferring a stale PE flag to an unrelated reporting structure.

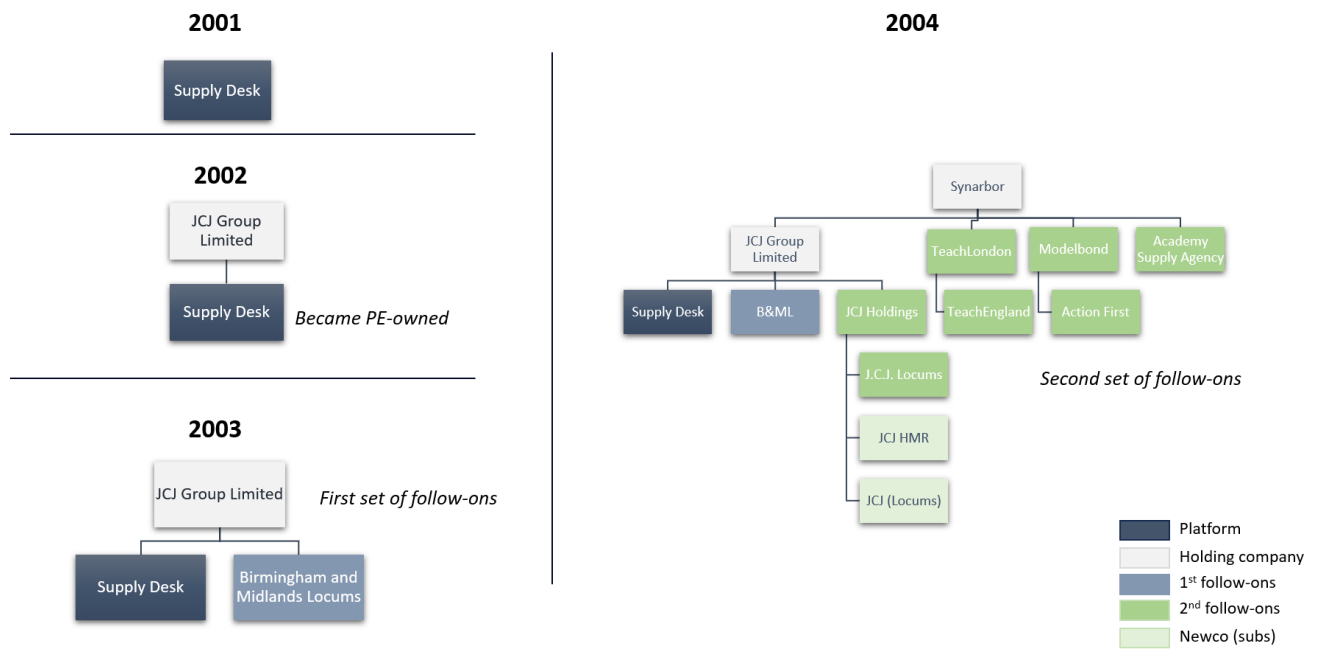
Separately, we classify annual structures as listed using legal-entity IPO and delisting dates. We evaluate the listing signal in the relevant year and propagate it across the contemporaneous ownership structure, including signals from non-reporting legal entities. This captures structures in which the listed holding company reports little or no operating revenue while its subsidiaries generate the observed activity. If a structure is both listed and under PE control, we classify it as PE-owned so that the three owner categories remain mutually exclusive. After PE control ends, a time-valid listing signal can classify the structure as listed.

Since we collect shareholder information on all UK-domiciled firms, our ownership structures represent UK ownership only and may miss cross-border ownership. It could be that some companies are owned by the same non-UK owner. This is not a problem if the non-UK owner is the immediate shareholder of the UK entity. If the non-UK owner, however, is not the immediate shareholder, but different foreign legal entities sit in between, then concentration may be higher than in our estimates. It could be that PE firms are more likely to

establish cross-border relations. To address this concern, we relate our highest shareholder definition to the global ultimate owner as defined by Orbis, but we do not find any big discrepancies.

Figure [B.1](#) illustrates why annual top-owner identifiers alone are insufficient around buyouts. Acquisition vehicles and holding companies can appear above the operating target after the transaction, while the underlying reporting business and its subsidiaries continue. For example, after Synabor was taken private in 2002, it completes follow-on acquisitions throughout the years and establishes new subsidiaries. And, in many buyouts, the PE firm establishes one or several holding companies that sit on top of the original target company. As a result, it is hard to track ownership structures by focusing on the highest shareholder. The time-consistent structure and identification of periods of PE ownership follow the reporting business through supported reorganizations rather than requiring the same top legal entity in every year.

Figure B.1: Ownership structure of Synarbor



C Herfindahl decomposition

This appendix describes how we decompose the change in concentration between years $t - 1$ and t . The calculation is performed separately for every industry-year transition. Concentration is measured across ownership structures rather than individual legal entities. If $s_{g,t}$ is the revenue market share of ownership structure g in year t , then

$$\text{HHI}_t = \sum_g s_{g,t}^2. \quad (4)$$

We multiply the index and all decomposition components by 10,000 only when reporting them in conventional Herfindahl points.

C.1 Classifying continuing activity, entry, and exit

We first determine which economic activity is present in each year and how it is grouped under common ownership. Entry and exit are defined symmetrically. A candidate entrant is an entire ownership structure that appears in observed market activity, and a candidate exit is an entire structure that disappears. We then use the complete legal-entity ownership records to identify cases in which some or all of the underlying entities continue under another observed structure. Fully supported continuation is removed from entry or exit; partially supported continuation is divided between continuing and entering or exiting activity. Changes involving only part of a continuing structure are not treated as entry or exit.

Some legal entities contribute observed revenue in only one of the two years even though the broader ownership structure continues in both years. In other words, the legal entity enters or exits within a continuing structure, rather than the entire economic unit entering or exiting the market. We therefore do not classify its appearance or disappearance as structure-level entry or exit. Instead, the complete legal-entity ownership records are used to identify its owner in the year for which revenue is unavailable. We do not impute revenue in that year: the missing-side revenue remains zero. The revenue observed in the other year can nevertheless be evaluated under both the earlier and later ownership assignments. Any change caused by regrouping that observed revenue is assigned to ownership reallocation, while the remaining change between zero and observed revenue is assigned to growth.

C.2 The eight counterfactual markets

The decomposition varies three dimensions of the market between their year- $t-1$ and year- t configurations:

1. market participation, denoted by $p \in \{0, 1\}$;
2. revenue, denoted by $r \in \{0, 1\}$; and
3. ownership, denoted by $o \in \{0, 1\}$.

Zero denotes the configuration associated with year $t-1$ and one the configuration associated with year t . These three binary dimensions generate eight counterfactual markets.

For legal entity i , let $a_i(p)$ indicate whether its activity is included under participation configuration p , let $\tilde{y}_i(r)$ denote its potential revenue under revenue configuration r , and let $g_i(o)$ denote the ownership structure to which it is assigned under ownership configuration o . For continuing activity, $\tilde{y}_i(0)$ and $\tilde{y}_i(1)$ equal observed revenue in $t-1$ and t , respectively; if revenue is unreported at one of those observations, it remains zero. For an entrant retained after the legal-continuity checks, both potential-revenue values equal its observed revenue in t . For an exiter, both equal its observed revenue in $t-1$. Holding entrant and exiter size fixed across the two revenue configurations ensures that changing participation does not simultaneously introduce an additional growth effect.

Revenue assigned to ownership structure g in counterfactual market (p, r, o) is

$$R_g(p, r, o) = \sum_i a_i(p) \tilde{y}_i(r) 1\{g_i(o) = g\}. \quad (5)$$

Total market revenue, structure-level market shares, and concentration in this market are

$$R(p, r, o) = \sum_g R_g(p, r, o), \quad s_g(p, r, o) = \frac{R_g(p, r, o)}{R(p, r, o)}, \quad (6)$$

$$H(p, r, o) = \sum_g s_g(p, r, o)^2. \quad (7)$$

Every counterfactual market is therefore normalized using its own total revenue. In particular, adding or removing a market participant changes the shares of all other participants. The observed Herfindahls are

$$H(0, 0, 0) = \text{HHI}_{t-1}, \quad H(1, 1, 1) = \text{HHI}_t. \quad (8)$$

C.3 Averaging across the six possible orderings

Ownership, growth, and market participation may be introduced in six possible orders. For example, the ordering used for illustration in the main text moves from $H(0,0,0)$ to $H(0,0,1)$ by changing ownership, then to $H(0,1,1)$ by changing revenue, and finally to $H(1,1,1)$ by changing participation. A different order generally assigns different amounts to the three channels because revenue and participation affect the market denominator.

The Shapley contribution of ownership reallocation is its average marginal effect across all positions in these six orderings:

$$\begin{aligned}\Phi_t^{\text{Own}} = & \frac{1}{3} [H(0,0,1) - H(0,0,0)] + \frac{1}{6} [H(1,0,1) - H(1,0,0)] \\ & + \frac{1}{6} [H(0,1,1) - H(0,1,0)] + \frac{1}{3} [H(1,1,1) - H(1,1,0)].\end{aligned}\tag{9}$$

The growth contribution is

$$\begin{aligned}\Phi_t^{\text{Gr}} = & \frac{1}{3} [H(0,1,0) - H(0,0,0)] + \frac{1}{6} [H(1,1,0) - H(1,0,0)] \\ & + \frac{1}{6} [H(0,1,1) - H(0,0,1)] + \frac{1}{3} [H(1,1,1) - H(1,0,1)],\end{aligned}\tag{10}$$

and the net-entry contribution, before separating entry from exit, is

$$\begin{aligned}\Phi_t^{\text{Net}} = & \frac{1}{3} [H(1,0,0) - H(0,0,0)] + \frac{1}{6} [H(1,1,0) - H(0,1,0)] \\ & + \frac{1}{6} [H(1,0,1) - H(0,0,1)] + \frac{1}{3} [H(1,1,1) - H(0,1,1)].\end{aligned}\tag{11}$$

The coefficients $1/3$ and $1/6$ are the frequencies with which each comparison appears when the marginal contribution is averaged across the six orderings. Shapley efficiency gives the exact identity

$$H(1,1,1) - H(0,0,0) = \Phi_t^{\text{Own}} + \Phi_t^{\text{Gr}} + \Phi_t^{\text{Net}}.\tag{12}$$

Thus, the decomposition has no residual apart from numerical precision.

C.4 Separating entry from exit

Entry and exit affect the same market denominator. Their contributions therefore cannot be obtained by adding entrants' squared shares and subtracting exiters' squared shares. We separate them through a second Shapley calculation within each fixed revenue and ownership configuration (r, o) .

Let B denote the year- $t - 1$ participant set, E the set of entrants, X the set of exiters, and $F = (B \setminus X) \cup E$ the final participant set. Let $V_{r,o}(Q)$ be the Herfindahl calculated using participant set Q while holding revenue configuration r and ownership configuration o fixed. Entry's contribution in this configuration is

$$\psi_{r,o}^E = \frac{1}{2} [V_{r,o}(B \cup E) - V_{r,o}(B) + V_{r,o}(F) - V_{r,o}(B \setminus X)], \quad (13)$$

while exit's contribution is

$$\psi_{r,o}^X = \frac{1}{2} [V_{r,o}(B \setminus X) - V_{r,o}(B) + V_{r,o}(F) - V_{r,o}(B \cup E)]. \quad (14)$$

The first comparison for each event direction evaluates it before the other direction, and the second evaluates it afterward. Consequently,

$$\psi_{r,o}^E + \psi_{r,o}^X = V_{r,o}(F) - V_{r,o}(B). \quad (15)$$

We then average entry and exit across the four revenue and ownership configurations using the same outer weights:

$$\Psi_t^j = \frac{1}{3}\psi_{0,0}^j + \frac{1}{6}\psi_{1,0}^j + \frac{1}{6}\psi_{0,1}^j + \frac{1}{3}\psi_{1,1}^j, \quad j \in \{E, X\}. \quad (16)$$

The two direction-specific contributions satisfy

$$\Phi_t^{\text{Net}} = \Psi_t^E + \Psi_t^X. \quad (17)$$

Because every participant set is rescaled to sum to one, entry includes both the entrant's own squared share and the dilution of incumbents. Exit includes both the removal of the exiting structure and the increase in the shares of surviving structures. Entry will therefore generally reduce the Herfindahl and exit will generally increase it, although neither sign is imposed mechanically.

C.5 Attribution across owner types

We next attribute the ownership, growth, and net-entry channels to three mutually exclusive owner types,

$$\mathcal{K} = \{\text{PE}, \text{L}, \text{NL}\}, \quad (18)$$

where PE denotes private equity-owned structures, L listed structures, and NL non-listed non-PE structures. A one-type-at-a-time calculation would not generally add to the aggregate channel because changing one type can alter the market shares of all others. We therefore apply a complete owner-type Shapley game within every fixed configuration of the other two market dimensions.

For channel $q \in \{\text{Own}, \text{Gr}, \text{Net}\}$ and a fixed configuration c of the other two dimensions, let $v_c^q(S)$ denote the Herfindahl when the owner types in coalition $S \subseteq \mathcal{K}$ adopt their year- t configuration for channel q and all remaining owner types retain their year- $t-1$ configuration. The contribution of owner type k in this game is

$$\phi_{k,c}^q = \sum_{S \subseteq \mathcal{K} \setminus \{k\}} \frac{|S|! (|\mathcal{K}| - |S| - 1)!}{|\mathcal{K}|!} [v_c^q(S \cup \{k\}) - v_c^q(S)]. \quad (19)$$

With three owner types, this evaluates the empty coalition, every single type, every pair, and the full coalition. We combine the four configurations of the other two dimensions using

$$\Phi_{k,t}^q = \frac{1}{3}\phi_{k,00}^q + \frac{1}{6}\phi_{k,10}^q + \frac{1}{6}\phi_{k,01}^q + \frac{1}{3}\phi_{k,11}^q. \quad (20)$$

For each channel, owner-type efficiency implies

$$\Phi_t^q = \sum_{k \in \mathcal{K}} \Phi_{k,t}^q. \quad (21)$$

This treatment is especially important when a structure changes owner type—for example, in a PE exit to a listed buyer. The owner-type game does not assign the entire transition mechanically to either the seller or buyer. Instead, it averages each owner’s marginal contribution across the coalitions, so the PE and listed components can both contribute while continuing to sum to the aggregate ownership effect.

C.6 Numerical illustration of one decomposition ordering

This example illustrates one ordering of the decomposition; the estimates reported in the paper average the marginal contribution of each channel across all six possible orderings. Suppose that the initial market contains three independent ownership structures, A, B, and C, with revenues of 40, 30, and 30. The initial Herfindahl is therefore

$$0.40^2 + 0.30^2 + 0.30^2 = 0.34. \quad (22)$$

For presentation, we multiply the index and its components by 10,000. The initial value is therefore reported as 3,400 Herfindahl points. Suppose that A and B subsequently come under common ownership, their endpoint revenues are 50 and 30, C's endpoint revenue is 40, and a new independent structure D enters with revenue of 10. Consider the ordering in which ownership is introduced first, growth second, and entry last:

State	Owner-group revenues	Reported HHI	Reported change
Initial market	40, 30, 30	3,400	—
Endpoint ownership	70, 30	5,800	+2,400
Endpoint revenue	80, 40	5,556	−244
Endpoint participation	80, 40, 10	4,793	−763

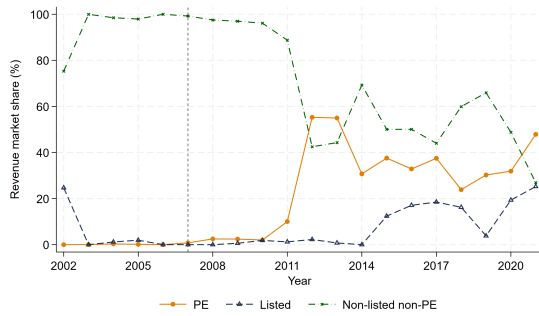
In this ordering, combining A and B contributes +2,400 Herfindahl points through ownership reallocation. Updating revenues then contributes −244 points because C grows faster relative to the combined A–B structure. Adding D and recalculating all market shares contributes a further −763 points through entry. The three marginal changes sum to +1,393, which equals the observed increase from 3,400 to 4,793. A different ordering changes the amount assigned to each channel but not the total change. The reported decomposition therefore averages the channel-specific marginal changes across all six orderings.

D A case study of fitness facilities

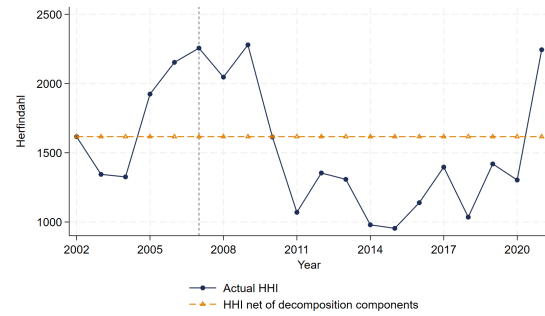
Fitness facilities illustrate how a stable or declining net HHI can coexist with substantial ownership consolidation. More so, the sector has seen a large number of PE-backed roll-ups over the past years. Figure D.1 shows the changing market shares of PE-owned, listed, and non-listed non-PE structures and then decomposes the observed Herfindahl by channel and owner type. The flat series obtained after subtracting all decomposition components is the accounting baseline implied by exact reconciliation, while the observed Herfindahl changes markedly. By channel, ownership reallocation raises concentration persistently, while growth accounts for much of the offsetting variation. By owner, the PE contribution is positive and the non-listed contribution negative. The case therefore mirrors the aggregate result: ownership consolidation and firm dynamics can move in opposite directions within the same market.

Figure D.1: Ownership and concentration in the fitness-facilities industry

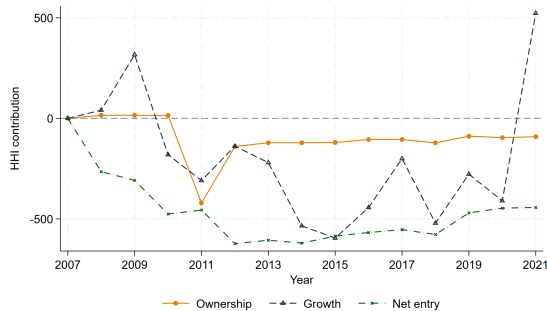
Panel A reports revenue market shares for PE-owned, listed, and non-listed non-PE structures. Panel B compares the observed Herfindahl with the HHI after subtracting the cumulative decomposition components (the reconciliation baseline). Panel C reports cumulative ownership, growth, and net-entry contributions, and Panel D reports the corresponding total contributions of PE-owned, listed, and non-listed non-PE structures. The vertical reference line in Panels A, B, and D marks 2007; Panel C begins in 2007 and therefore does not require a separate reference line.



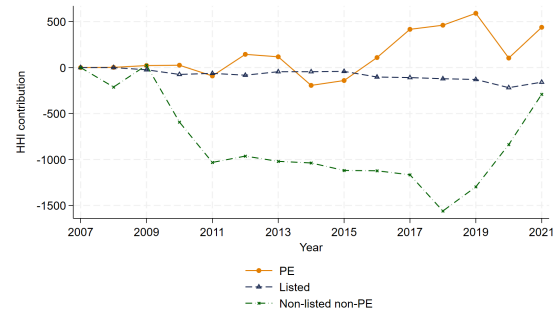
Panel A: Market share of ownership types



Panel B: Herfindahl



Panel C: Decomposition by source



Panel D: Decomposition by ownership type

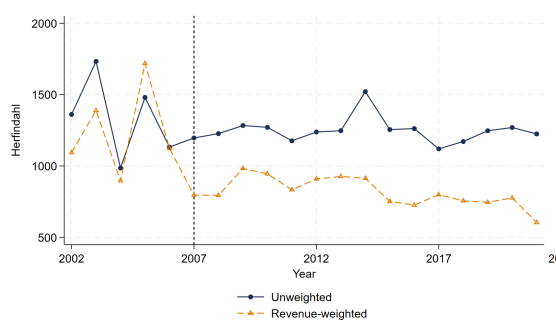
E Sector variation

Figure E.1 shows that average concentration follows markedly different paths across sectors. Healthcare and Education deconcentrate over the sample period, whereas Transport becomes more concentrated. Figures E.2 and E.3 show why. In Healthcare, ownership reallocation raises concentration, but it is outweighed by negative growth and especially net-entry contributions. In Transport, all three channels are positive near the end of the sample, so ownership and firm dynamics complement rather than offset one another. Accommodation and Food occupies an intermediate case: ownership becomes increasingly positive, while growth is negative through much of the later sample and then rebounds. These examples show that a similar ownership contribution can translate into different observed concentration trends depending on the direction of growth and net entry.

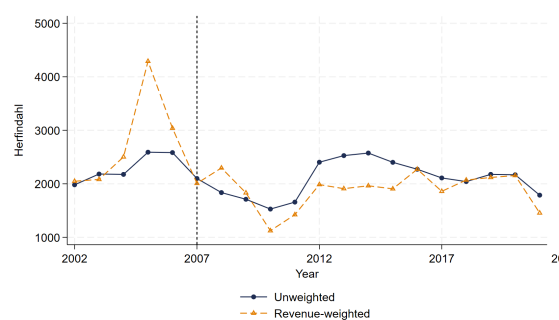
The owner decomposition adds a second source of variation. PE and listed structures generally contribute positively to ownership-related consolidation, but their total sector contributions are not uniformly positive because growth and net entry can offset them. Non-listed structures account for most activity and generate the largest movements in several sectors, including the strong deconcentration in Healthcare. Sector variation therefore reflects both the size of ownership consolidation and the response of other firms in the market.

Figure E.1: Herfindahl by sector

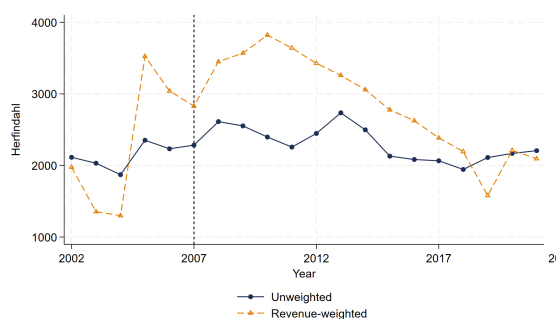
Each panel plots the development over time of the average unweighted Herfindahl by NACE main sector. The sample includes non-tradable industry-year observations between 2002 and 2021 and industries are classified by four-digit NACE codes.



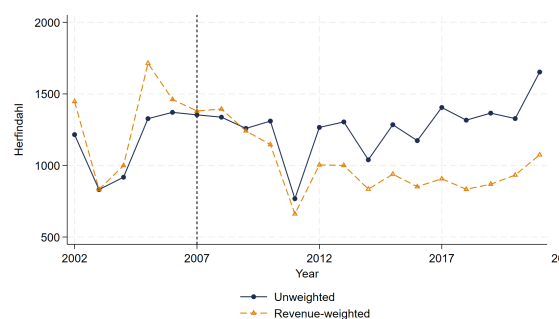
Panel A: Services



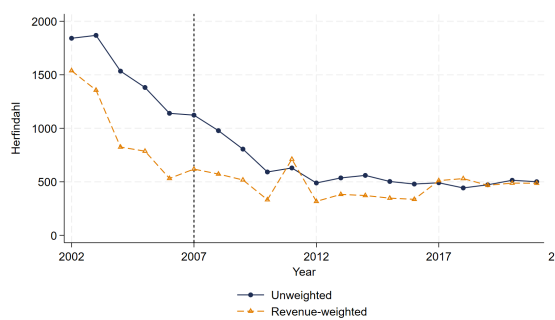
Panel B: Finance



Panel C: Information

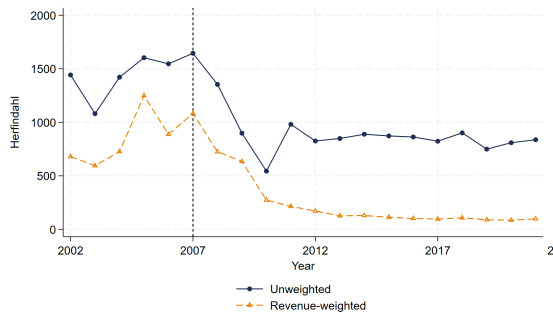


Panel D: Accommodation and Food

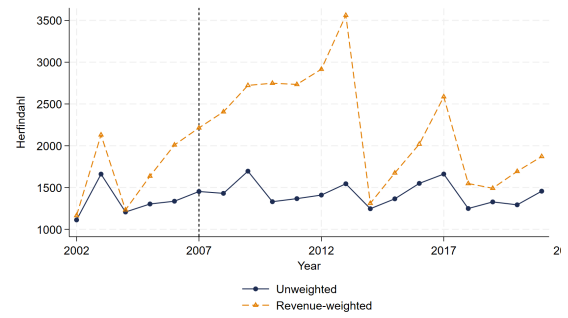


Panel E: Healthcare

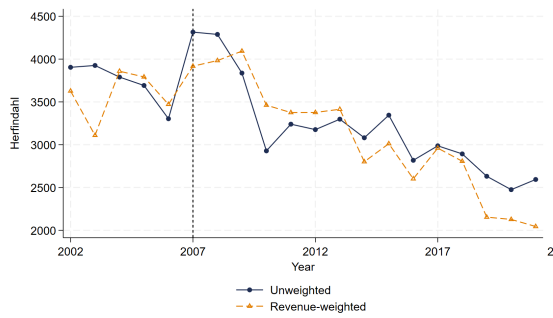
Figure E.1: Herfindahl by sector (continued)



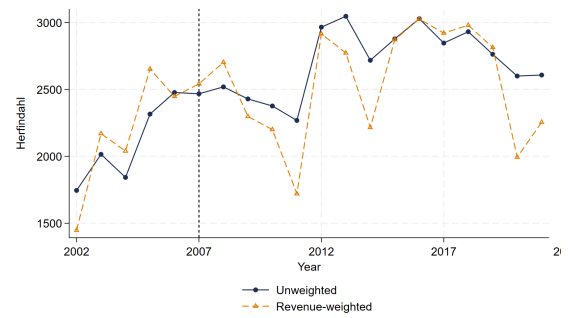
Panel F: Education



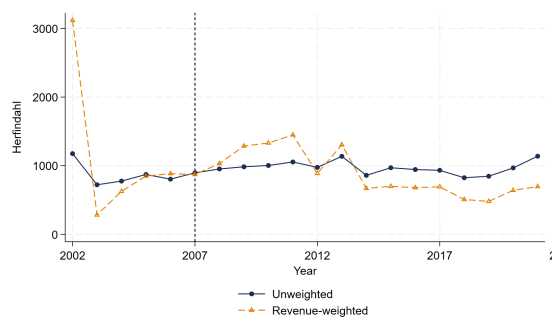
Panel G: Recreation



Panel H: Utilities



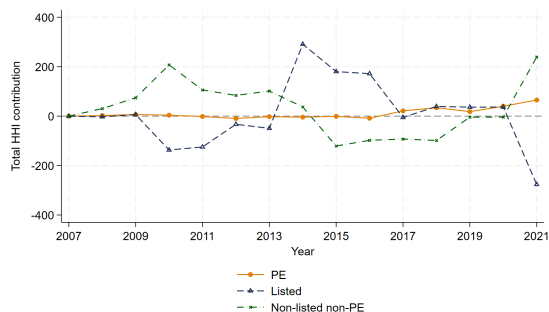
Panel I: Transport



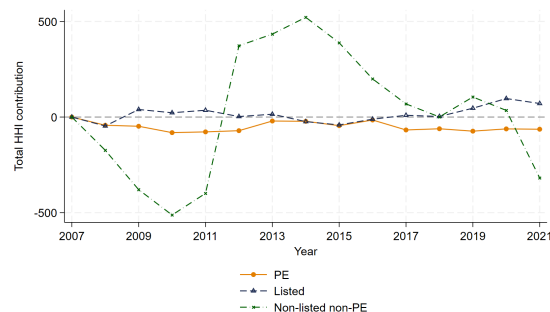
Panel J: Prof., Science, Tech.

Figure E.2: Cumulative concentration contributions by owner and sector

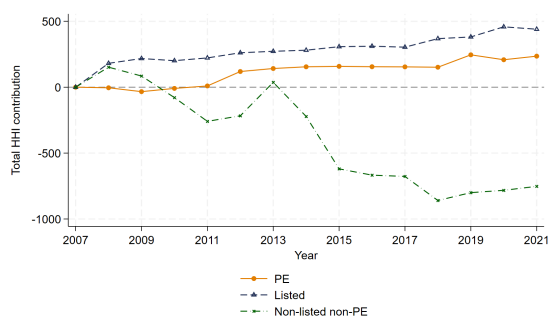
Each panel plots the unweighted average cumulative contribution of PE-owned, listed, and non-listed non-PE structures for one NACE main sector over 2007–2021. The contribution for an owner is the sum of its ownership, growth, and net-entry components. Positive values raise the Herfindahl and negative values reduce it. The sample contains non-tradable four-digit NACE industries.



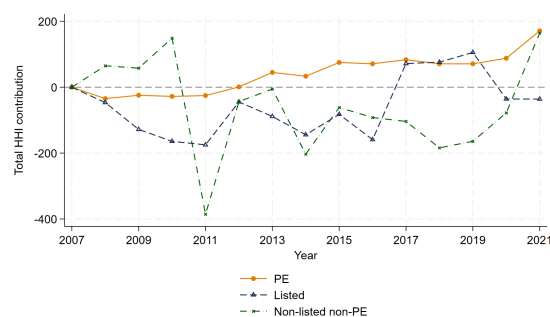
Panel A: Services



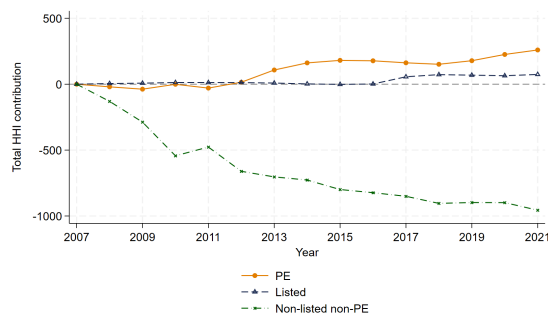
Panel B: Finance



Panel C: Information

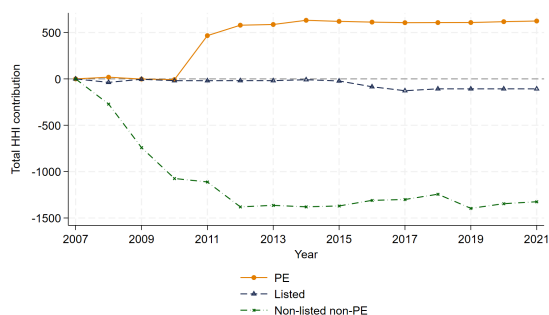


Panel D: Accommodation and Food

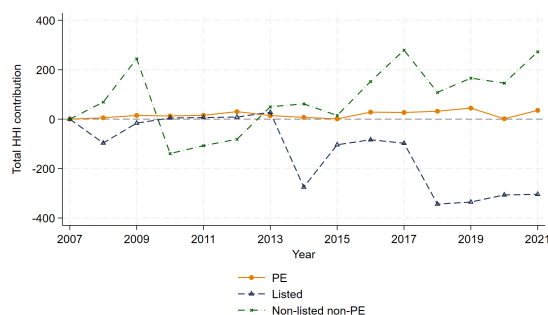


Panel E: Healthcare

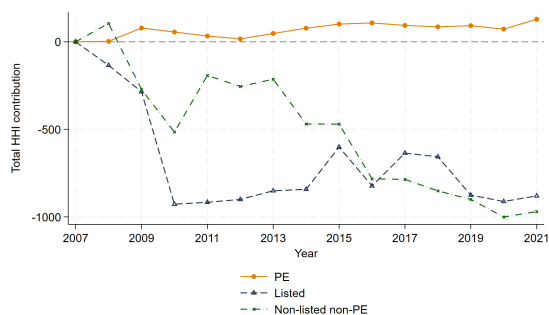
Figure E.2: Cumulative concentration contributions by owner and sector (continued)



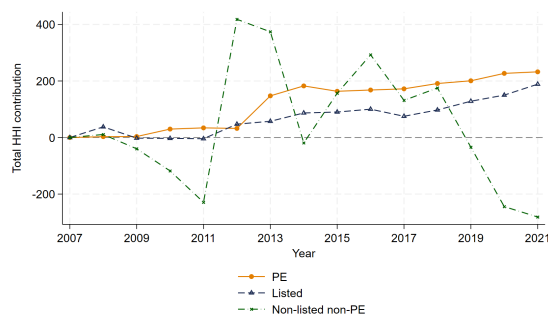
Panel F: Education



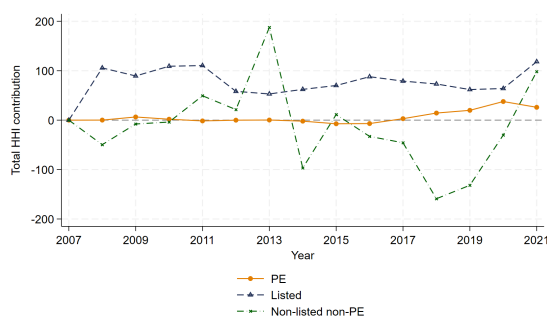
Panel G: Recreation



Panel H: Utilities



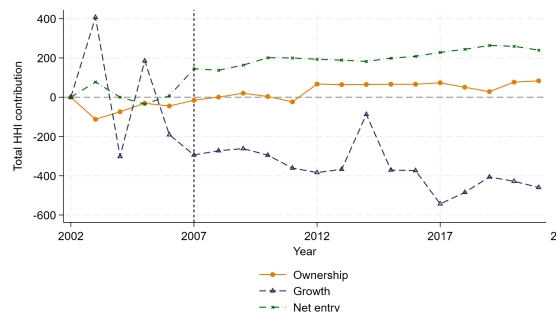
Panel I: Transport



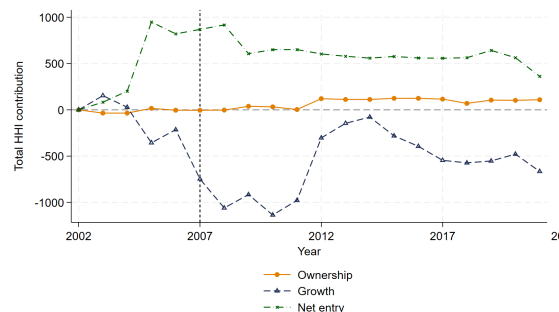
Panel J: Prof., Science, Tech.

Figure E.3: Cumulative concentration contributions by channel and sector

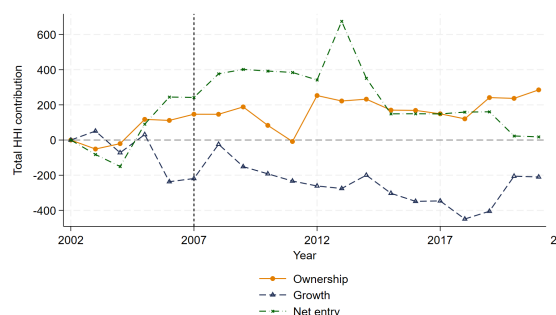
Each panel plots the unweighted average cumulative ownership, growth, and net-entry contribution for one NACE main sector over 2007–2021. Positive values raise the Herfindahl and negative values reduce it. The three contributions add to the observed cumulative change in concentration. The sample contains non-tradable four-digit NACE industries.



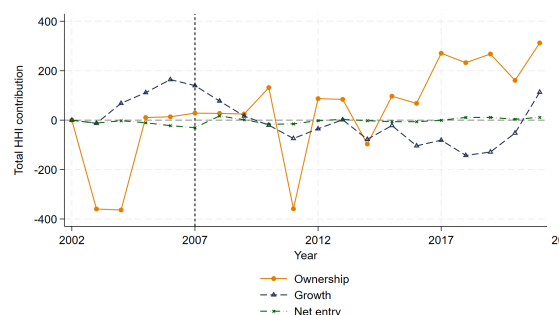
Panel A: Services



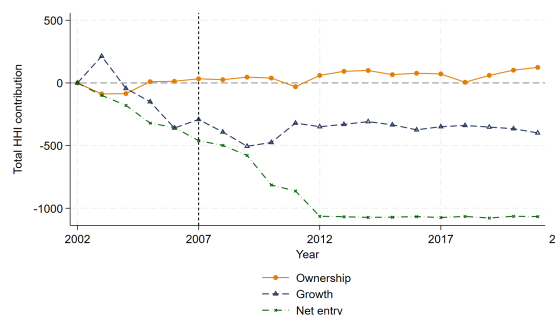
Panel B: Finance



Panel C: Information

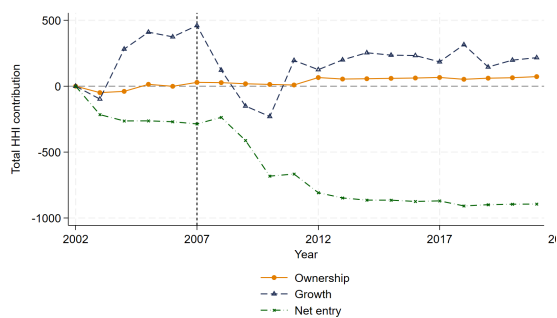


Panel D: Accommodation and Food

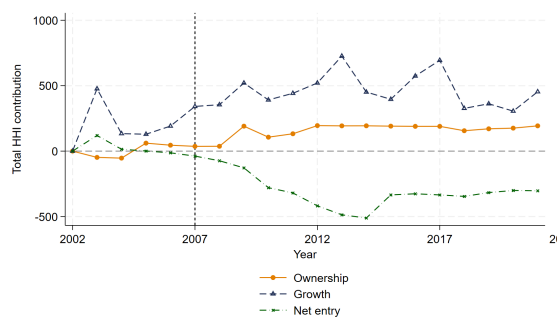


Panel E: Healthcare

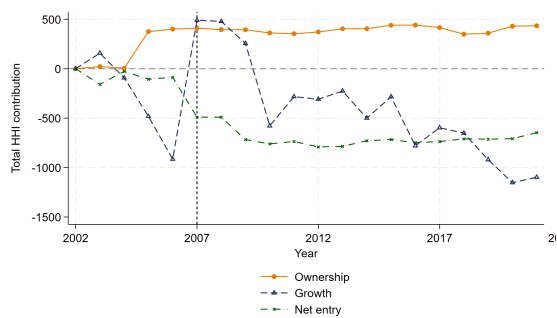
Figure E.3: Cumulative concentration contributions by channel and sector (continued)



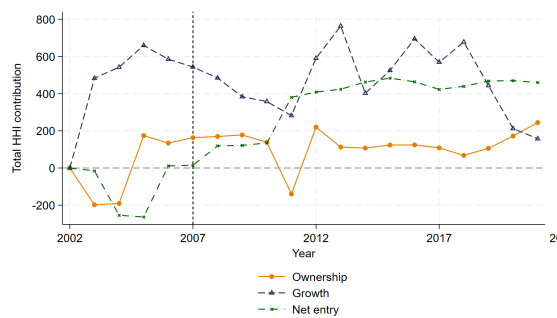
Panel F: Education



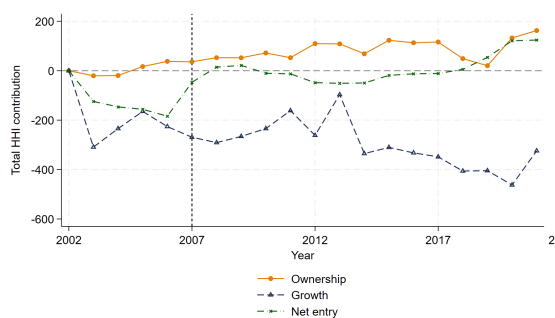
Panel G: Recreation



Panel H: Utilities



Panel I: Transport



Panel J: Prof., Science, Tech.

Table E.1 reports average revenue shares by owner and sector. PE has its largest average share in Healthcare (8.6%), followed by Utilities (6.9%) and Accommodation and Food (6.5%). Listed ownership follows a different sector pattern: its average share is highest in Accommodation and Food (15.6%) and Utilities (14.8%), and is also sizeable in Finance and Transport. The sector distribution therefore reinforces that PE and listed ownership need not be important in the same markets, even when their aggregate ownership contributions to concentration are similar.

Table E.1: Market share by ownership type and sector

The sample includes non-tradable industry-year observations between 2002 and 2021. Industries are classified by four-digit NACE codes. The table reports unweighted industry-year averages of revenue market shares.

Sector	Obs	# Ind.	Ownership	Mean	Median	Std. dev.	Min	Max
Health	240	12	PE	8.6	4.1	13.0	0.0	64.9
			Listed	3.4	0.2	8.4	0.0	60.6
			Non-listed	88.0	92.9	15.1	35.1	100.0
Utilities	180	9	PE	6.9	0.4	14.1	0.0	77.1
			Listed	14.8	5.1	22.3	0.0	90.3
			Non-listed	78.3	91.0	25.8	4.3	100.0
Accomm. and Food	160	8	PE	6.5	3.1	9.1	0.0	56.3
			Listed	15.6	2.7	24.3	0.0	77.1
			Non-listed	77.9	88.9	24.9	16.4	100.0
Information	420	21	PE	6.2	0.9	14.4	0.0	89.6
			Listed	10.1	3.4	14.6	0.0	83.3
			Non-listed	83.8	92.2	19.9	9.9	100.0
Services	280	14	PE	6.2	2.3	9.1	0.0	36.8
			Listed	10.8	4.8	14.5	0.0	92.7
			Non-listed	83.0	87.2	15.8	7.3	100.0
Education	220	11	PE	5.7	0.6	13.6	0.0	78.1
			Listed	5.9	0.3	14.1	0.0	77.6
			Non-listed	88.4	96.2	18.7	21.9	100.0
Recreation	300	15	PE	5.2	0.1	9.9	0.0	55.3
			Listed	6.9	0.6	14.1	0.0	79.4
			Non-listed	87.9	97.8	17.9	18.1	100.0
Prof. Sci. & Tech.	200	10	PE	4.3	0.6	7.8	0.0	50.0
			Listed	7.5	3.8	9.5	0.0	67.2
			Non-listed	88.1	90.7	11.6	32.8	100.0
Finance	340	17	PE	3.9	1.7	7.5	0.0	83.4
			Listed	13.5	8.2	16.0	0.0	85.5
			Non-listed	82.6	88.0	17.0	14.5	100.0
Transport	240	12	PE	2.1	0.0	6.6	0.0	54.8
			Listed	12.6	5.7	19.8	0.0	97.5
			Non-listed	85.4	92.6	20.5	2.5	100.0

F Weighted non-tradable

This section replicates the main descriptive figures and long-difference regressions after weighting each industry by operating revenue. The weighted results place greater emphasis on economically large markets and therefore test whether the unweighted findings are driven by the many smaller industries in the baseline sample.

Figure F.1: Private equity and listed market shares over time: revenue-weighted averages

The figure plots revenue-weighted average market shares of PE-owned and listed structures in non-tradable four-digit NACE industries. The dotted segments before 2007 indicate the run-up period and the solid segments the main sample period. The orange line is current PE ownership and the blue line listed ownership; it is not the broader transaction-linked PE footprint reported in Figure A.5.

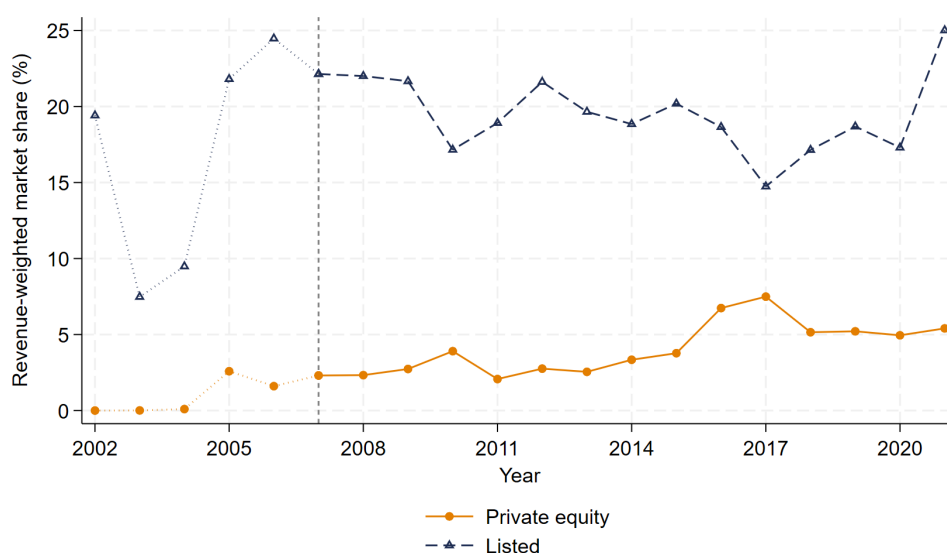
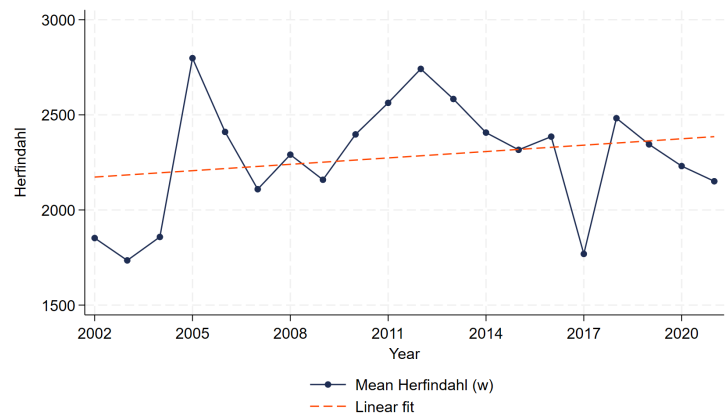


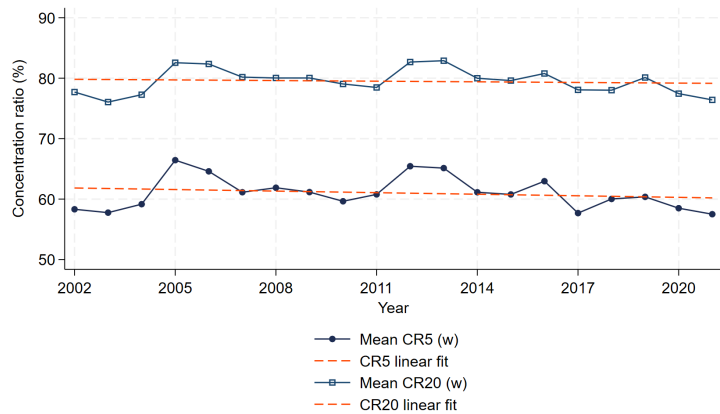
Figure F.2 shows that the revenue-weighted concentration measures fluctuate rather than rising monotonically. The weighted Herfindahl reaches a mid-sample peak in 2012, aligning with findings from De Loecker et al. (2020), and declines thereafter. Weighting changes the influence of individual industries but does not produce a sustained aggregate increase in concentration.

Figure F.2: Revenue-weighted Herfindahl and concentration ratios in non-tradable industries

Panel A plots the operating-revenue-weighted mean Herfindahl. Panel B plots the corresponding weighted mean revenue shares of the five and twenty largest ownership-structure–industry units. The sample contains non-tradable four-digit NACE industries between 2002 and 2021.



Panel A: Herfindahl (w)

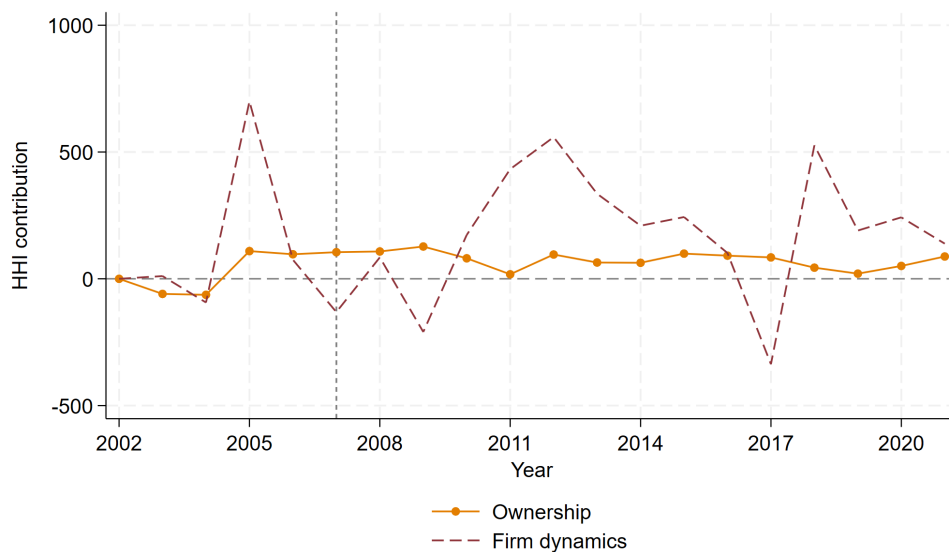


Panel B: Concentration ratios (w)

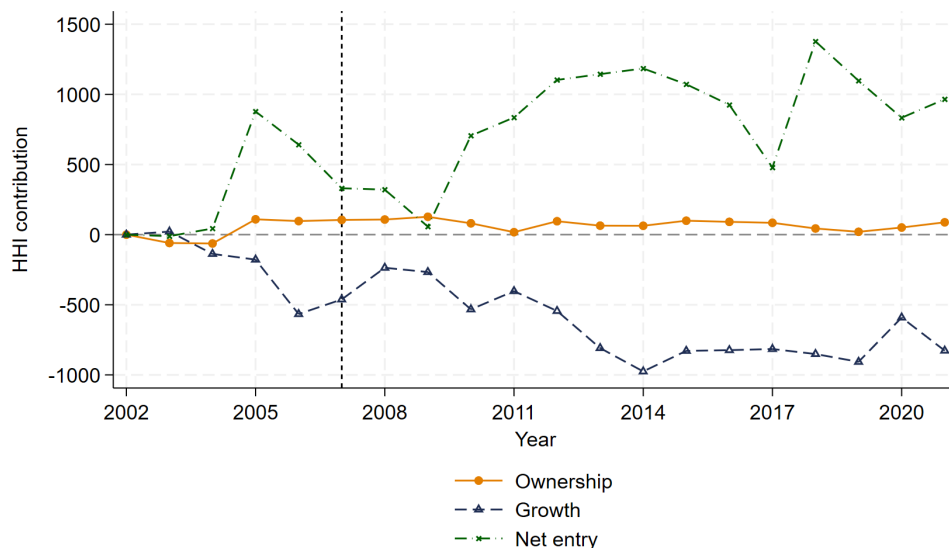
Figures F.3–F.5 show that weighting changes which offsets are most important. Ownership remains positive but modest. Growth is strongly concentration-reducing, particularly for listed structures, whereas net entry is strongly concentration-increasing and offsets the negative growth contribution. The weighted firm-dynamics total is therefore positive near the end of the sample rather than a simple counterweight to ownership. The owner decomposition continues to show positive PE and listed ownership contributions, but the much larger listed market share gives listed structures greater influence in economically large industries.

Figure F.3: Revenue-weighted decomposition of concentration by channel

Panel A reports the two-channel decomposition into ownership reallocation and firm dynamics, where firm dynamics is the sum of growth and net entry. Panel B separates firm dynamics into growth and net entry. The series are revenue-weighted averages across non-tradable four-digit NACE industries and are cumulative from 2007. Positive values raise the Herfindahl and negative values reduce it.



Panel A: Weighted cumulative consolidation – two-channel



Panel B: Weighted cumulative consolidation – three-channel

Figure F.4: Revenue-weighted decomposition of concentration by owner type

The figure reports cumulative total contributions of PE-owned, listed, and non-listed non-PE structures, averaging across non-tradable four-digit NACE industries using industry revenue weights. Each owner total combines its ownership, growth, and net-entry contributions. Positive values raise the Herfindahl and negative values reduce it.

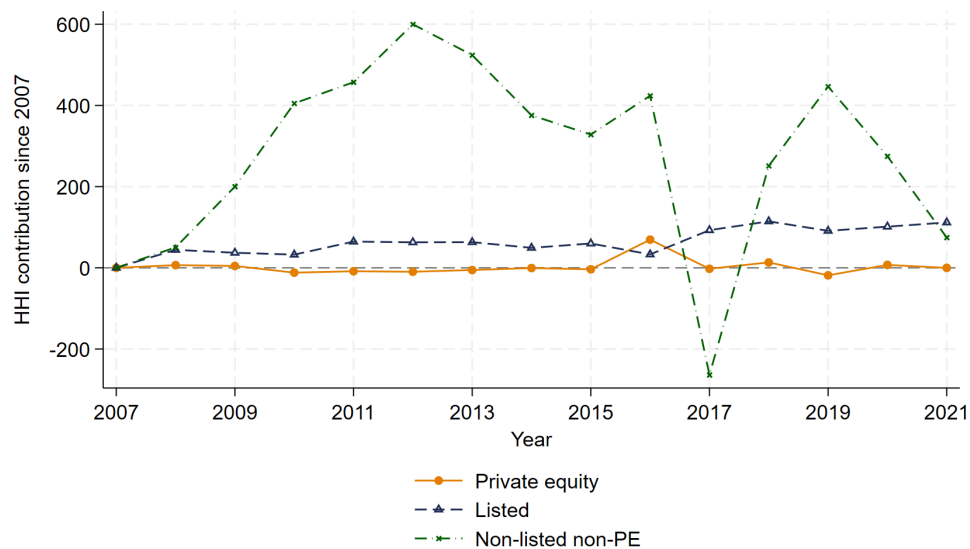
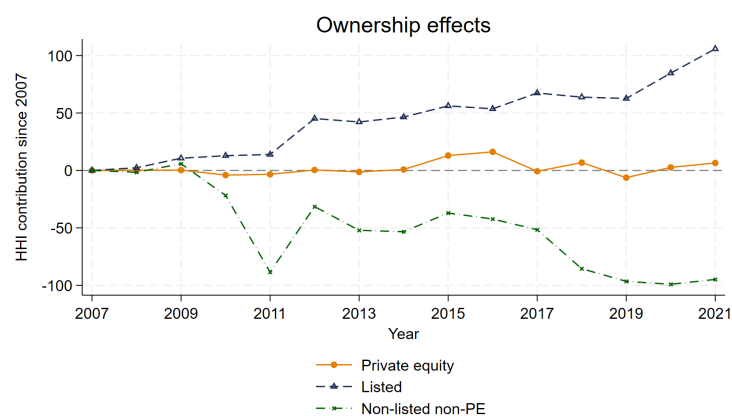
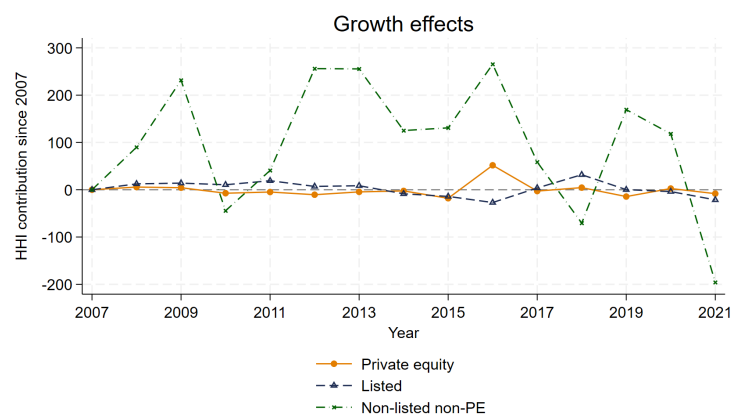


Figure F.5: Revenue-weighted concentration contributions by owner and channel

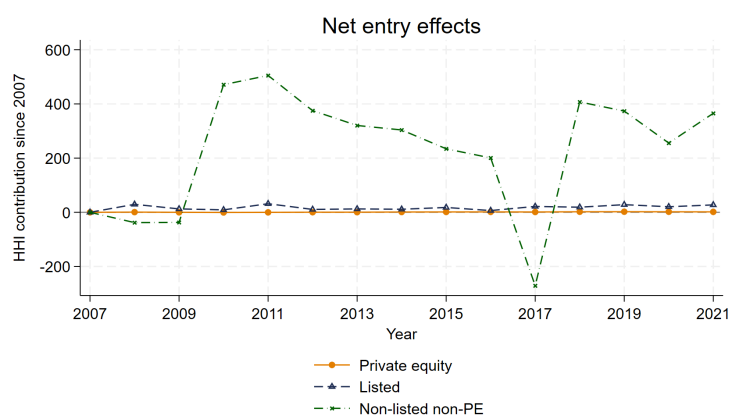
Panels A–C report cumulative ownership, growth, and net-entry contributions, respectively, for PE-owned, listed, and non-listed non-PE structures. Industries are weighted by operating revenue. Positive values raise the Herfindahl and negative values reduce it. The sample contains non-tradable four-digit NACE industries and the cumulative series begin in 2007.



Panel A: Cumulative ownership-driven consolidation



Panel B: Cumulative growth-driven consolidation



Panel C: Cumulative net-entry-driven consolidation

Table F.1: Revenue-weighted industry outcomes and decomposition components

This table replicates the long-difference industry regressions using industry operating-revenue weights. Ownership, growth, and net entry enter separately for PE-owned, listed, and non-listed non-PE structures. Regressions use raw HHI-point components and displayed coefficients are signed-mean economic effects. All specifications include controls for initial industry characteristics and realized industry growth. Reported t -statistics use robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	(1) $\Delta\mu$	(2) ΔTFP	(3) $\Delta\text{CostEmp}$	(4) $\Delta\text{CostGoods}$
<i>Ownership-driven</i>				
PE	-0.002 (-1.14)	-0.004* (-1.83)	-0.000 (-1.19)	-0.001* (-1.68)
Listed	-0.008 (-0.55)	-0.032* (-1.69)	-0.001 (-0.57)	-0.020* (-1.89)
Non-listed	0.010 (0.52)	0.019 (0.79)	0.005* (1.84)	0.016** (2.45)
<i>Growth-driven</i>				
PE	-0.000 (-0.20)	-0.004* (-1.76)	0.000 (0.14)	-0.000 (-0.07)
Listed	-0.000** (-2.06)	0.000*** (3.54)	-0.000 (-1.13)	0.000** (2.11)
Non-listed	-0.003 (-0.43)	-0.000 (-0.02)	-0.003 (-1.10)	-0.005 (-1.03)
<i>Net entry-driven</i>				
PE	-0.005 (-1.31)	-0.003* (-1.89)	-0.001 (-1.26)	0.000 (0.33)
Listed	-0.002*** (-2.63)	0.002 (1.45)	-0.000 (-0.94)	0.001* (1.78)
Non-listed	0.036*** (3.81)	-0.065*** (-2.64)	0.006 (1.51)	-0.027** (-2.42)
<i>Controls</i>				
Initial HHI	-0.079** (-2.44)	0.055 (0.74)	-0.025** (-2.06)	-0.005 (-0.18)
Industry growth	0.004 (0.26)	0.010 (1.36)	0.001 (0.58)	0.003 (0.88)
Initial size (log)	-0.174*** (-3.46)	0.271*** (3.04)	-0.023 (-1.58)	-0.055** (-2.00)
Initial Fin. constraints	0.012 (0.15)	-0.272** (-2.48)	0.004 (0.12)	0.048 (0.85)
Initial μ	-0.358*** (-2.94)	-0.373*** (-2.92)	-0.048 (-1.40)	-0.003 (-0.05)
Initial TFP	-0.355*** (-3.90)	-0.998*** (-5.57)	-0.114** (-2.16)	-0.269** (-2.29)
Observations	169	169	169	169
Adj. R-squared	0.367	0.705	0.174	0.351
F-stat	8.788	7.715	1.995	1.448

Table F.2: Combined owner and channel effects in revenue-weighted regressions

The table reports economically scaled linear combinations from the revenue-weighted long-difference regressions in Table F.1. Panel A combines the ownership, growth, and net-entry contributions within each owner type. Panel B combines the owner-specific contributions within each channel. Robust t -statistics use the full variance–covariance matrix of the corresponding regression and are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

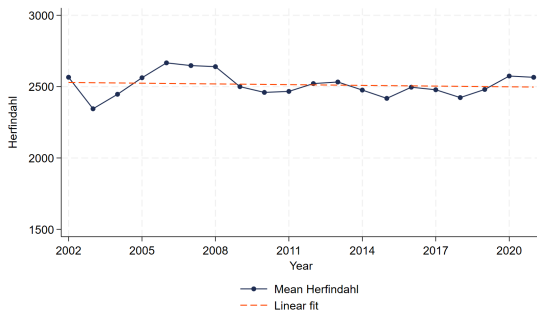
	$\Delta\mu$	ΔTFP	$\Delta\text{Cost/Emp}$	$\Delta\text{Cost/Goods}$
<i>Panel A: Effects by owner Type</i>				
Total PE	-0.007 (-1.08)	-0.009** (-2.08)	-0.002 (-1.42)	-0.001 (-0.23)
Total Listed	-0.013 (-0.74)	-0.022 (-1.38)	-0.002 (-0.71)	-0.019* (-1.94)
Total Non-listed	0.056* (1.80)	0.004 (0.08)	0.010 (1.15)	-0.012 (-0.66)
<i>Panel B: Effects by concentration channel</i>				
Total Ownership	-0.000 (-0.01)	-0.014 (-1.19)	0.004 (1.45)	-0.006 (-0.58)
Total Growth	-0.007 (-0.45)	0.032 (1.56)	-0.001 (-0.58)	0.001 (0.22)
Total Net-entry	0.044*** (2.91)	-0.045 (-1.31)	0.004 (0.53)	-0.027 (-1.63)

G Tradable sectors

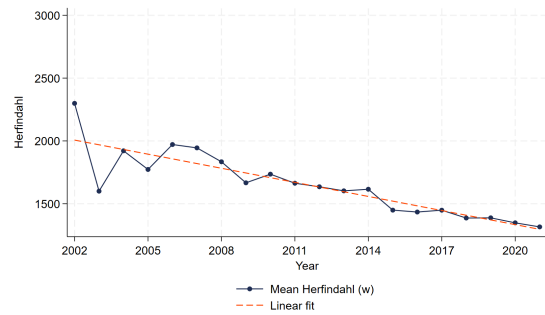
Tradable industries provide an external-validity check because domestic revenue shares do not capture foreign competitors, imports, or export-market conditions. We therefore interpret the results as evidence on whether the accounting patterns extend beyond non-tradables, not as a complete measure of effective product-market concentration in tradable sectors.

Figure G.1: Herfindahl indices in tradable industries

Panel A plots the unweighted average Herfindahl and Panel B the operating-revenue-weighted average Herfindahl for tradable four-digit NACE industries between 2002 and 2021.



Panel A: Herfindahl



Panel B: Herfindahl (w)

Figure G.2: Market shares by owner type in tradable industries

The figure plots unweighted average revenue market shares of PE-owned, listed, and non-listed non-PE structures in tradable four-digit NACE industries. The dotted segments before 2007 indicate the run-up period and the solid segments the main sample period.

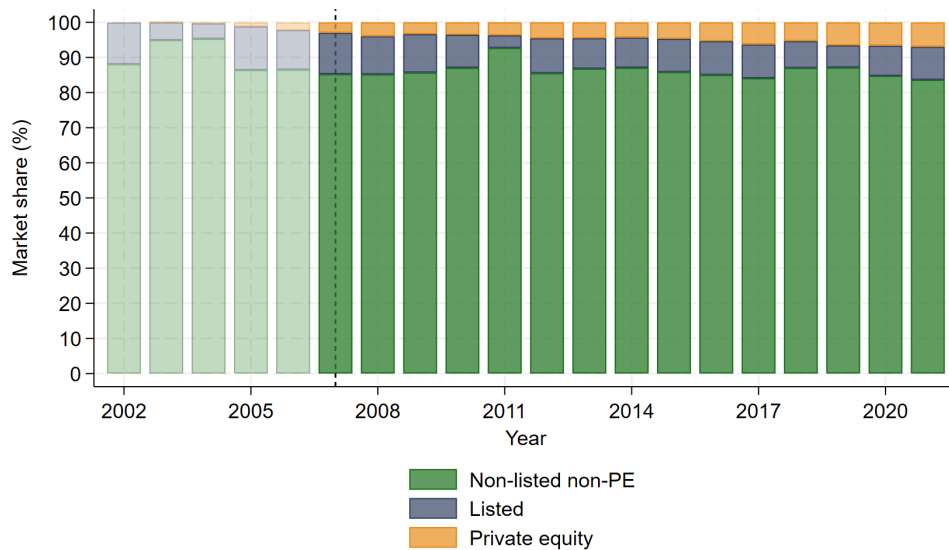
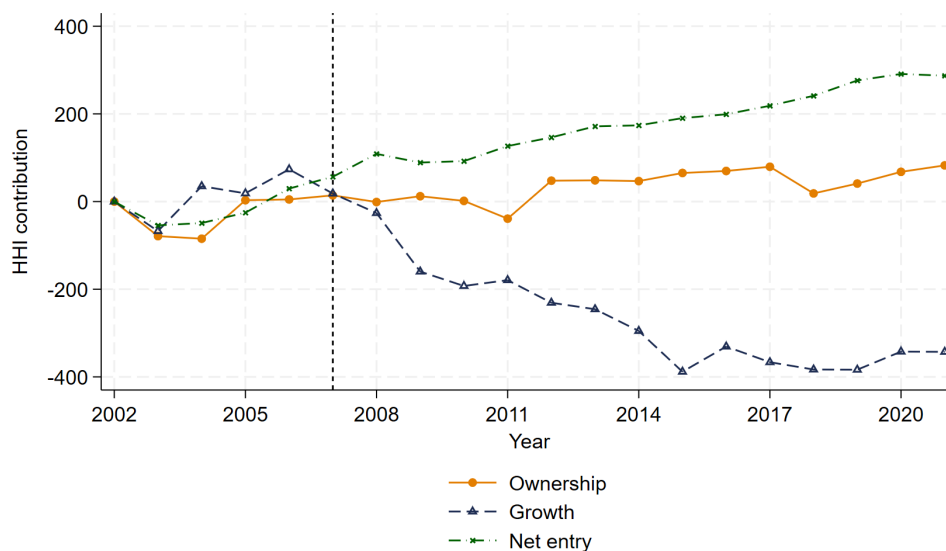
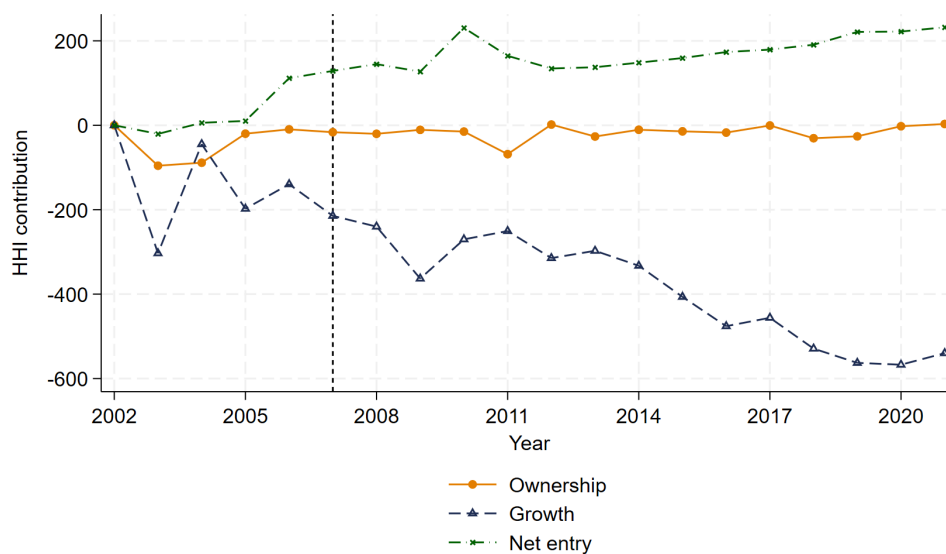


Figure G.3: Concentration contributions by channel in tradable industries

Panels A and B report unweighted and operating-revenue-weighted cumulative contributions of ownership reallocation, growth, and net entry. Positive values raise the Herfindahl and negative values reduce it. The sample contains tradable four-digit NACE industries and cumulative contributions begin in 2007. The sample contains tradable four-digit NACE industries and cumulative contributions begin in 2007.

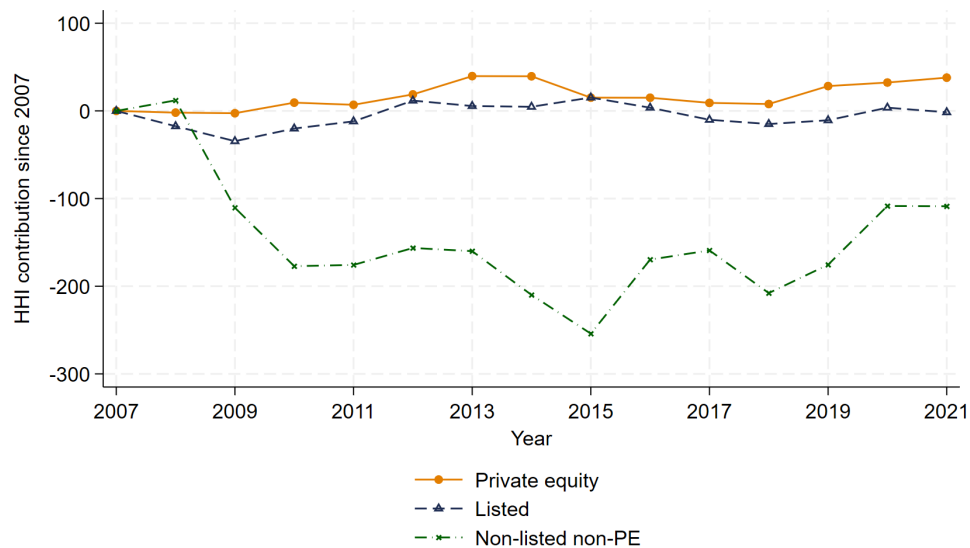


Panel A: Unweighted cumulative consolidation

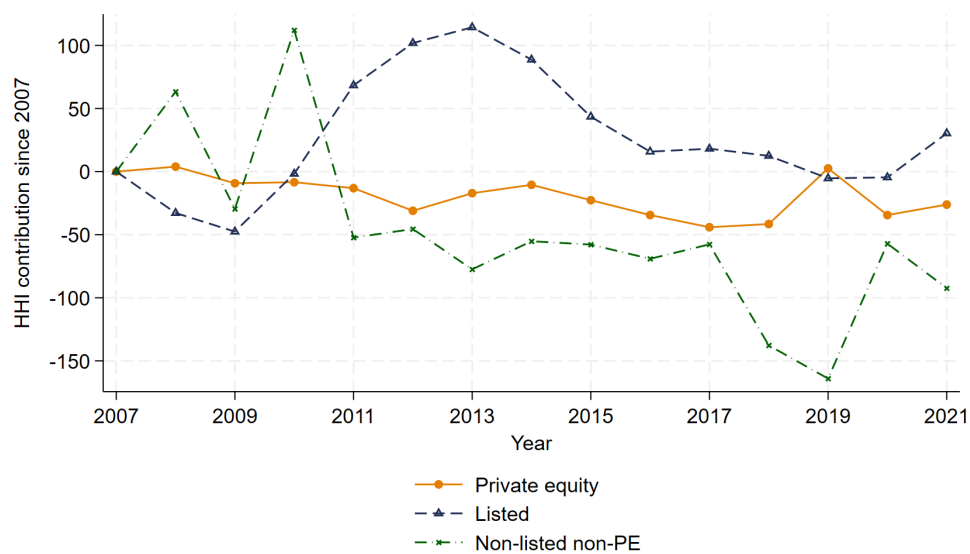


Panel B: Weighted cumulative consolidation

Figure G.4: Concentration contributions by owner type in tradable industries
Panels A and B report unweighted and operating-revenue-weighted cumulative total contributions of PE-owned, listed, and non-listed non-PE structures. Each owner total combines its ownership, growth, and net-entry contributions. Positive values raise the Herfindahl and negative values reduce it. The sample contains tradable four-digit NACE industries.



Panel A: Unweighted cumulative consolidation



Panel B: Weighted cumulative consolidation

The unweighted decomposition shows positive ownership and net-entry contributions and a larger negative growth contribution. The weighted results similarly show that growth reduces concentration, while net entry offsets part of that decline. Owner totals are smaller than in non-tradables: the unweighted PE contribution is modestly positive, the listed total is close to zero, and the non-listed total is negative; weighting changes their relative magnitudes but not the absence of a common positive owner effect.

Table G.1 shows little evidence that the owner totals are associated with markup or TFP changes. At the channel level, ownership is weakly associated with higher markups and TFP, while net entry is associated with lower markups. The scale estimates do not support an expansion interpretation: the total PE contribution and the aggregate ownership channel are associated with lower employment and revenue growth. Taken together, the tradable results show that the non-tradable markup patterns are not mechanically reproduced when domestic market shares provide a less complete account of competition.

Table G.1: Linear combinations by owner type and consolidation channel in tradable industries

Coefficients report economically scaled linear combinations from the long-run industry regressions. The regressions give equal weight to each industry. Robust t -statistics are in parentheses; each standard error uses the full robust variance–covariance matrix of the corresponding regression. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

	$\Delta\mu$	ΔTFP	$\Delta\text{Cost}/\text{Emp}$	$\Delta\text{Cost}/\text{Goods}$	ΔProfit	$\Delta \ln \text{Emp}$	$\Delta \ln \text{Rev}$
<i>Panel A: Effects by Owner Type</i>							
Total PE	0.002 (1.49)	0.005 (1.57)	0.003*** (5.19)	-0.003*** (-2.69)	-0.002*** (-2.95)	-0.032*** (-3.96)	-0.034*** (-5.29)
Total Listed	-0.001 (-0.51)	-0.001 (-0.52)	-0.001* (-1.67)	-0.004** (-2.57)	0.002* (1.75)	-0.005 (-0.63)	-0.008 (-1.02)
Total Non-listed	-0.001 (-0.50)	0.000 (-0.13)	0.001 (1.25)	0.001 (0.69)	-0.002* (-1.68)	0.008 (0.70)	0.007 (0.67)
<i>Panel B: Effects by Consolidation Channel</i>							
Ownership total	0.002* (1.93)	0.007** (2.04)	0.002** (2.57)	-0.007*** (-4.70)	0.001 (0.64)	-0.022*** (-2.79)	-0.019*** (-2.93)
Growth total	0.004 (1.45)	-0.005 (-1.40)	0.004*** (3.32)	0.000 (0.23)	-0.002 (-1.61)	-0.017 (-1.53)	-0.037*** (-3.84)
Net-entry total	-0.006*** (-3.21)	0.001 (0.35)	-0.002* (-1.89)	0.001 (0.45)	-0.001 (-0.82)	0.009 (0.87)	0.022* (1.94)