Common Ownership in Fintech Markets

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I. INTRODUCTION

Is common ownership in fintech companies an empirically significant phenomenon? What are its impact on competition and innovation in fintech markets and its implications for competition law enforcement? This chapter studies these questions providing evidence and insights on the extent of common shareholdings held by different types of investors in different types of firms and the likely concerns in selected fintech market segments and countries. It also comments on how the specific ownership and governance structures of fintech firms may materially influence the magnitude and systemic nature of effects associated with common ownership.

Fintech markets differ in a number of important ways from traditional markets that are usually less dynamic, and fintech firms are often not publicly listed companies over which the common ownership phenomenon has been empirically studied more extensively. This fact affects, on the one hand, the empirical and theoretical dimensions of potential competitive effects. On the other hand, it also creates distinct challenges and opportunities for competition law enforcement that have been under-theorised and underappreciated to date. By shedding light on these novel issues surrounding common ownership in fintech as well as the complex relationships between fintech competition, innovation, and investment, the chapter aims to deepen the analysis of the implications of common ownership for the operation of firms and markets. As such, it also aims to provide useful guidance to antitrust policymakers for appropriate future action.

The structure of the chapter is as follows. Section II presents empirical evidence on the extent of common ownership in fintech markets across various types of firms, investors and countries. Section III studies the potential impact of common ownership on fintech firms' behaviour and market competition. Section IV concludes discussing the implications of the findings for competition law enforcement.

II. COMMON OWNERSHIP IN FINTECH MARKETS

Common ownership, the simultaneous ownership of minority shares in competing firms by institutional investors, has recently been the subject of novel economic theory and empirical studies suggesting potential effects on competition and innovation.[1] Most empirical evidence gathered so far focuses on US markets and publicly listed firms in which a small group of large institutional investors such as mutual and index funds have extensive common shareholdings.[2]

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[1] OECD, 'Common Ownership by Institutional Investors and Its Impact on Competition' (2017) DAF/COMP(2017)10 (summarising the literature).

[2] José Azar, Martin C Schmalz and Isabel Tecu, 'Anticompetitive Effects of Common Ownership' (2018) 73 The Journal of Finance 1513; José Azar, Sahil Raina and Martin Schmalz, 'Ultimate Ownership and Bank Competition' (2022) 51 Financial Management 227; Mohammad Torshizi and Jennifer Clapp, 'Price Effects of Common Ownership in the Seed Sector' (2019); Matthew Backus, Christopher Conlon and Michael Sinkinson, 'Common Ownership and Competition in the Ready-to-Eat Cereal Industry' [2021] NBER Working Paper 28350; Albert Banal-Estañol, Melissa Newham and Jo Seldeslachts, 'Common Ownership in the U.S. Pharmaceutical Industry: A

The issue has gained significant attention given the meteoric rise of index funds and their asset managers – the so-called "Big Three" – in light of the increasing recent growth of portfolio diversification and passive investment strategies.[3] In turn, this unprecedented capital concentration has triggered discussions about the potential implications of institutional common ownership in multiple, often the largest, rival firms within the same industry for competition and consumers.[4]

However, common ownership is a broader phenomenon that is not limited to a specific type of common shareholders, such as the Big Three, or to a specific type of commonly held firms, such as publicly traded companies or firms in a direct competitive relationship.[5] For instance, there is little evidence of common ownership in private or closely held companies, as is often the case with start-ups and fintech firms. Although the presence of large US investment funds is less pronounced in other countries, there is emerging evidence that common shareholding is as prevalent in Europe and Australia, making politicians and competition law policymakers attentive to the evolution and impact of this new phenomenon.[6] It is also well understood that the (degree of) common ownership and its likely effects may vary across different markets[7] and critically depend on the type of common (and non-common) investors and commonly held firms, i.e., the specific ownership and governance structures in place in each individual case.[8]

Network Analysis' (2021) 66 The Antitrust Bulletin 68 <https://doi.org/10.1177/0003603X20985796> accessed 2 August 2022; Jin Xie, 'Horizontal Shareholdings and Paragraph IV Generic Entry in the U.S. Pharmaceutical Industry' (2021) 66 The Antitrust Bulletin 100 <https://doi.org/10.1177/0003603X20985797> accessed 2 August 2022.

[3] Lucian A Bebchuk and Scott Hirst, 'The Specter of the Giant Three' (2019) 99 Boston University Law Review 721; José Azar, 'The Common Ownership Trilemma' (2020) 87 The University of Chicago Law Review 263.

[4] OECD, 'Common Ownership by Institutional Investors and Its Impact on Competition' (n 1); 'U.S. FTC Hearings on Competition and Consumer Protection in the 21st Century, Panel #8: Common Ownership' (*Federal Trade Commission*, 6 December 2018).

[5] Anna Tzanaki, 'Varieties and Mechanisms of Common Ownership: A Calibration Exercise for Competition Policy' (2022) 18 Journal of Competition Law & Economics 168; José Azar and Xavier Vives, 'Revisiting the Anticompetitive Effects of Common Ownership' [2022] European Corporate Governance Institute – Finance Working Paper No. 827/2022.

[6] Nicoletta Rosati and others, 'Common Shareholding in Europe' (Publications Office of the European Union 2020) EUR - Scientific and Technical Research Reports (JRC121476); Simona Frazzani and others, 'Barriers to Competition through Joint Ownership by Institutional Investors' (2020) Study for the Committee on Economic and Monetary Affairs, European Parliament, Luxembourg; Nicoletta Rosati, Pietro Bomprezzi and Maria Martinez Cillero, 'Institutional Investors and Common Ownership in the European Energy Sector' <https://papers.ssrn.com/abstract=4046563> accessed 10 May 2022; Monopolkommission, 'Hauptgutachten XXIV: Wettbewerb 2022' (5 July 2022); Monopolkommission, 'Biennial Report XXII: Competition 2018' (3 July 2018); Competition and Markets Authority (CMA), 'State of UK Competition Report 2022' (29 April 2022); Note by the United Kingdom, 'OECD Roundtable on Common Ownership by Institutional Investors and Its Impact on Competition' (2017) DAF/COMP/WD(2017)92; Parliament of the Commonwealth of Australia, 'Report on the Implications of Common Ownership and Capital Concentration in Australia' (2022) House of Representatives Standing Committee on Economics.

[7] Martin C Schmalz, 'Recent Studies on Common Ownership, Firm Behavior, and Market Outcomes' (2021) 66 (1) Antitrust Bulletin; Menesh Patel, 'Common Ownership, Institutional Investors, and Antitrust' (2018) 82(1) Antitrust Law Journal 279; Jo Seldeslachts, Melissa Newham and Albert Banal-Estañol, 'Changes in Common Ownership of German Companies' (2017) 30 Economic Bulletin - DIW Berlin.

[8] Martin C Schmalz, 'Common-Ownership Concentration and Corporate Conduct' (2018) 10 Annual Review of Financial Economics 413; Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5); José Azar and Anna Tzanaki, 'Common Ownership and Merger Control Enforcement' in Ioannis Kokkoris (ed), *Research Handbook in*

Some economic studies present an empirical account of common ownership in the banking sector in a number of important jurisdictions with different characteristics.[9] Also, there is very limited scholarship on the magnitude and implications of common shareholding among fintech firms associated with ridesharing platforms with overlapping investors in Southeast Asia.[10] Yet, there is no systematic or comprehensive account of the extent of common ownership in fintech markets more generally. This is the aim of this chapter.

A. The global fintech landscape

The empirical analysis that follows focuses, for the most part, on start-ups and private fintech companies representing the vast majority of the fintech firms worldwide,[11] which have not been subject to rigorous study regarding the state of common ownership to date. Yet, for completeness and comparison, this analysis is supplemented with data on a smaller sample of fintech firms that have successfully gone public following an IPO and are present in public markets to the extent useful.

We obtain data for the analysis from Crunchbase database (as of February 2022). Crunchbase is one of the most popular databases used for the analysis of venture capital and private equity investments. Since most of the fintech companies that we analyse are private, this database can provide us with the richest information about the equity investments in such firms. We download information about all companies with the industry classified as "fintech" and founded not earlier than in 1995. The company data contains name, date of founding, location, product market description, activity status (active or closed), as well as estimates of the company's revenue and employees. In addition, we download information about all financing rounds received by these companies that show round-by-round how much funding the company raised and which investors participated in each round. Also, we obtain information about investors, including their names, location, and type (venture capital, angel, private equity, corporation, etc.). The analysis only includes companies classified by the database as active and for which there are data on financing rounds and participating investors that allow us to identify common owners and estimate investors' ownership shares. Overall, our data contains information about equity financing in almost 6.9 thousand fintech companies from 116 countries. Nearly 90% of fintech companies in our sample were founded after 2010.

Figure 1a below reports the top countries ranked by the total number of fintech companies included in the analysis. The largest fintech market by the number of companies is the United States (2,375), followed by the United Kingdom (764), China (391), India (380), and Canada (215). Figure 1b shows the total amount of capital invested in fintech companies in these countries. Again, the United States is the largest market ($99.1 bln), followed by China ($45.3 bln), the United Kingdom ($29.4 bln), India ($17.5 bln), and Germany ($9.1 bln). If Europe is taken as a

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Law and Economics of Competition Enforcement (Edward Elgar Publishing, forthcoming); C Scott Hemphill and Marcel Kahan, 'The Strategies of Anticompetitive Common Ownership' (2020) 129 Yale Law Journal 1392.

[9] Albert Banal-Estañol, Nuria Boot and Jo Seldeslachts, 'Common Ownership Patterns in the European Banking Sector—The Impact of the Financial Crisis' (2022) 18 Journal of Competition Law & Economics 135; Azar, Raina and Schmalz (n 2).

[10] Steven Van Uytsel, 'Horizontal Shareholding Among Fintech Firms in Asia: A Preliminary Competition Law Assessment' in Mark Fenwick, Steven Van Uytsel and Bi Ying (eds), *Regulating FinTech in Asia: Global Context, Local Perspectives* (Springer 2020).

[11] According to Crunchbase data.

whole, it appears as the second largest market in both figures with 1,819 fintech firms and $54 bln amount invested.

Figure 1: Number of Fintech Companies and Amounts Invested in Them by Country

Figure 1a.

Figure 1b.

Number of Fintech Companies

Total Amount Invested in Fintech Companies ($ bln)

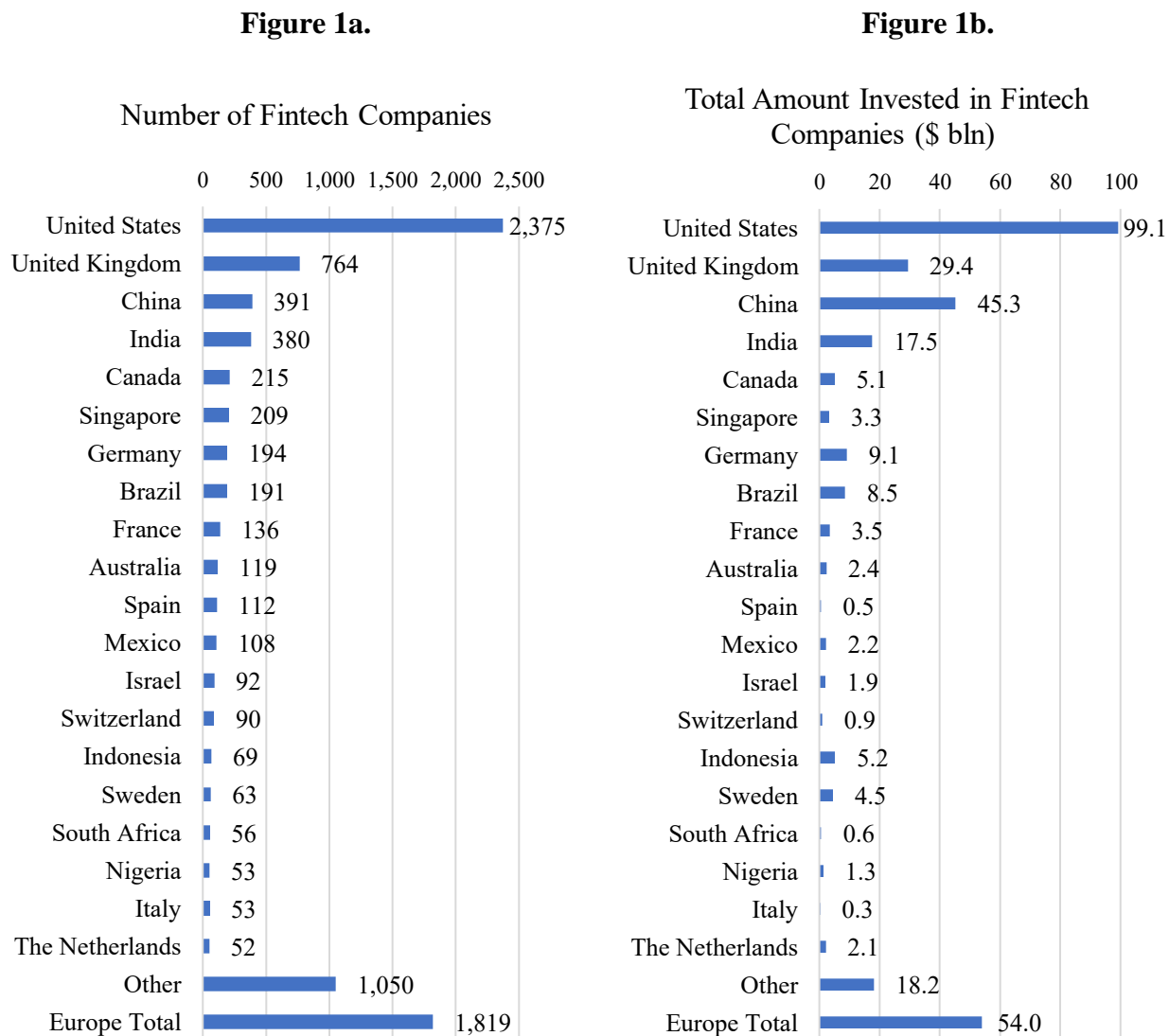| Country	Number of Fintech Companies	Total Amount Invested ($ bln)
United States	2,375	99.1
United Kingdom	764	29.4
China	391	45.3
India	380	17.5
Canada	215	5.1
Singapore	209	3.3
Germany	194	9.1
Brazil	191	8.5
France	136	3.5
Australia	119	2.4
Spain	112	0.5
Mexico	108	2.2
Israel	92	1.9
Switzerland	90	0.9
Indonesia	69	5.2
Sweden	63	4.5
South Africa	56	0.6
Nigeria	53	1.3
Italy	53	0.3
The Netherlands	52	2.1
Other	1,050	18.2
Europe Total	1,819	54.0

Table 1 then presents the top-10 investors, ranked by the share of total dollar investment in fintech companies worldwide. The columns report each investor's name, type, the number of fintech companies in which the investor has minority ownership, and the percentage of capital contributed by the investor in the total amount invested in fintech companies worldwide. As it may be observed in this table, the most prominent global investors in fintech in the overwhelming majority are either venture capital or private equity firms.

Table 1. Top-10 Fintech Investors Worldwide

| Investor name	Investor type	Number of fintech companies with minority ownership	Investor's share of total worldwide $ investment
Softbank	Venture Capital	70	2.39%
Sequoia	Venture Capital	115	2.07%
Tiger Global Management	Private Equity Firm	102	1.48%
Temasek Holdings	Private Equity Firm	26	1.10%
GIC	Private Equity Firm	25	1.04%
JP Morgan	Investment Bank	49	0.99%
The Carlyle Group	Private Equity Firm	10	0.99%
General Atlantic	Private Equity Firm	24	0.96%
Ribbit Capital	Venture Capital	61	0.93%
Warburg Pincus	Private Equity Firm	14	0.82%
Total		**496**	**12.77%**

Figure 2 further illustrates the share of dollar investment in fintech companies worldwide by investor category. This illustration confirms that the largest financial investors in fintech startups that are typically early-stage private companies are venture capitalists and private equity investors. However, other investor types such as investment banks, angels and corporate venture capital units also have an important presence in the fintech industry. At the same time, it is also notable that large asset managers such as the Big Three in the US (BlackRock, Vanguard, State Street) represent a minor share of investments in fintech startups worldwide (around 2% in total). The market conditions (illiquidity of assets, frictions, lack of perfect public information regarding startup valuation) as well as legal constraints (restrictions on the level and type of pension fund investments) in private markets may explain the low percentage of this group of large institutional investors in common shareholdings in privately held fintech firms.[12]

Having said that, one should note that our data may undercount the extent to which large asset management firms invest in fintech companies given that these investors often engage in private equity markets indirectly: i.e., through their participation in venture capital and private equity funds as limited partners. Thus, these institutional investors provide capital for the funds but are not participating in their management. For example, according to data in Pitchbook, a popular database on private equity investments, Blackrock has acted as a limited partner in nearly 80 venture capital and private equity funds since 2001. Most of these funds include between 20 to 200 other limited partners, depending on fund size, and such limited partners' investments are passive. Therefore, limited partners cannot participate in the funds' day-to-day activities or influence the funds' portfolio companies. Nevertheless, in recent years, large asset management firms have started directly investing in private markets, typically by participating in the later stages of venture capital financing. Based on our Crunchbase dataset, Blackrock invested in 20 fintech companies, State Street in four, whereas the Vanguard Group has not invested in fintech companies as a direct investor. However, the number of investments in private early-stage firms by asset managers, including in industries other than fintech, has been

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[12] OECD, 'Annual Survey of Investment Regulation of Pension Funds and Other Pension Providers' (2021) <https://www.oecd.org/finance/private-pensions/annualsurveyofinvestmentregulationofpensionfunds.htm> accessed 30 August 2022.

quickly growing in the last three years. Therefore, it is expected that the share of traditional large asset managers as fintech investors is likely to increase in the following years.

Figure 2. Fintech Investment by Investor Category Worldwide
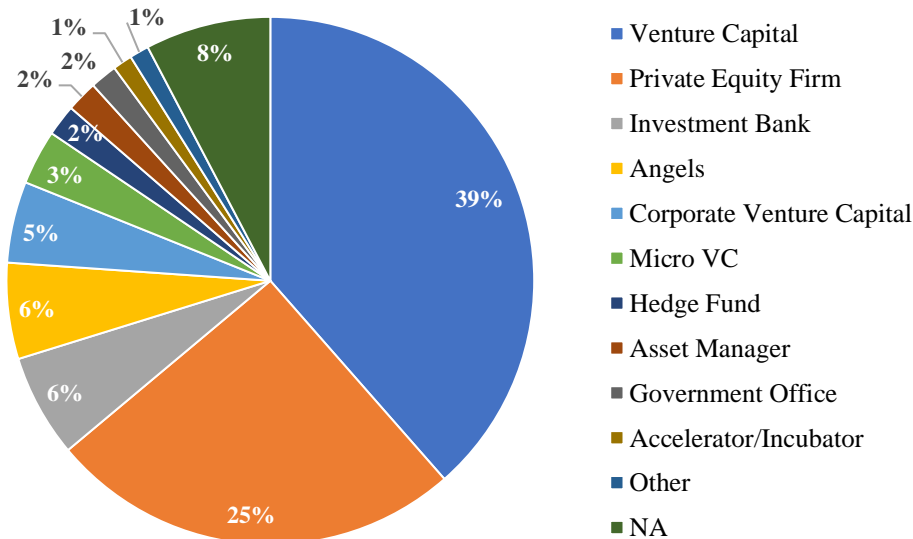
B. Top common investors in fintech by country

In this section, we provide more granular data on the fintech investment landscape broken down by country and region. Table 2 below reports the top-10 investors in each country, focusing on a selection of European markets (UK, Spain, Sweden, Ireland). The columns report each investor's name, type, the number of fintech companies in which the investor has minority ownership, and the percentage of capital contributed by the investor in the total amount invested in fintech companies in the country. Investors are ranked based on the proportion of total dollar investment in fintech companies in the country.

In most European markets, it may be seen that private equity and venture capital are the largest and the most common fintech investors. The notable outlier is Ireland, where the government has a very strong presence as a common investor of fintech companies while investment banks provide a considerable share of investment. Ireland is also the most concentrated of the four European fintech markets we have presented in detail. The UK is the least concentrated market, yet with some common ownership observed. Blackrock is present in Sweden with investments in only two fintech companies. All in all, the number of overlapping investors with common shareholdings across fintech companies in each of the four markets is limited.

Table 2. Top-10 Fintech Investors by Country (European Markets)

Investor name	Investor type	Number of fintech companies with minority ownership	Share of total country's investment
United Kingdom			
Tiger Global Management	Private Equity Firm	9	3.35%
Motive Partners	Private Equity Firm	2	2.48%
CPP Investments	Asset Manager	1	2.38%
Softbank	Venture Capital	5	1.91%
Accel	Venture Capital	11	1.75%
DST Global	Private Equity Firm	4	1.42%
GIC	Private Equity Firm	2	1.21%
Target Global	Venture Capital	5	1.20%
Toscafund Asset Management	Hedge Fund	2	1.08%
Capability and Innovation Fund	Government Office	16	1.08%
Total		**57**	**17.87%**
Spain			
Prime Ventures	Venture Capital	1	7.42%
Rinkelberg Capital	Venture Capital	1	4.70%
Credit Suisse	Investment Bank	1	4.70%
Crowdcube	Venture Capital	9	4.37%
ING Group	Investment Bank	1	3.86%
National Health Forecast (PSN)	Corporate Venture Capital	1	3.86%
Greycroft	Venture Capital	1	2.73%
Spark Capital	Venture Capital	1	2.51%
All Iron Ventures	Venture Capital	2	1.87%
Encomenda VC	Micro VC	6	1.66%
Total		**24**	**37.66%**
Sweden			
Commonwealth Bank of Australia	Corporate Venture Capital	1	7.00%
Northzone	Venture Capital	3	4.18%
HMI Capital	Venture Capital	2	3.47%
BlackRock	Asset Manager	2	2.91%
Chrysalis Investments	Venture Capital	1	2.91%
Dragoneer Investment Group	Private Equity Firm	1	2.59%
Alma Mundi Ventures	Venture Capital	1	2.35%
WestCap	Private Equity Firm	1	2.35%
Softbank	Venture Capital	1	2.35%
Raison Asset Management	Private Equity Firm	1	2.35%

Investor name	Investor type	Number of fintech companies with minority ownership	Share of total country's investment
Total		**14**	**32.46%**
Ireland			
Allied Irish Banks	Investment Bank	1	16.56%
ING Group	Investment Bank	1	11.52%
Enterprise Ireland	Government Office	23	8.92%
Frontline Ventures	Venture Capital	2	6.36%
Disruptive Technologies Innovation Fund	Government Office	1	5.20%
Act Venture Capital	Venture Capital	2	3.34%
Trinity Ventures	Venture Capital	1	3.34%
Covid-19 Credit Guarantee Scheme	Government Office	1	2.86%
Octopus Ventures	Venture Capital	1	2.74%
Lifeline Ventures	Micro VC	1	2.01%
Total		**34**	**62.87%**

Table 3 presents the top-10 investors in other selected countries outside Europe (US, Brazil, China, Indonesia). The columns document each investor's name, type, the number of fintech companies in which the investor has minority ownership, and the percentage of capital contributed by the investor in the total amount invested in fintech companies in the country. Again, investors are ranked based on the proportion of total dollar investment in fintech companies in the country.

The United States is the least concentrated fintech market but with a large number of common shareholdings among all top fintech investors. The other markets, while considerably more concentrated, have rather limited common ownership. One noteworthy exception is the venture capital firm Sequoia in China, with 22 investments in fintech companies. Again, the largest and most common categories of fintech investors are venture capital and private equity. In Indonesia, however, corporate venture capital has a significant presence.

Table 3. Top-10 Fintech Investors by Country (Other Markets)

Investor Name	Investor Type	Number of fintech companies with minority ownership	Share of Total Country's Investment
United States			
Sequoia	Venture Capital	37	1.88%
Tiger Global Management	Private Equity Firm	36	1.52%
Andreessen Horowitz	Venture Capital	56	1.32%
Ribbit Capital	Venture Capital	29	1.30%
Softbank	Venture Capital	24	1.07%

Investor Name	Investor Type	Number of fintech companies with minority ownership	Share of Total Country's Investment
DST Global	Private Equity Firm	16	0.89%
Coatue	Private Equity Firm	27	0.82%
Insight Partners	Private Equity Firm	22	0.79%
ICONIQ Capital	Private Equity Firm	10	0.75%
Accel	Venture Capital	34	0.71%
Total		**291**	**11.04%**

Brazil

Investor Name	Investor Type	Number of fintech companies with minority ownership	Share of Total Country's Investment
JP Morgan	Investment Bank	2	23.83%
Advent International	Private Equity Firm	1	5.07%
Softbank	Venture Capital	6	4.29%
Propel Venture Partners	Venture Capital	2	4.22%
Goldman Sachs	Investment Bank	4	3.56%
MSA Capital	Private Equity Firm	1	2.95%
Berkshire Hathaway	Investment Bank	1	2.95%
Sands Capital Ventures	Private Equity Firm	1	2.95%
Kaszek	Venture Capital	12	2.79%
Ribbit Capital	Venture Capital	7	2.30%
Total		**37**	**54.88%**

China

Investor Name	Investor Type	Number of fintech companies with minority ownership	Share of Total Country's Investment
Sequoia	Venture Capital	22	4.67%
China Creation Ventures (CCV)	Venture Capital	2	4.62%
The Carlyle Group	Private Equity Firm	2	4.49%
Warburg Pincus	Private Equity Firm	2	3.27%
Credit Suisse	Investment Bank	3	3.26%
General Atlantic	Private Equity Firm	2	3.25%
GIC	Private Equity Firm	3	3.21%
Primavera Capital Group	Private Equity Firm	5	3.20%
Khazanah Nasional	Private Equity Firm	2	3.18%
Temasek Holdings	Private Equity Firm	2	3.17%
Total		**45**	**36.32%**

Indonesia

Investor Name	Investor Type	Number of fintech companies with minority ownership	Share of Total Country's Investment
Alibaba Group	Corporate Venture Capital	2	28.12%
Softbank	Venture Capital	5	9.09%
EV Growth	Venture Capital	5	7.42%

Investor Name	Investor Type	Number of fintech companies with minority ownership	Share of Total Country's Investment
Sinar Mas Group	Corporate Venture Capital	1	3.83%
Google	Corporate Venture Capital	1	3.36%
Temasek Holdings	Private Equity Firm	1	3.36%
The Silverhorn Group	Venture Capital	1	2.40%
Sequoia	Venture Capital	7	2.31%
SCB Group	Corporate Venture Capital	1	1.92%
Ant Group	Corporate Venture Capital	1	1.92%
Total		**25**	**63.72%**

Table 4 below reports the combined share of dollar fintech investments by the top-10 investors in each country, for a wide variety of countries. The columns document the country name, the total number of fintech companies in the country, and the total share of dollar investment in fintech companies by the top-10 investors. Only countries with at least 30 fintech companies are reported. Countries are ranked by the number of fintech companies within each geographical area (i.e., Europe, Americas, Asia, Australia, Middle East, Africa).

The main conclusion that may be drawn from this table is that across the three leading regions (Europe, Americas, and Asia), fintech markets are generally more concentrated when the number of fintech companies in the market is smaller.

Table 4: Combined Investment Share of 10 Largest Investors

Country	Number of fintech companies in the country	Top-10 investors' combined ownership in country's fintechs
Europe		
United Kingdom	764	17.87%
Germany	194	23.36%
France	136	27.07%
Spain	112	37.66%
Switzerland	90	34.49%
Sweden	63	32.46%
Italy	53	55.71%
The Netherlands	52	62.61%
Ireland	46	62.87%
Estonia	40	56.55%
Denmark	31	66.05%
Americas		
United States	2,375	11.04%
Canada	215	24.48%
Brazil	191	54.88%
Mexico	108	45.08%
Colombia	48	41.64%
Chile	38	54.29%
Argentina	37	61.81%
Asia		
China	391	36.32%
India	380	33.87%
Singapore	209	20.81%
Indonesia	69	63.72%
Japan	50	51.41%
South Korea	42	68.52%
Australia	119	36.11%
Middle East		
Israel	92	25.30%
United Arab Emirates	52	46.02%
Turkey	35	69.91%
Africa		
South Africa	56	44.09%
Nigeria	53	60.01%
Kenya	34	73.76%

C. Common ownership networks in fintech markets

This section provides evidence on the level of common ownership connections among rival fintech firms. Figure 3 below shows the density of common ownership networks in the market for payments only in two selected countries chosen to illustrate the contrast between fintech markets of different size. Figures 3a and 3b present the network graphs for common ownership in the payments market in Sweden and the UK respectively. The size of the blue circles in the graphs proxies for the firm size in terms of employment and the size of yellow circles proxies for the size of investors in terms of their total dollar fintech investments worldwide. Clearly, the most notable difference between the two markets is the size of the networks. The Swedish market is characterised by just a handful of fintech companies active in payments, each having its own group of investors that is largely not connected with others. Here the largest group of investors in the graph is backing Klarna (large blue circle in the centre). Therefore, this market is characterised by a generally low overlap of investors across firms. In contrast, the UK market is characterised by the presence of a core group of larger fintech companies (Monzo, Revolut, Wise, Checkout.com represented by the larger blue circles in the centre of the graph) as well as a few smaller companies (e.g., Divido, Currencycloud, GoCardless), each of which is funded by large groups of investors that tend to have at least one more payments company in their portfolio. However, beyond this core group of firms and investors shown to be concentrated in the centre, we can observe many payments companies with investors that tend not to have other investments in the industry. Moreover, there are relatively few investors that hold more than two competitors in their portfolio simultaneously. More specifically, 79% of all investors in the UK payments market have only one portfolio company, 11% of investors hold two payments fintech companies, and the remaining 10% have more than two payments companies in their portfolio at the same time. In our sample, only four investors have at least 10 payment companies in their portfolio.

Figure 3. Network Graphs (Payments Market only)

| **a. Sweden** | **b. The U.K.** |
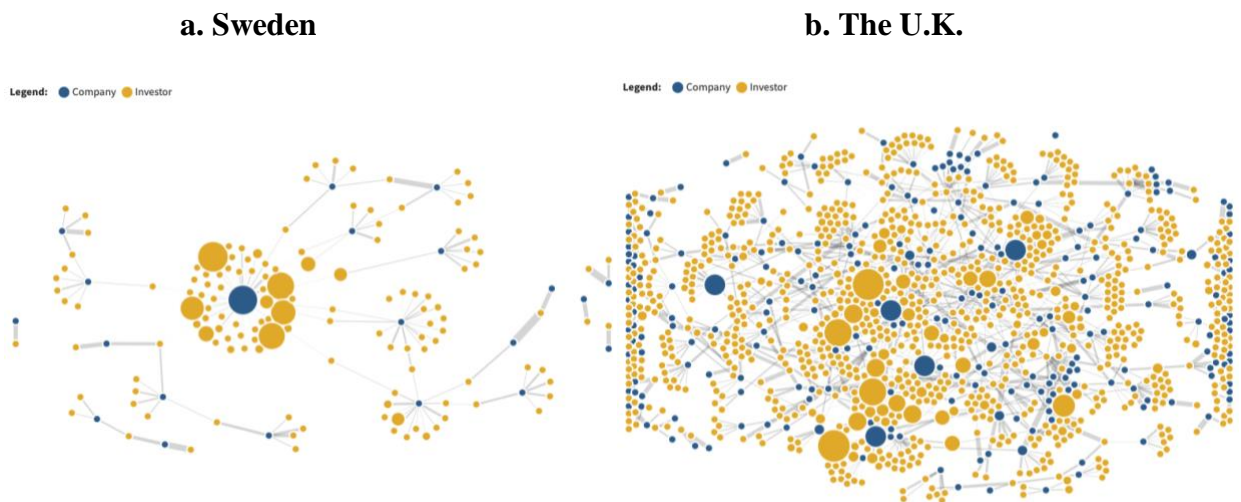
III. IMPACT OF COMMON OWNERSHIP IN FINTECH MARKETS

The above empirical analysis clearly shows that common ownership's span varies widely across different geographies, fintech markets, and investor types. But what is the likely impact of such common ownership? Economic theory suggests that common ownership may have both negative and positive effects on market competition and innovation, depending on the circumstances.[13] A critical component in the competition analysis is estimating the "common owners' weights" (or "lambdas") that aim to assess the magnitude of the likely effects of common ownership based on a unilateral effects analysis. In addition, it is important to consider the parallel existence and interplay of cross-ownership and common ownership structures when evaluating competition effects. This may occur in the context of mergers and acquisitions of fintech companies by investors who may have common shareholdings across other firms in the target's market, on the one hand, and may be themselves in a competitive relationship with the acquired target company, on the other hand. The following sections expand on these considerations.

A. Theories of harm and efficiencies

Common ownership among horizontal competitors, or "horizontal shareholding",[14] may have adverse effects on competition in the form of increased prices, reduced quantities, choice, quality or innovation, either based on unilateral or coordinated effects theories of harm.[15]

Unilateral effects

Unilateral effects arising from horizontal common ownership have been the focus of most economic research to date. It has been shown that common ownership may lead to lessened incentives to compete[16] or innovate[17] or enter[18] product markets by means of various mechanisms.[19] The basic assumption that drives these results is that 'under common ownership in oligopoly, "atomistic" firms and shareholders cannot be assumed, which in turn leads to theories about an altered objective function of the firm (portfolio value maximization)' and altered unilateral competitive incentives (across-firm internalization of profits).[20] Essentially

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[13] Ángel L López and Xavier Vives, 'Overlapping Ownership, R&D Spillovers, and Antitrust Policy' (2019) 127 Journal of Political Economy 2394; Xavier Vives, 'Common Ownership, Market Power, and Innovation' (2020) 70 International Journal of Industrial Organization; Alexandra J Gibbon and Jan Philip Schain, 'Rising Markups, Common Ownership, and Technological Capacities' [2020] DICE Discussion Paper No. 340.

[14] Einer Elhauge, 'Horizontal Shareholding' (2016) 129 Harvard Law Review 1267.

[15] OECD, 'Common Ownership by Institutional Investors and Its Impact on Competition' (n 1) 16–21.

[16] Azar, Schmalz and Tecu (n 2); Azar, Raina and Schmalz (n 2).

[17] On unilateral effects based on reduced innovation incentives, see the European Commission's merger control enforcement practice in Case M.7932 *Dow/DuPont*, Commission decision of 27 March 2017, Annex 5, paras 56-60; and Case M.8084 *Bayer/Monsanto*, Commission decision of 21 March 2018.

[18] Xie (n 2); Melissa Newham, Jo Seldeslachts and Albert Banal-Estanol, 'Common Ownership and Market Entry: Evidence from Pharmaceutical Industry' (2018) DIW Berlin Discussion Paper 1738; Alexandro Ruiz-Pérez, 'Market Structure and Common Ownership' <https://www.cemfi.es/~ruiz-perez/alexandro_ruiz_perez_JMP_nov2019.pdf>.

[19] Einer Elhauge, 'The Causal Mechanisms of Horizontal Shareholding' (2021) 82 Ohio State Law Journal; Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5); Ederer Antón and others, 'Common Ownership, Competition, and Top Management Incentives' [2022] Journal of Political Economy, forthcoming.

[20] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5) 178–179. On the origins of the economic theory of partial ownership (of which common ownership is a special case) and its more recent extensions, see Daniel P O'Brien and Steven C Salop, 'Competitive Effects of Partial Ownership: Financial Interest and Corporate Control' (2000) 67 Antitrust Law Journal 559; José Azar, 'Portfolio Diversification, Market Power, and the Theory

even without any communication or coordination, commonly held firms may have a reduced tendency to expand output or lower price in order to gain market share since this may come at the expense of industry rivals in which the common owners may have, extensive albeit minority, parallel shareholdings.[21]

The foundation that theoretically underlies the commonly held firms' altered market conduct and increased market power is that common ownership affects the incentives and behaviour of the managers of those firms. That is, managers of commonly held firms are thought to maximise the total portfolio profits of their common shareholders taking into account their parallel holdings in rival firms in the same industry. In an environment of oligopolistic markets where firms strategically interact, aggressive competition – or targeted governance that improves individual firm performance – imposes negative externalities on the commonly held firms and their common shareholders.[22] Therefore, the latter have an incentive to internalise those externalities and in given circumstances, they may also have the power to influence firm management and implement their preferences.

The control or influence mechanism over managers is clear in the case of "active" investors and fund managers (e.g., through the exercise of voice, exit, or engagement).[23] This is particularly so for "concentrated" common owners with significant stakes, board seats and a dominant voting position in the governance of at least one of their commonly held firms.[24] The same is true for private commonly held companies, where the control dynamics may be more easily tractable. Yet, even perceived "passive" common institutional investors in the absence of other dominant shareholders in corporate governance may be able to realise their collective interest and relative power in pursuit of portfolio value.[25] Principal-agent conflicts that are typical in large public corporations with a dispersed ownership structure are factored in latest economic models and estimations. However, the likely anticompetitive effects of common ownership persist even though they are observed to be more limited in magnitude.[26] This practically means that managers may not fully internalise the anticompetitive incentives of common owners as theoretical models predict but only partially due to the presence of (some) managerial agency costs.[27] As a result, contextual and empirical analysis may be necessary to approximate the actual effects of common ownership in a given setting in each individual case.

Furthermore, quantification measures of common ownership such as the "modified HHI" (MHHI)[28] or the "common owners' weights" (lambdas)[29] rely on theoretical scholarship based

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of the Firm' (2016) <http://papers.ssrn.com/abstract=2811221>; José Azar and Ricardo M Ribeiro, 'Estimating Oligopoly with Shareholder Voting Models' <https://papers.ssrn.com/abstract=3988265.> accessed 3 August 2022.

[21] Schmalz (n 8) 417.

[22] Antón and others (n 19) 28; Madison Condon, 'Externalities and the Common Owner' (2020) 95 Washington Law Review 1.

[23] Ben Charoenwong, Zhenghui Ni and Qiaozhi Ye, 'Active Mutual Fund Common Owners' Returns and Proxy Voting Behavior' <https://papers.ssrn.com/abstract=4184584> accessed 16 August 2022; Schmalz (n 8).

[24] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5).

[25] ibid; Anna Tzanaki, 'The Passive Mechanisms of Common Ownership' (*ProMarket*, 5 May 2022) <https://www.promarket.org/2022/05/05/passive-mechanisms-common-ownership/> accessed 4 August 2022.

[26] Azar and Ribeiro (n 20); Backus, Conlon and Sinkinson (n 2); Antón and others (n 19).

[27] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5) 223; Azar, 'The Common Ownership Trilemma' (n 3) 286–293.

[28] Timothy F Bresnahan and Steven C Salop, 'Quantifying the Competitive Effects of Production Joint Ventures' (1986) 4 International Journal of Industrial Organization 155; O'Brien and Salop (n 20).

[29] Matthew Backus, Christopher Conlon and Michael Sinkinson, 'Common Ownership in America: 1980-2017' (2021) 13 (3) American Economic Journal: Microeconomics 273; Vives (n 13); Azar and Tzanaki (n 8).

on unilateral effects. The former estimates the level of additional market concentration and "effective" market power due to common ownership whereas the latter the degree of internalisation of rivals' profits relative to own firm profits by the firm manager in its objective function due to common ownership. Ultimately, both methods aim to capture the increased unilateral pricing incentives produced by common shareholdings in rival firms. In addition, both measures incorporate the common investors' financial interests (profit share) and degree of influence (control share) in each competing firm in the same industry in order to quantify those unilateral anticompetitive incentives.

The degree of control the common owners have materially affects their ability to impact outcomes in corporate governance and market competition. For instance, if the common owners have no control or influence, then common ownership will have zero effects. Firms will act independently in the market as they will continue to maximise their own individual firm value. Typically, most theoretical and empirical economic literature assumes "proportionate control" – that is, control weights are assumed to be equal to the profit weights. Some models check this basic assumption against alternative control scenarios for robustness and still find anticompetitive effects flowing from common ownership.[30] On the other hand, in the absence of other dominant shareholders and given the often relatively large size, systemic presence and potentially cumulative influence of institutional shareholders, common owners may *de facto* have disproportionate corporate power and thus may substantially affect market outcomes.[31] For these reasons, it is critical that the realistic setting, in which common ownership is observed, is analysed such as the specific ownership and governance structures of the commonly held firms (size and dispersion of shareholders, legal environment and special contractual arrangements shaping corporate governance) as well as the relevant market structures (concentrated markets with oligopolistic competition, structural and personal links among the commonly held firms).[32]

Coordinated effects

Common ownership may also affect competition in product markets by means of coordinated effects. Theories of harm relating to coordinated effects suggest that common ownership may increase the likelihood for either explicit coordination among the commonly held firms or tacit collusion under conducive market and other surrounding conditions.[33] Either way, the market conduct of the firms changes and so does the industry equilibrium in a coordinated fashion, in pursuit of maximising joint profits and gaining monopoly rents. Besides, non-commonly held rival firms in the oligopoly may have aligned interests to achieve a coordinated outcome since they stand to also share in the supracompetitive profits.[34]

Common shareholders may facilitate explicit or implicit coordination through various means. First, common owners may act as a "cartel ringmaster" or "instigator" by having an

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[30] Azar, Schmalz and Tecu (n 2); Schmalz (n 8).

[31] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5); Schmalz (n 8).

[32] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5); Gardiner C Means, 'The Separation of Ownership and Control in American Industry' (1931) 46 The Quarterly Journal of Economics 68.

[33] Edward B Rock and Daniel L Rubinfeld, 'Common Ownership and Coordinated Effects' (2020) 83 Antitrust Law Journal 201; Patel (n 7) 49; Anna Tzanaki, 'The Regulation of Minority Shareholdings and Other Structural Links between Competing Undertakings: A Law & Economics Analysis' (Doctoral Thesis, UCL (University College London) 2017); Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5) 206; Lysle Boller and Fiona Scott Morton, 'Testing the Theory of Common Stock Ownership' [2019] NBER Working Paper No. w27515.

[34] Rock and Rubinfeld (n 33) 226; Boller and Morton (n 33) 38.

active and leading role in orchestrating anticompetitive coordination among their portfolio firms.[35] This could be achieved through common owners' active discussions and engagement with corporate management or boards, with a view to influence the companies' long-term strategy,[36] during private meetings or during earning calls where investors are present and firm and industry profitability are discussed.[37] As relatively large minority shareholders, common owners may have privileged access to management and more generally they may have more control than their formal equity share suggests.[38] Similarly to an industry association or a non-rival (consulting) firm that could serve as a "cartel facilitator", common owners may induce explicit agreement or information sharing regarding important competitive parameters among industry rivals and thus actively and in full knowledge contribute to the implementation and maintenance of a cartel.[39] Indeed, there is evidence that rival firms with common ownership links may explicitly conclude anticompetitive agreements to raise prices (and profits), restrain output [40] and prevent or delay entry (e.g., settlement agreements between commonly held brand and generic drug manufacturers that aim to withhold generic entry in pharmaceutical markets).[41]

Furthermore, common owners may serve as a conduit of communication or a channel for access to and transmission of information among the commonly held firms.[42] Information exchanges, especially private ones, "can help to provide focal points and more generally solve the coordination problem that arises in a prisoner's dilemma setting"[43] but also sustain and fill in the gaps in a real-world "incomplete cartel contract" that is legally unenforceable by ensuring monitoring and compliance among the cartelising firms (and avoiding misinterpreting rival moves due to a changing environment as deviations).[44] In this way, common ownership links may facilitate the flow of information and help align incentives among the commonly held firms and thus enhance the transparency and credibility of communications regarding their competitive strategies.[45] Even public statements or unilateral disclosures expressing the common shareholders' strategic preferences regarding the future conduct of their portfolio firms in the market may in given circumstances potentially be considered anticompetitive.[46] Besides,

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[35] Rock and Rubinfeld (n 33).

[36] Case M.7932 *Dow/DuPont*, Commission decision of 27 March 2017, Annex 5, para 19.

[37] Rock and Rubinfeld (n 33).

[38] Case M.7932 *Dow/DuPont*, Commission decision of 27 March 2017, Annex 5, §3 and 4; Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5).

[39] Cartel facilitators are sanctioned under EU competition law as long as they qualify as "undertakings" even if they are not active in the same market(s) where the cartel takes place. Anne Vallery and Caroline Schell, 'AC-Treuhand: Substantial Fines for Facilitators of Cartels' (2016) 7 Journal of European Competition Law & Practice 254.

[40] Bradley Olson and Lynn Cook, 'Wall Street Tells Frackers to Stop Counting Barrels, Start Making Profits' *Wall Street Journal* (13 December 2017) <https://www.wsj.com/articles/wall-streets-fracking-frenzy-runs-dry-as-profits-fail-to-materialize-1512577420> accessed 6 August 2022.

[41] Jin Xie and Joseph Gerakos, 'Institutional Cross-Holdings and Generic Entry in the Pharmaceutical Industry' (2020) 110 AEA Papers and Proceedings 569.

[42] Rock and Rubinfeld (n 33); Patel (n 7) 52.

[43] Rock and Rubinfeld (n 33) 234.

[44] Massimo Motta, 'Review of Michael Whinston, Lectures on Antitrust Economics (MIT Press, 2006)' (2007) 3(1) Competition Policy International 316.

[45] EU Horizontal Merger Guidelines, recitals 47-48; Rock and Rubinfeld (n 33).

[46] ibid; OECD, 'Unilateral Disclosure of Information with Anticompetitive Effects' (2012) Policy Roundtable DAF/COMP(2012)17; Ioannis Lianos and Florian Wagner-von Papp, 'Tackling Invitations to Collude and Unilateral Disclosure: The Moving Frontiers of Competition Law?' (2022) 13(4) Journal of European Competition Law & Practice 249.

common ownership is shown to increase voluntary disclosure of strategic information that help firms coordinate.[47]

Common owners may also encourage adoption of executive compensation packages tied to rival or industry performance and designed to align incentives between common owners and managers of their portfolio firms.[48] Inducing agreement on common facilitating practices such as incentives schemes is another means of helping facilitate coordination.[49] Indeed, common ownership as cross-ownership may be an anticompetitive facilitating practice itself.[50] It has been further claimed that common ownership may be a substitute to explicit collusion in certain industries.[51]

Even without any explicit agreement or communication, common ownership may be able to induce and sustain tacit collusion by altering the incentives of portfolio and rival firms to collude or compete, and their relative gains and losses.[52] However, economic research on market-wide tacit collusion is inconclusive in the abstract. On the one hand, common owners may increase the likelihood and success of collusion by increasing firms' incentives to collude and the discount rate of managers of their portfolio firms.[53] This in turn increases their long-term gains from cooperation and decreases the incentives and likelihood of defection. On the other hand, in the presence of common ownership, punishment is softer after defection when firms revert to competition given the higher profits earned due to unilateral effects.[54] This fact increases their incentives to deviate from collusion.

In short, common ownership may have a coordinating, signaling, or monitoring and deterring function enabling coordinated market outcomes. These effects and functions of common shareholders among competitors, and related antitrust risk, may be exacerbated if common ownership (structural links) is coupled with interlocking directorates (personal links).[55] In such case, common investors may be able to appoint the same person(s) as a director on the board of multiple competing firms in the same industry in which they have common

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[47] Andrea Pawliczek, A Nicole Skinner and Sarah LC Zechman, 'Facilitating Tacit Collusion through Voluntary Disclosure: Evidence from Common Ownership' <https://papers.ssrn.com/abstract=3382324> accessed 7 August 2022.

[48] Rock and Rubinfeld (n 33); Werner Neus, Manfred Stadler and Maximiliane Unsorg, 'Market Structure, Common Ownership and Coordinated Manager Compensation' [2020] University of Tübingen Working Papers in Business and Economics No.133; Werner Neus and Manfred Stadler, 'Common Holdings and Strategic Manager Compensation: The Case of an Asymmetric Triopoly' (2020) 39 Managerial and Decision Economics 814.

[49] Steven C Salop, 'Practices That (Credibly) Facilitate Oligopoly Coordination' in Joseph E Stiglitz and G Frank Mathewson (eds), *New developments in the analysis of market structure* (MIT Press 1986).

[50] Tzanaki, 'The Regulation of Minority Shareholdings and Other Structural Links between Competing Undertakings' (n 33); David Gilo, 'Partial Ownership as a Strategic Variable to Facilitate Tacit Collusion' (1995) 10/95, revised 4/97 John M. Olin Program in Law, Economics, and Business, Harvard Law School, Discussion Paper No. 170.

[51] Banal-Estañol, Newham and Seldeslachts (n 2) 98.

[52] Rock and Rubinfeld (n 33); Patel (n 7).

[53] Boller and Morton (n 33) 38.

[54] Patel (n 7) 52.

[55] Yaron Nili, 'Horizontal Directors' (2020) 114 Northwestern University Law Review 1179; José Azar, 'Common Shareholders and Interlocking Directors: The Relation Between Two Corporate Networks' (2022) 18 Journal of Competition Law & Economics 75; Ofer Eldar, Jillian Grennan and Katherine Waldock, 'Common Ownership and Startup Growth' [2020] Duke Law School Public Law & Legal Theory Series No. 2019-42; OECD, 'Antitrust Issues Involving Minority Shareholdings and Interlocking Directorates' (2009) Policy Roundtable DAF/COMP(2008)30.

shareholdings. Similarly, if common owners are also common creditors in rival firms at the same time the likelihood of collusion is increased.[56]

Efficiencies and procompetitive effects

Common ownership of horizontal competitors may also generate procompetitive efficiencies and other beneficial effects for consumers and society.[57] Efficiencies that enhance the commonly held firms' ability and incentive to compete or innovate, for instance by realising cost savings or innovation synergies, may be able to outweigh any negative effects on competition and benefit consumers leading to lower prices, higher quality, new or improved products and services, and more choice.[58] These are favorably viewed by antitrust enforcers and policymakers. While common ownership may produce additional substantial benefits for corporate governance and the operation of capital markets (e.g., minimizing managerial agency costs, greater diversification, lower cost of capital, increased liquidity) that profit shareholders and investors, consumers do not generally stand to gain.[59] Competition policy does not trade off such efficiencies against competition and consumer harms. These are disregarded by antitrust enforcers as "out-of-market" efficiencies[60] since competition enforcement is in principle "market specific".[61]

An important parameter of competition in fintech markets, which are generally more dynamic in nature, is innovation. Several theoretical and empirical economic studies indicate that common ownership in both publicly traded and private firms (startups) may have positive effects on innovation under specific circumstances. These effects are particularly pronounced in high tech or highly innovative industries that are subject to large innovation, technological and informational spillovers.[62] However, depending on the specific type of common investors (e.g., large asset managers and institutional investors or venture capitalists, focused or long-term financial investors), the magnitude of efficiencies and the means through which these are attained may differ.[63] Accordingly, the innovation implications of common ownership may differ depending on the specificities of given industries, firms and investors.[64] For these reasons, the

[56] D Sokol, 'Debt, Control, and Collusion' (2022) 71 Emory Law Journal 695.

[57] OECD, 'Common Ownership by Institutional Investors and Its Impact on Competition' (n 1) 28–29.

[58] Azar and Tzanaki (n 8) 40.

[59] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5) 170, 204, 217; OECD, 'Common Ownership by Institutional Investors and Its Impact on Competition' (n 1) 28–29; Jonathan B Baker, 'Overlapping Financial Investor Ownership, Market Power, and Antitrust Enforcement: My Qualified Agreement with Professor Elhauge' (2016) 129 Harvard Law Review Forum 212, 227–231 (noting however that within-industry diversification benefits to financial investors holding shares in competitors are limited because industry profits and equity values are highly positively correlated; besides, if common ownership lessens competition this increases the positive correlation and further lessens the diversification benefits).

[60] Azar and Tzanaki (n 8) 40–41; Patel (n 7) 56.

[61] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5) 204 ('competition enforcement is "market-specific" in that only efficiency gains within the same relevant market [and for the same group of consumers] may offset potential anticompetitive unilateral effects [consumer harm] found in that market').

[62] López and Vives (n 13); Miguel Anton and others, 'Innovation: The Bright Side of Common Ownership?' [2018] IESE Working Paper <https://papers.ssrn.com/abstract=3099578> accessed 3 February 2018; Eldar, Grennan and Waldock (n 55); Juanita González-Uribe, 'Exchanges of Innovation Resources inside Venture Capital Portfolios' (2020) 135 Journal of Financial Economics 144; Gibbon and Schain (n 13).

[63] Paul Borochin, Jie Yang and Rongrong Zhang, 'The Effect of Institutional Ownership Types on Innovation and Competition' [2018] Working Paper <https://papers.ssrn.com/abstract=3204767> accessed 20 August 2018.

[64] López and Vives (n 13).

analysis of the innovation, as with the competition, effects of common ownership needs to be case specific.

The rationale for bringing about these welfare enhancing effects is of the same logic as that underlying unilateral and coordinated theories of harm: (i) common owners are interested in maximizing their total portfolio profits and in doing so, they will induce corporate managers to internalize *positive* externalities among their portfolio firms,[65] or (ii) common owners may have the incentives and ability to induce *beneficial* coordination and facilitate information flows among their portfolio firms.[66] In the case of venture capital investors, "active" mechanisms due to strong control rights and board representation across rival commonly held firms may provide a more straightforward and observable means of effectuating such effects.[67] Furthermore, it is suggested that common ownership in private markets may counterbalance any short-term anticompetitive effects of common ownership among public firms as the former may encourage entrepreneurial activity and entry of innovative, high-growth startups into dormant industries and thus disrupt larger firms that may be commonly owned and have limited incentives to compete.[68]

More generally, common ownership may mitigate firms' disincentives to innovate and invest in cost-reducing R&D by solving the technological spillover problem among portfolio firms.[69] Moreover, common institutional ownership may improve innovation productivity as well as rationalise and minimise wasteful duplicative efforts.[70] Common institutional owners may also increase innovation incentives by attenuating career risks of corporate managers.[71] Besides, they may be able to play a more active monitoring role and act as a market-based mechanism to internalise governance externalities among the commonly held firms.[72] In addition, common investors may have a knowledge-sharing role that enables them to transfer knowhow from one firm to benefit another firm.[73] As such, common institutional investors, even passive ones, are found to help facilitate the diffusion of information about new technologies between commonly held firms leading to innovation.[74]

Similar beneficial effects are for the most part evidenced when startups share a common venture capital investor. Common VC ownership reduces duplication of R&D costs (which can help solve a market failure in patent races for example), it leads VCs to shut down lagging product development projects, withhold funding from lagging startups, and redirect those startups' innovation. All this leads to improving innovation efficiency.[75] Besides, common VCs

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[65] ibid; Vives (n 13).

[66] Jie (Jack) He and Jiekun Huang, 'Product Market Competition in a World of Cross-Ownership: Evidence from Institutional Blockholdings' (2017) 30 The Review of Financial Studies 2674.

[67] Ofer Eldar and Jillian Grennan, 'Common Ownership and Entrepreneurship' [2021] Duke Law School Public Law & Legal Theory Series No. 2021-25 3.

[68] Eldar and Grennan (n 67).

[69] López and Vives (n 13).

[70] He and Huang (n 66).

[71] Philippe Aghion, John Van Reenen and Luigi Zingales, 'Innovation and Institutional Ownership' (2013) 103 American Economic Review 277.

[72] Jie (Jack) He, Jiekun Huang and Shan Zhao, 'Internalizing Governance Externalities: The Role of Institutional Cross-Ownership' (2019) 134 Journal of Financial Economics 400.

[73] Kaijuan Gao and others, 'The Power of Sharing: Evidence from Institutional Investor Cross-Ownership and Corporate Innovation' (2019) 63 International Review of Economics & Finance 284.

[74] Leonard Kostovetsky and Alberto Manconi, 'Common Institutional Ownership and Diffusion of Innovation' [2020] Working Paper <https://papers.ssrn.com/abstract=2896372>.

[75] Xuelin Li, Tong Liu and Lucian A Taylor, 'Common Ownership and Innovation Efficiency' [2021] Jacobs Levy Equity Management Center for Quantitative Financial Research Paper.

and VC directors serving on other startup boards are shown to facilitate and spur startup growth for a number of reasons.[76] Commonly held startups benefit by raising more capital through more investment rounds, or through the sharing of valuable information and the efficient allocation of opportunities among startups due to accumulated expertise.[77] In addition, they are less likely to fail and exit more successfully through IPOs or acquisitions by another commonly held startup.[78]

As a result, the procompetitive effects of common ownership will have to be taken into account and weighted against any anticompetitive effects by competition agencies.[79]

B. Common ownership weights

In this section we provide an empirical estimation of the likely impact of common ownership in fintech markets in light of its observed levels in different countries and product markets. First, we explain the theory and assumptions underlying the estimation process as well as present the formula for the calculation of the common owners' weights or "lambdas".[80] Next, we provide empirical evidence on country-level common ownership lambdas in the largest fintech markets, taken as a whole and broken down by narrower product market segments.

Starting with the estimation process employed, we estimate investors' ownership share in a given company based on our Company-Funding Round-Investors dataset described in section II.A. Our main measure of an investor's ownership share is a weighted average of her investment shares across all financing rounds:

$$Ownership\ Share_{i,j} = \sum_{n=1}^{N} w_{j,n} \frac{Investment_{i,j,n}}{Total\ Investment_{j,n}}$$

Here, $Ownership\ Share_{i,j}$ is the estimated ownership percentage of investor i in company j; $Investment_{i,j,n}$ is the amount Investor i contributed in round n raised by company j; $Total\ Investment_{i,j,n}$ is the total capital company j raised in round n from all participating investors; N is the total number of rounds raised by company j. Weights $w_{j,n}$ are the company's average equity percentage sold in round n, adjusted for its dilution in future rounds that occurs due to issuing new shares when new rounds of financing are raised.

Estimation of ownership shares in fintech companies is not straightforward because companies in our sample are privately owned and thus not obliged to disclose all details of their financing process. This prompts us to make several assumptions in the estimation of the ownership shares. In our data, the exact amount of capital contributed by a specific investor in each round, $Investment_{i,j,n}$, is not always known. Databases on venture capital financing often report information on the total size of a financing round, $Total\ Investment_{j,n}$, but not on how much each investor contributed to that round. Therefore, our estimation is based on the assumption that *all investors contribute equal dollar amounts within the same investment round (Assumption 1).* Second, our data does not allow us to observe how much of its equity the company sells in each round. So, we approximate equity shares sold in each round, $w_{j,n}$, based on venture capital industry

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[76] Eldar, Grennan and Waldock (n 55); Eldar and Grennan (n 67).
[77] Eldar, Grennan and Waldock (n 55).
[78] ibid.
[79] Schmalz (n 7) 22.
[80] See n 28 above.

benchmarks: we assume that *the company sells 10% of its equity in a pre-seed round, 25% in the seed and in the Series A rounds, 20% in Series B and C, and 15% in each of the remaining rounds (Assumption 2).* In this, we account for the fact that each following investment round dilutes previous investors' ownership. In practice, equity shares sold in each round may vary depending on the required investment amount, bargaining power of participating investors, and implied company valuation. However, our conclusions are not sensitive to decreasing or increasing all or some of the used approximate equity shares by several percentage points as the estimated measures of common ownership concentration change only marginally as a result of such modifications. This is because the impact of the actual shares on the lambda calculation is less material than there being a common owner or not. We further assume that *all unsold equity belongs to the founder who does not have significant holdings in other fintech firms (Assumption 3).* To check the sensitivity of our results to using different methods of ownership estimation, we also measure the *Ownership Share* as a percentage of an investor's dollar investment in the firm relative to the total capital raised by the firm. This method may underestimate the importance of early investors and overweight the ownership share of late investors since the latter usually contribute substantially larger amounts. Nevertheless, even using this method of estimating ownership shares, the results do not change significantly (not tabulated).

The formula used to calculate the weight that firm j puts on the profits of firm k due to common ownership, the "lambda", is as follows:

$$\lambda_{jk} = \frac{\sum_{i \in I} \gamma_{ij} \beta_{ik}}{\sum_{i \in I} \gamma_{ij} \beta_{ij}},$$

where γ_{ij} is the control share of shareholder i in firm j, and β_{ij} is the ownership share of shareholder i in firm j, and I denotes the set of shareholders of firm j. This formula obtains whenever the objective function of the firm is to maximize a weighted average of shareholder profits, with the control shares γ_{ij} as weights. This objective function was used by O'Brien and Salop (2000) and can be microfounded as the equilibrium outcome of model of shareholder voting as in Azar (2012).[81] Firm j's objective is then to maximize

$$\sum_{i \in I} \gamma_{ij} \sum_{k=1}^{J} \beta_{ik} \pi_k.$$

As shown in Azar (2012, chapter 7), this is equivalent to maximizing

$$\pi_j + \sum_{k \neq j} \lambda_{jk} \pi_k,$$

where λ_{jk} has the formula above.

Based on this formula for the estimation of firm-level lambdas, we estimate average lambdas at the country level, as a simple average and as a weighted average, where we use each fintech company's sales estimate as weights. Table 5 below presents the estimated country-level common ownership lambdas in the largest fintech markets. Only countries with at least 30 fintech firms with available ownership data are included in the table.

Table 5 presents lambda estimates following two scenarios: i) a baseline scenario using the assumptions described above ("lower-limit estimates); and ii) a scenario outlined below that is used as a robustness check for comparison ("upper-limit estimates"). In our baseline lambdas

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[81] O'Brien and Salop (n 20); José Azar, 'A New Look at Oligopoly: Implicit Collusion Through Portfolio Diversification' (PhD Dissertation, Princeton University 2012).

estimation, we assumed that the founder controls the remaining equity not sold to the investors. In our sample, on average, a fintech company is estimated to sell 33% of equity to external investors (older companies with more financing rounds sell more while younger companies with fewer financing rounds sell less), thus the company's founder is assumed to control the remaining 67%, on average. Note, that company founders are assumed not to have holdings in other fintech companies as we cannot observe their actual shareholdings in other private firms. Considering these assumptions, lambdas estimated with this method can be interpreted as a likely lower bound of the actual lambdas. Therefore, to make sure we do not undervalue the actual concentration in the markets due to common ownership, we proceed to estimate an upper bound for the countries' lambdas. We assume that equity not issued to investors recorded in the database is dispersed and none of the unrecorded owners (e.g., founders and employees that typically hold shares in the startup) has significant control. Hence, we assume that the investors hold all control over the company proportionally to their estimated ownership shares. This assumption allows us to estimate a likely upper limit for lambdas and as such we use it for comparison to illustrate that common ownership overlaps are still likely to produce some but significantly lesser effects than in public markets.

We also considered a scenario in which there is not only one but several founders (all founders of a fintech company listed in the Crunchbase database) hold equal proportions of the equity not sold to external investors. This scenario therefore assumes the existence of several non-common shareholders with control besides external institutional, and potentially common, investors. Under this assumption, we obtain lambda estimates that are slightly higher than in the baseline, lower-limit, scenario, but significantly lower than under the upper-limit scenario. We do not separately tabulate these results, but they present intermediate scenarios of ownership allocation that fit the suggested range of estimated lambdas, lower and upper limits, shown below.

Table 5. Lambdas by Country

Country	N companies	Lower-limit estimates		Upper-limit estimates	
		Simple average	Weighted by revenue	Simple average	Weighted by revenue
Europe					
United Kingdom	764	0.0007	0.0008	0.0089	0.0055
Germany	194	0.0014	0.0025	0.0103	0.0067
France	136	0.0015	0.0022	0.0114	0.0087
Spain	112	0.0010	0.0012	0.0164	0.0219
Switzerland	90	0.0003	0.0002	0.0050	0.0042
Sweden	63	0.0032	0.0039	0.0199	0.0112
Italy	53	0.0014	0.0012	0.0198	0.0149
The Netherlands	52	0.0022	0.0009	0.0155	0.0039
Ireland	46	0.0125	0.0172	0.1477	0.0815
Estonia	40	0.0008	0.0004	0.0473	0.0103
Denmark	31	0.0089	0.0234	0.0819	0.0842
Americas					
United States	2,375	0.0005	0.0015	0.0054	0.0045
Canada	215	0.0005	0.0010	0.0102	0.0096

Brazil	191	0.0016	0.0035	0.0179	0.0216
Mexico	108	0.0025	0.0048	0.0305	0.0231
Colombia	48	0.0009	0.0002	0.0122	0.0007
Chile	38	0.0040	0.0021	0.0504	0.0162
Argentina	37	0.0018	0.0014	0.0206	0.0108
Asia					
China	391	0.0006	0.0009	0.0043	0.0036
India	380	0.0009	0.0055	0.0081	0.0102
Singapore	209	0.0006	0.0010	0.0067	0.0093
Indonesia	69	0.0038	0.0029	0.0333	0.0149
Japan	50	0.0061	0.0122	0.0305	0.0243
South Korea	42	0.0032	0.0127	0.0160	0.0224
Australia	119	0.0009	0.0005	0.0071	0.0152
Middle East					
Israel	92	0.0012	0.0010	0.0201	0.0072
United Arab Emirates	52	0.0006	0.0008	0.0100	0.0214
Turkey	35	0.0015	0.0013	0.0217	0.0112
Africa					
South Africa	56	0.0006	0.0004	0.0049	0.0020
Nigeria	53	0.0014	0.0010	0.0285	0.0139
Kenya	34	0.0004	0.0013	0.0086	0.0075

As it may be seen in this table, the highest lambdas under our baseline scenario are observed in the countries with the largest levels of common ownership as reported in section II above (e.g., Ireland, Denmark, South Korea). That is, those markets that are the most concentrated and smaller in size in our sample. However, when measured against the benchmark common ownership weights in publicly traded firms estimated at the level of 0.72 in 2017, these country-level lambdas are overall relatively small.[82] This suggests that the average effect of common ownership in private markets across countries is rather limited or negligible by comparison to public markets.

Comparing the different lambdas' estimations shown in Table 5, it can further be observed that the magnitude of lambdas in the scenario representing the upper limit of the lambda estimates is found to be from 2 to about 10 times higher than in the baseline scenario representing the lower bound. Nonetheless, the lambdas' magnitude is still low compared to average lambdas observed in public markets. The highest weighted average lambda estimates are again in Ireland and Denmark where they equal 0.08. At the same time, even under this scenario the United Kingdom has a lambda of 0.006, the United States 0.005, Sweden 0.011. Therefore, we can safely conclude that even if we assume that fintech companies' founders do not hold control and control is

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[82] José Azar and Xavier Vives, 'General Equilibrium Oligopoly and Ownership Structure' (2021) 89 Econometrica 999.

distributed among institutional investors, most of the analyzed markets have low common ownership concentration.

Table 6 then reports the estimated country-level common ownership lambdas by specific fintech market segment in the selected countries under the baseline scenario. These lambdas are weighted averages, where weights are the companies' sales. Lambdas are estimated only for product markets with at least 10 fintech companies.

Table 6: Lambdas by Product Market and Country – Lower-limit Estimates

| Country | Overall country lambda | Product market | | | | |
		Loans	Payments	Asset management	Insurance	Blockchain
Europe						
United Kingdom	0.0008	0.0013	0.0014	0.0002	0.0019	0.0004
Germany	0.0025	0.0029	0.0037	0.0006	0.0011	0.0008
France	0.0022	0.0053	0.0033	0.0015	0.0041	0.0004
Spain	0.0012	0.0012	0.0009	0.0016	0.0025	0.0001
Switzerland	0.0002	0.0001	0.0001	0.0001	-	0.0001
Sweden	0.0039	0.0067	0.0059	0.0073	-	
Italy	0.0012	0.0007	0.0013	0.0046	0.0001	-
The Netherlands	0.0009	0.0003	0.0007	-	-	-
Ireland	0.0172	0.0388	0.0328	-	-	-
Estonia	0.0004	0.0008	0.0005	-	-	0.0005
Denmark	0.0234	-	0.0116	-	-	-
Americas						
United States	0.0015	0.0009	0.0016	0.0023	0.0009	0.0028
Canada	0.0010	0.0019	0.0014	0.0003	0.0001	0.0003
Brazil	0.0035	0.0095	0.0101	0.0102	0.0013	0.0002
Mexico	0.0048	0.0077	0.0078	0.0049	0.0002	-
Colombia	0.0002	0.0000	0.0002	-	-	-
Chile	0.0021	-	0.0026	0.0030	-	-
Argentina	0.0014	0.0013	0.0000	-	-	-
Asia						
China	0.0009	0.0018	0.0017	0.0021	0.0013	0.0002
India	0.0055	0.0064	0.0030	0.0027	0.0004	0.0012
Singapore	0.0010	0.0028	0.0007	0.0044	0.0013	0.0006
Indonesia	0.0029	0.0016	0.0024	0.0015	-	-
Japan	0.0122	0.0110	0.0136	0.0151	-	0.0041
South Korea	0.0127	0.0837	0.0476	0.0025	-	0.0211
Australia	0.0005	0.0006	0.0015	0.0023	-	0.0020
Middle East						

Israel	0.0010	0.0019	0.0013	0.0005	0.0119	0.0003
United Arab Emirates	0.0008	0.0006	0.0008	0.0019	0.0020	-
Turkey	0.0013	0.0038	0.0019	-	-	-
Africa						
South Africa	0.0004	0.0000	0.0003	-	0.0001	-
Nigeria	0.0010	0.0007	0.0013	-	-	-
Kenya	0.0013	0.0003	0.0002	-	-	-

Table 6 confirms the earlier findings and conclusions drawn from Table 5. That is, the estimated lambdas are generally small in absolute terms also when fintech markets are looked at more narrowly by specific product market segment. A notable exception where relatively higher lambdas are observed in specific fintech markets are in Loans and Payments in Ireland and South Korea for example. Yet again, when compared to similar common ownership weights in public firms, these numbers are rather miniscule. Thus, also at the narrower product market level, the estimated likely effects from common ownership in fintech startups and private firms is rather small.

Table 7 follows the same structure as Table 6 but instead of lower -limit estimates it presents upper-limit estimates. This again shows that the assumption of a lack of control by company founders results in significantly higher estimates than in the baseline scenario. However, the majority of country-product markets illustrated in the Table 7 still have low common ownership concentration. The exceptions as previously are Ireland, Denmark, and South Korea, which have higher ownership concentration on loans and payments markets, and to some extent in the blockchain market. Besides, a somewhat higher concentration under this scenario generating the upper limit of lambdas also can be observed: i) in the asset management fintech markets in Spain, Sweden, Italy, and Japan; ii) in the insurtech market in Israel; and iii) the blockchain market in South Korea. Overall, as before, the concentration is typically higher in product markets with fewer players.

Table 7: Lambdas by Product Market and Country – Upper-limit Estimates

Country	Overall country lambda	Product market				
		Loans	Payments	Asset management	Insurance	Blockchain
Europe						
United Kingdom	0.0055	0.0088	0.0098	0.0026	0.0092	0.0044
Germany	0.0067	0.0069	0.0079	0.0026	0.0093	0.0124
France	0.0087	0.0131	0.0136	0.0133	0.0227	0.0035
Spain	0.0219	0.0257	0.0097	0.0643	0.0114	0.0004
Switzerland	0.0042	0.0006	0.0027	0.0011	-	0.0005
Sweden	0.0112	0.0152	0.0120	0.0629	-	-
Italy	0.0149	0.0033	0.0102	0.0453	0.0012	-
The Netherlands	0.0039	0.0022	0.0036	-	-	-
Ireland	0.0815	0.1220	0.0946	-	-	-
Estonia	0.0103	0.0240	0.0348	-	-	0.0045
Denmark	0.0842	-	0.0532	-	-	

Americas

United States	0.0045	0.0039	0.0046	0.0046	0.0047	0.0058
Canada	0.0096	0.0110	0.0149	0.0041	0.0005	0.0097
Brazil	0.0216	0.0211	0.0196	0.0378	0.0095	0.0064
Mexico	0.0231	0.0270	0.0304	0.0377	0.0029	-
Colombia	0.0007	0.0001	0.0006	-	-	-
Chile	0.0162	-	0.0213	0.0298	-	-
Argentina	0.0108	0.0052	0.0002	-	-	-

Asia

China	0.0036	0.0066	0.0058	0.0052	0.0060	0.0007
India	0.0102	0.0116	0.0074	0.0085	0.0020	0.0077
Singapore	0.0093	0.0206	0.0054	0.0135	0.0057	0.0143
Indonesia	0.0149	0.0088	0.0119	0.0108	-	-
Japan	0.0243	0.0206	0.0252	0.0514	-	0.0187
South Korea	0.0224	0.1201	0.0705	0.0044	-	0.0419

Australia | 0.0152 | 0.0029 | 0.0057 | 0.0179 | - | 0.0906 |

Middle East

Israel	0.0072	0.0110	0.0095	0.0051	0.0613	0.0079
United Arab Emirates	0.0214	0.0022	0.0057	0.0226	-	-
Turkey	0.0112	0.0393	0.0112	-	-	-

Africa

South Africa	0.0020	0.0002	0.0011	-	0.0005	-
Nigeria	0.0139	0.0082	0.0150	-	-	-
Kenya	0.0075	0.0035	0.0020	-	-	-

C. M&A and cross-ownership of fintech by common owners

In this section we present data on M&A activity in fintech markets among common investors. More specifically, we provide empirical evidence on full acquisitions of fintech companies as well as minority investments in several rival fintech companies by the same common investor(s). Our data also illustrates in which of those full or minority acquisitions, the target(s) were a direct competitor to the common investor(s) prior to the acquisition. Subsequently, the likely motivations for such acquisitions and the implications as well as the interplay of common ownership and cross-ownership are briefly discussed.

Table 8 below presents the top-20 acquirers of fintech firms globally. The table reports the acquirer's name, the number of fully acquired fintech companies, the number of those fully acquired fintech companies that operated in a similar product market as the acquirer, the number of fintech companies in which the acquirer has minority ownership, the number of those fintech companies in which the acquirer has minority ownership that operated in a similar product market as the acquirer.

Table 8. Top Acquirers of Fintech Companies – Full M&A and Minority Investments in Fintech

Company name	Full acquisitions	Of which are competitors	Minority stake acquisitions	Of which are competitors
PayPal	7	6	35	18
Coinbase	6	6	69	63
SoFi	5	5	2	2
Visa	5	5	41	37
JP Morgan	5	4	49	29
Goldman Sachs	4	4	76	54
Nasdaq	4	2	1	0
Zip	4	4	3	3
Stripe	4	4	13	12
PayU	4	3	6	5
Mastercard	4	4	53	43
Kraken	4	4	4	4
Q2ebanking	4	4	0	0
Intercontinental Exchange	3	1	2	0
Envestnet	3	1	1	1
FTX Exchange	3	3	4	2
FIS	3	3	14	11
Nubank	3	3	0	0
Klarna	2	2	2	1
American Express	2	2	42	29

As it may be seen in this table, such acquisitions by common investors are not rare. In comparison, minority investment transactions are significantly more common than full acquisitions of fintech companies. Also, the great majority of the observed either full or minority acquisitions by common investors are transactions in which the acquirer is a competitor with the target (i.e., there is cross-ownership). This may more plausibly be expected for instance in the case of corporate VC investors. As an illustration, PayPal pursued 7 full acquisitions of fintech startups in 6 of which it was considered a competitor to the target. Visa pursued 5 full acquisitions in all 5 of which it was considered to compete in the same product market as the target. On the other hand, PayPal has completed 35 minority stake acquisitions in 18 of which it was a competitor to the target. Visa undertook 41 minority stake acquisitions in 37 of which it was a competitor to the target.

Table 9 presents only those of the top global acquirers of fintech firms shown above that engage in full acquisitions while already having minority ownership and partial cross-ownership in the target at the same time. The table reports the acquirer's name, the number of fully acquired fintech companies in which the acquirer had minority ownership prior to the acquisition, and the number of those fully acquired fintech companies in which the acquirer had a pre-existing minority stake *and* which operated in a similar product market as the acquirer. Companies listed in Table 7 that engage in none (zero) of these acquisitions are dropped from the table below.

Table 9. Top Acquirers of Fintech Companies – Full M&A *Given* Prior Minority Investments in Fintech and Cross-ownership

Company name	Full acquisitions in which acquirer had minority ownership	Of which are competitors
PayPal	1	1
Visa	3	3
Zip	2	2
Stripe	1	1
PayU	1	0
American Express	1	1

These transactions seem to take place remarkably more rarely. As such, their effect when they do occur is unlikely to be so egregious. That said, given the rarity and relative obscurity surrounding their occurrence, these transactions may be hard to track and scrutinise. This in turn suggests that they should be more closely monitored. Besides the motivations behind common ownership transactions outlined in section III.A above (i.e., market power or efficiencies), full mergers taking place against the backdrop of common or cross-ownership may be driven by additional anti- or procompetitive motives. For instance, the presence of cross- or common ownership may justify seemingly value reducing mergers for the acquiring firm, which may nonetheless be rational and efficient from the perspective of the acquirer's diversified common shareholders.[83] The latter may have parallel ownership stakes in the target and non-merging rival firms, whose gains from the acquisition may outweigh any losses incurred by the acquirer.[84] In addition, in a Cournot industry with asymmetric firms, where for instance 9 of the competing firms are equally efficient and commonly owned while the 10th firm is separately owned and either more or less efficient than the others, then a merger between the separately owned firm and the firms under common ownership may be "may be driven by some efficiency benefits relating to the "shifting" of industry output towards more efficient firms".[85] That is, it may be motivated by "rationalization of production" efficiencies ("killer" merger) or by a motive to scale down or close their own less efficient operations ("suicidal" merger) depending on whether the separately owned firm is less or more efficient respectively.[86]

Besides, acquisitions of startups by incumbent rivals may be driven by a "killer acquisitions" motive. That is, a dominant firm may acquire innovative targets to preempt future

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[83] Azar and Tzanaki (n 8) 2, 9–10, 14.

[84] Gregor Matvos and Michael Ostrovsky, 'Cross-Ownership, Returns, and Voting in Mergers' (2008) 89 Journal of Financial Economics 391; Miguel Antón and others, 'Beyond the Target: M&A Decisions and Rival Ownership' (2022) 144 Journal of Financial Economics 44; cf Jarrad Harford, Dirk Jenter and Kai Li, 'Institutional Cross-Holdings and Their Effect on Acquisition Decisions' (2011) 99 Journal of Financial Economics 27. Although Harford et al. suggest that any stake in the target may not necessarily suffice to compensate the acquirer's shareholders for losses on the acquirer side, as Matvos and Ostrovsky purport, Antón et al. show that parallel stakes in non-merging rivals may more than offset any losses of the acquirer and as a result may well rationalise such transactions from the perspective of the diversified common shareholders.

[85] Azar and Tzanaki (n 8) 14.

[86] ibid.

competition from nascent or potential competitors and protect its market power.[87] Similarly, startup acquisitions may be justified as "reverse killer acquisitions" in that the incumbent firm buys the innovative firm with the aim to discontinue its own related innovation efforts or projects.[88] On the other hand, acquisitions of high tech startup firms may be "acqui-hires" or "talent acquisitions" to get access to top rate human capital.[89] Additionally, they may be a means for established companies to nurture startup growth and competition for innovative product development with the aim to eventually acquire the best of them (i.e., the winner of the innovation race), essentially outsourcing early R&D activity rather than pursuing it organically.[90] This may also be a way for experienced firms to partner with and mentor startups to facilitate new market entry, manage "disruptive" innovation and help them navigate complex regulatory processes.[91] Furthermore, information synergies or industry and investor expertise may explain the interest of common investors and potential rivals in full or partial acquisitions of fintech.[92]

From the data at hand, it is difficult to conclude what the precise motivations or effects behind such transactions. Yet, the fact that they occasionally occur and when they do, they may have potential unintended or underappreciated consequences for the companies involved, whose interests may not fully align with those of their minority or common investors, warrants caution and close scrutiny on the part of antitrust agencies. For instance, while startups may be funded by incumbents that seek to control the process of competition or innovation, with the aim to expand or kill it, it is less clear seen in the abstract whether this is bad for competition. This is a possibility if for example an established company like Visa can identify *ex ante* who may be a potential rival, yet it is hard to reach any firm conclusion from this alone absent any concrete context.

So far, our analysis has concentrated on privately held fintech firms since they represent the overwhelming majority of the market by number. In our data, we have almost 6.8 thousand privately held fintech companies, while only 340 firms that went public via an IPO worldwide. However, to enrich the analysis and make it more complete we compare common ownership in private and public markets. Therefore, we supplement our preceding analysis by estimating common ownership concentration among nearly 80 fintech companies in the United States, the largest fintech market by fintech IPOs. Here we only include companies that went public since 2000, are still active, and have ownership data in Capital IQ.

Table 10 below shows two examples of the top-5 owners in publicly listed fintech companies from our sample. Panel A shows the ownership structure of Robinhood Markets, Inc. that went public in July 2021 and as of September 2022 it has a market capitalization of nearly $8 billion. We can see that among its top-5 owners, there are two founders of the company as

[87] Colleen Cunningham, Florian Ederer and Song Ma, 'Killer Acquisitions' (2021) 129 Journal of Political Economy 649.

[88] Cristina Caffarra, Gregory Crawford and Tommaso Valletti, '"How Tech Rolls": Potential Competition and "Reverse" Killer Acquisitions' (*VoxEU Blog*, 11 May 2020).

[89] John Coyle and Gregg Polsky, 'Acqui-Hiring' (2013) 63 Duke Law Journal 281.

[90] Matthew J Higgins and Daniel Rodriguez, 'The Outsourcing of R&D through Acquisitions in the Pharmaceutical Industry' (2006) 80 Journal of Financial Economics 351.

[91] Luca Enriques and Wolf-Georg Ringe, 'Bank–Fintech Partnerships, Outsourcing Arrangements and the Case for a Mentorship Regime' (2020) 15 Capital Markets Law Journal 374.

[92] David Benson and Rosemarie H Ziedonis, 'Corporate Venture Capital as a Window on New Technologies: Implications for the Performance of Corporate Investors When Acquiring Startups' (2009) 20 Organization Science 329.

well as two venture capital funds (Index Ventures SA and DST Global), and an angel investor fund (Emergent Fidelity Technologies Ltd.). In contrast, PayPal shown in Panel B is owned by large asset management firms. The company went public in 2015 and has a market capitalization around $100 billion. From this comparison, we can observe that even in young publicly listed firms the presence of large asset management firms is limited. However, as a fintech company grows in age and size, the presence of large asset management companies substantially increases. Therefore, based on these examples we can highlight the differences in shareholder structure between newly listed and mature public fintech companies and thus illustrate the evolution of common ownership concentration with the fintech company's life cycle.

Table 10: Top Shareholders in a Newly Listed and a Mature Public Fintech Company

Panel A: Robinhood Markets, Inc. (IPO year 2021)

Shareholder Name	% Ownership
Bhatt, Baiju Prafulkumar (Co-Founder, Chief Creative Officer & Director)	8.83
Index Ventures SA	8.68
DST Global	6.60
Emergent Fidelity Technologies Ltd.	6.39
Tenev, Vladimir (Co-Founder, President, CEO & Chairman of the Board)	6.02

Panel B: PayPal Holdings, Inc. (IPO year 2015 (first time in 2002))

Shareholder Name	% Ownership
The Vanguard Group, Inc.	8.20
BlackRock, Inc.	6.59
State Street Global Advisors, Inc.	3.81
Comprehensive Financial Management LLC	2.75
Geode Capital Management, LLC	1.75

If we look across all shareholders of publicly listed fintech companies in our sample that have ownership in at least 10 companies, Vanguard will be the top owner in terms of average ownership share it holds (5.36). Blackrock occupies the third position and State Street Global Advisors the nineth (with 3.94 and 1.37 average ownership shares respectively). Here, we observe ownership patterns similar to those found in other public markets, with large asset management firms being among the largest common owners of publicly listed firms. A comparison can thus be made between private and public fintech markets based on these findings and our earlier analysis. While private fintech markets do not appear to exhibit extensive common ownership, this is nearly as prevalent among publicly listed fintech companies as among other mature public companies in other industries analyzed in the literature.

Table 11: Largest Common Owners in Public Fintech Companies

Shareholder Name	Number of fintech companies with minority ownership	Average Ownership Share
Vanguard	54	5.36

Temasek Holdings (Private) Limited	10	4.33
Blackrock	63	3.94
Capital Research and Management Company	16	3.52
Massachusetts Financial Services Company	14	2.23
T. Rowe Price Group, Inc. (NasdaqGS:TROW)	40	1.97
Wellington Management Group LLP	27	1.76
Fred Alger Management, LLC	12	1.50
State Street Global Advisors, Inc.	55	1.37
Dimensional Fund Advisors LP	32	0.96

Finally, we contrast the estimated lambdas in the private and public fintech markets in the United States. The estimate of the common ownership lambda for the US public fintech companies weighted by the companies' market capitalization varies in the range of 0.23 and 0.34. The lower-limit estimate is based on the sample of all 77 firms about which we obtained information from Capital IQ. At the same time, the upper bound is estimated only by including 48 sampled companies that publicly disclose at least 70% of their ownership structure. Under both scenarios, the lambda estimates for US public fintech companies are significantly higher than the ones we observe for private fintech markets, even such concentrated markets such as Ireland or Denmark. These findings suggest that public markets have a significantly higher number of common owners among a large number of companies.

IV. IMPLICATIONS FOR COMPETITION LAW ENFORCEMENT

What implications can be drawn from the above findings and discussion for competition law enforcement? The foregoing theoretical and the empirical analysis offers rich and interesting insights. Most notably, common ownership in fintech companies presents distinct issues and concerns during different stages of the life cycles of such firms, i.e., at the initial startup stage when they are still private or later when they succeed and go public.

First, the documented degree of common ownership found among fintech startups and private firms is rather small. Also, the estimated impact of common ownership in private fintech markets seems limited. Thus, the empirical account portrayed here suggests there is little cause for concern over common shareholdings in private firms and markets. This conclusion is supported by further theoretical reasons. On the one hand, the complexity of the capital and governance structure of startups may upset the control dynamics between investors and founders and weaken monitoring oversight within such firms.[93] This means that even though there might exist overlapping investors with common shareholdings in rival fintechs, these investors may not always have an interest in contracting for or exercising strong control rights over their commonly held firms. As such, founders may be able to retain control longer while their startups remain private for instance due to financing received by alternative venture capital investors (e.g., corporate VC)[94] or due to the adoption of special governance structures such as dual class

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[93] Elizabeth Pollman, 'Startup Governance' (2019) 168 University of Pennsylvania Law Review 155; Anat Alon-Beck, 'Alternative Venture Capital: The New Unicorn Investors' [2020] Case Legal Studies Research Paper No. 2020-26.
[94] Alon-Beck (n 93).

shares.[95] Such arrangements that put insiders focused on specific firm value and performance in charge of directing the firms rather than managers that attend to portfolio-minded common diversified shareholders, may thus mitigate any pro- or anticompetitive effects of common ownership.[96] On the flip side, when common investors of fintech startups do have and exercise control (e.g., especially VC investors), the control mechanism ("active" and concentrated) for them to produce competition effects and its basis (contractual rather than based on "residual claim" status of shareholders-principals mandated by corporate law) may be more easily observable and thus more easily tractable and enforceable by antitrust agencies within established frameworks.[97]

By contrast, common ownership in public firms and fintech markets seems more extensive and potentially more worrisome. Once fintech firms mature and successfully go public, common ownership obtains different qualities and characteristics that require discrete and tailored assessment. Public firm governance allows for more transparency and accountability as subject to tighter regulation.[98] Common investors, even if "passive" institutional investors with diffuse diversified shareholdings in rivals, may be able under certain conditions (e.g., size and distribution of other shareholders) to implement their anticompetitive incentives.[99] This is so notwithstanding the existence of managerial agency costs in large public corporations or legal constraints such as corporate law fiduciary duties which need not be violated in cases where non-diversified shareholders also come to gain from the anticompetitive outcomes common ownership produces.[100] Most importantly, however, the common ownership patterns observed in public fintech firms resemble, both empirically and analytically, those found in other public markets (e.g., airlines, banks) in that the largest fintech firms once they succeed and go public they are incorporated into common ownership networks (e.g., of index fund portfolios). In these instances, as suggested elsewhere, competition policy and enforcement need to intelligently develop to effectively address the novel "diffuse" common shareholding phenomenon.[101]

Furthermore, based on the preceding exposition, antitrust risks from common ownership in fintech markets arise not only when fintech firms become public (e.g., after a successful IPO) but also when they are acquired through M&A. Both full acquisitions and minority investments in fintech need to be monitored by antitrust enforcers as they interact with common and cross-ownership. This is because these investments bring about an additional layers of competition risks and concerns that may be underappreciated if the M&A regulatory assessment completely abstracts from and disregards the surrounding context where pre-existing common or cross-shareholding are observed.[102]

All in all, the level of common ownership in fintech markets is varying and its effects are mixed. While likely more limited and *ad hoc* a phenomenon in fintech startups where any harm potential is likely small and isolated, competition concerns may become more real and significant in public firms or in smaller product or national markets where common ownership networks appear denser and more concentrated. Overall, these results advocate for a careful,

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[95] Vittoria Battocletti, Luca Enriques and Alessandro Romano, 'Dual Class Shares in the Age of Common Ownership' [2022] European Corporate Governance Institute - Law Working Paper No. 628.
[96] ibid; Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5).
[97] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5).
[98] Alon-Beck (n 93).
[99] Tzanaki, 'Varieties and Mechanisms of Common Ownership' (n 5).
[100] ibid.
[101] ibid.
[102] See section III.C above.

case-specific analysis of common ownership among fintech firms against the proper analytical frame and empirical context as outlined in this article. In this connection, the type of firms, investors and markets as well as the quality of available data (on financing, ownership, governance and M&A deal structures) are critical parameters for a well-informed assessment of common ownership cases by antitrust agencies. Such case-by-case, empirically informed approach will naturally add complexity to the competition analysis, yet in the alternative competition policy risks being not only obsolete but seriously misguided. Importantly, this is a valid lesson for competition policymakers not merely in cases relating to common ownership in the narrow sense but also as regards M&A transactions more broadly and thus merger control enforcement.[103]

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[103] Azar and Tzanaki (n 8).

Appendix

Table A1: Number of Fintech Companies and Amounts Invested in Them by Country

HQ Country	Number of Fintech Companies	Total Amount Invested ($ million)
United States	2,375	99,132.40
United Kingdom	764	29,385.47
China	391	45,260.62
India	380	17,540.11
Canada	215	5,096.46
Singapore	209	3,320.61
Germany	194	9,109.49
Brazil	191	8,482.16
France	136	3,467.38
Australia	119	2,352.54
Spain	112	519.46
Mexico	108	2,217.32
Israel	92	1,908.93
Switzerland	90	941.19
Indonesia	69	5,215.28
Sweden	63	4,541.40
South Africa	56	625.36
Nigeria	53	1,297.15
Italy	53	284.57
The Netherlands	52	2,145.57
United Arab Emirates	52	372.53
Japan	50	1,655.14
Colombia	48	506.55
Ireland	46	212.57
South Korea	42	2,688.25
Estonia	40	144.76
Chile	38	379.42
Argentina	37	699.47
Turkey	35	64.64
Kenya	34	189.45
Russian Federation	32	131.98
Denmark	31	999.84
Philippines	27	664.84

HQ Country	Number of Fintech Companies	Total Amount Invested ($ million)
Austria	26	579.82
Saudi Arabia	25	426.08
Thailand	23	446.56
Finland	23	121.48
Egypt	22	85.12
Malaysia	21	879.78
Belgium	21	563.31
Norway	21	99.86
Poland	20	168.14
Vietnam	18	1,032.72
Ghana	17	31.15
Lithuania	16	19.35
New Zealand	14	268.15
Luxembourg	14	39.08
Pakistan	13	65.36
Czech Republic	13	50.04
Peru	13	4.22
Portugal	12	298.01
Hungary	9	10.38
Romania	9	6.93
Cyprus	8	100.52
Uganda	8	4.73
Jordan	7	21.95
Mauritius	6	547.80
Greece	6	83.45
Sri Lanka	6	22.39
Ukraine	6	4.55
Croatia	6	2.13
Ecuador	5	94.60
Bulgaria	5	50.00
Costa Rica	5	11.56
Bangladesh	5	7.97
Lebanon	5	2.53
Uruguay	4	357.13
Myanmar	4	103.57
Cayman Islands	4	92.00

HQ Country	Number of Fintech Companies	Total Amount Invested ($ million)
Latvia	4	22.60
Seychelles	4	11.95
Liechtenstein	4	11.68
Iceland	4	11.53
Malta	4	11.36
Morocco	4	5.96
Qatar	4	0.71
Tunisia	3	6.61
Cameroon	3	3.86
Zambia	3	3.66
Azerbaijan	3	1.28
Slovenia	3	0.44
Georgia	3	0.34
Belarus	3	-
Bahamas	2	1,833.69
Senegal	2	200.00
Gibraltar	2	18.00
Belize	2	16.85
Slovakia (Slovak Republic)	2	2.13
Cambodia	2	0.22
Kazakhstan	2	0.20
Palestinian Territory	2	0.11
Iran	2	-
Isle of Man	1	457.96
Barbados	1	29.50
Ethiopia	1	13.80
Trinidad and Tobago	1	11.50
Dominica	1	9.98
Tajikistan	1	8.00
Sierra Leone	1	4.60
Kuwait	1	3.80
San Marino	1	3.61
Botswana	1	3.10
Panama	1	1.48
Lesotho	1	0.51
Venezuela	1	0.50

HQ Country	Number of Fintech Companies	Total Amount Invested ($ million)
Haiti	1	0.50
Saint Kitts and Nevis	1	0.45
Macedonia	1	0.35
Bolivia	1	0.08
Zimbabwe	1	0.03
Algeria	1	0.03
Puerto Rico	1	0.03
Jamaica	1	0.01