

Measuring the ownership and control of UK listed firms: Some methodological challenges

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ABSTRACT

While scholars in business, management, accounting and finance frequently use data on the ownership and control structure of companies in their research, we show that determining this structure for a UK public limited company using publicly available information can be fraught with a number of difficulties. The latest changes to the UK Listing rules following the Hill Review (2021) may further exacerbate these difficulties via the potential increase in listed companies with dual-class shares. With the help of case studies and further empirical work, we demonstrate some of the methodological challenges faced by researchers. We provide guidance on how to tackle these challenges.

1. Introduction

In their attempts to explain corporate decision making and behaviour, scholars in business, management, accounting and finance frequently use the ownership and control of a company as a key variable of interest, or to the very least as an important control variable. Traditionally, the UK has been thought to be an easier country to study as ownership typically equates control. In other words, in contrast to other countries, a typical stock-market listed UK company does not break the one-vote one-share rule (Grossman & Hart, 1988) via, e.g., the use of dual-class shares (Becht & Mayer, 2001). First, with the help of a number of case studies we critique this view. We illustrate that determining the ownership and control of a listed UK company is not always straightforward for a number of reasons, some of which are unique to the UK. This paper focuses on three methodological challenges, i.e., (a) the differentiation of ownership and control; (b) potential duplication in ownership and control caused by the existence of beneficial and non-beneficial holdings; and (c) identifying the ultimate owner of a company. In addition to highlighting these methodological challenges, we provide empirical evidence that the latter biases are material from an economic point of view and that they affect research findings, with potential changes to their policy implications. Finally, we propose ways to tackle these challenges. Importantly, given recent changes to the UK listing rules, we expect the complexity of UK corporate ownership and control to increase over the next decades.

The case could be made that the ownership and control of listed UK companies has become simpler rather than more complicated

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over time. Specifically, while the percentage of companies with dual-class shares in the UK was about 67% in 1950 (Braggion & Giannetti, 2019), it declined substantially over time to reach 24% in the early 2000s (Faccio & Lang, 2002). Our analysis confirms that this decline has persisted over recent years with only six companies listed on the London Stock Exchange (LSE) in December 2020 with dual-class shares. In contrast, the US has experienced an increase in the complexity of its corporate ownership and control. In particular, there has been a marked increase in the popularity of dual-class shares, especially among high-tech initial public offerings (IPOs). This includes well-known companies such as Google (now Alphabet) in 2004, Facebook (now Meta) in 2012, and Snap in 2017. According to Aggarwal et al. (2021), almost a third of US IPOs between 2017 and 2019 included dual-class shares. They explain the rise in the number of companies with dual-class shares by the increased willingness of venture capitalists to accommodate founder control post-IPO. In contrast, there has been no such reemergence on the LSE, except for a few recent additions such as Deliveroo and Wise (see Reddy, 2021; Yan, 2022, for a discussion of these cases).

However, we argue that the complexity of corporate ownership and control in the UK is likely to increase due to the most recent changes to the UK listing rules (e.g., Aggarwal et al., 2021; Lidman & Skog, 2021, pp. 580–2021; Reddy, 2021). Indeed, in November 2020, HM Treasury initiated a review of the competitiveness of the UK's listed company regime. The recommendations made by the Hill UK Listing Review (2021) were then implemented in December 2021. The changes include allowing companies with dual-class shares to list on the prestigious Premium Segment of the Main Market of the LSE with the express purpose of attracting high-growth companies in the new post-Brexit environment. Importantly, the overall shift in regulation is set to increase the number of companies with dual-class shares listed in the UK post-Brexit.¹

In addition, the vast majority of companies in the UK have non-beneficial holdings (Faccio & Lang, 2002). While the distinction between beneficial and non-beneficial holdings may be important from a tax perspective, it does not help researchers as it frequently creates duplication in ownership and control. We use data on beneficial and non-beneficial ownership from the Orbis database by Bureau van Dijk to identify the percentage of UK companies potentially affected by duplication of ownership and control. Untabulated results suggest that 50.6% of the UK companies included in the Orbis database have total ownership (i.e., the sum of their beneficial and non-beneficial ownership) that adds up to more than 100% (see also Fichtner & Heemskerk, 2020, for a discussion of issues with Orbis).² As discussed in this paper, the extent of duplication is often only disclosed at the aggregate level, making it impossible to adjust individual ownership stakes for duplication. Hence, difficulties associated with the potential duplication of ownership and control are not trivial and they affect more than half of the UK listed companies.

The above statistics highlight the following three issues. First, the methodological challenges discussed in this paper are not simply issues at the margins, but they affect a large percentage of UK listed companies. This implies that researchers should not use the data reported in the annual report as well as data from commercial data providers without making adjustments to them where appropriate.³ Second, the errors are systematic and not random as they result in ownership and control that is overstated rather than being overstated in some cases and understated in others. We are only able to observe the tip of the iceberg when it comes to this problem as companies whose ownership does not exceed 100% may still suffer from duplication. Finally, commercial data providers also do not typically distinguish between different classes of shares and companies with dual-class shares may therefore also end up having ownership and control exceeding 100%.

For example, the case of Daily Mail and General Trust plc demonstrates the difficulties in distinguishing between ownership and control.⁴ This company issued two types of shares, which allowed the Rothermere family to control 100% of the votes while owning just 33.37% of the share capital (see Section 2.1). The Orbis database provided by Bureau van Dijk fails to make a distinction between the two types of shares. As a result, the total ownership of Daily Mail and General Trust plc in this database is above 100% in 2020. Datastream altogether ignored the existence of dual-class shares for this company in 2020.⁵ Other databases suffer from similar issues. This implies that researchers are subject to different types of challenges when measuring ownership and control of UK companies. Both the anticipated increase in the popularity of dual-class shares and the existing high prevalence of non-beneficial holdings in the UK create a wedge between ownership and control. Using six cases of UK listed companies and replicating the regression analysis from an empirical study by replacing the study's hand collected data with data from commercial databases, this paper highlights the key challenges faced by researchers when measuring corporate ownership and control and provides guidance on how to address them.

¹ Lidman and Skog (2021) and Reddy (2021) scrutinise the recommendation of the Hill Review to allow dual-class shares to be listed under certain conditions on the Premium Segment of the LSE. Both papers conclude that some of the conditions proposed by the Review might be effective in attracting high-quality growth companies whereas others might weaken important existing governance mechanisms, thereby reducing investor protection.

² Our initial sample is comprised of all the 1,261 UK listed companies included in the Orbis database. The figure of 50.6% is based on the latest available ownership and control data for each company. For almost 80% of the companies is the data relate to the year 2020.

³ Prior studies acknowledge that the ownership and control data obtained from a commercial data provider are systematically biased. For example, Aminadav and Papaioannou (2020, p. 1196) claim that Orbis "[...] suffers from inconsistencies and errors (e.g., double entries), and information is missing for many companies (see also Kalemli-Ozcan et al. (2015))". This explains the decision of the authors to check the data manually and fill in gaps. Similarly, Fichtner and Heemskerk (2020) argue that Orbis misreports ownership. The authors acknowledge a bias in the data but they "expect that the error is relatively consistent and that therefore this is the best way of representing change [in ownership]" (p. 501). These quotes illustrate that some authors directly acknowledge the systematic errors in commercial databases and that they simply assume that these inaccuracies do not affect the conclusion of their studies.

⁴ In January 2022, DMGT delisted from the London Stock Exchange following a successful offer by Rothermere Continuation Limited (Financial Times, 16 December 2021).

⁵ Specifically, data item WC03451 (preference capital) equals zero.

The contributions of this paper are threefold. First, to the best of our knowledge this is the first methodological paper on ownership and control that discusses expert knowledge on how to process UK control and ownership data. This knowledge is often transmitted from PhD supervisor to PhD supervisee or from seasoned researchers to early-career researchers. While prior studies (e.g., Adams & Ferreira, 2008) provide a broad overview of the literature on ownership and control, including the reasons that lead to a wedge between ownership and control, this paper pursues a somewhat different objective by focusing on the *practicalities* pertaining to the collection and processing of such data. As the literature stands, some papers do an excellent job defining and measuring ownership and control (e.g., Aminadav and Papaionnou 2020) while others (e.g., Fichtner & Heemskerk, 2020) tend to be less rigorous, frequently mixing or equating ownership with control when in actual fact the two can be very different. More specifically, Short and Keasey (1999) choose to collect manually ownership data from annual reports. However, even they exclude companies from their sample with atypical ownership structures, including dual-class shares, as these cases “considerably complicate the determination of the ownership structure” (footnote 9 on page 88). Brammer and Pavelin (2006) also revert to a manual data collection, which again results in a reduced sample of UK companies due to ownership information missing in the annual reports. Other UK studies (e.g., Guest, 2009; Crossan, 2011, Andrikopoulos, Sun & Guo, 2017) use ownership data from Datastream, Thomson One Banker or PwC as provided and without making any further adjustments. The vast majority of these databases ignore the existence of dual-class shares and duplications of ownership and control. More generally, studies using samples with a significant proportion of companies with a major shareholder (such as studies on family firms) are more likely to suffer from biases if they fail to make a clear distinction between ownership and control. Such studies would then likely underestimate the potential for the large shareholder to expropriate the minority shareholders.

This paper aims to define the two concepts of ownership and control in a clear manner, explain the difference between the two, and guide the reader about where to find the necessary information in the annual reports to identify whether a wedge between ownership and control exists. The paper not only provides a discussion of the main methodological challenges, but it also proposes ways of dealing with them.

Second, to confirm the materiality of the bias in the ownership data provided by commercial databases, we replicate the main regression analysis in Mira et al. (2019) using institutional ownership, CEO ownership and non-executive ownership downloaded from FAME as a substitute for the hand collected data used by this study. We show that on average institutional ownership is overstated in FAME by about 5 percentage points compared to the hand collected data and the difference is significant at the 1% level. In addition, we show that the coverage of the individual director-level ownership data (i.e., CEO ownership and non-executive director ownership) by commercial databases is sparse. For example, about 96% of the observations in the sample have missing ownership for individual non-executive directors in FAME. The reported regression results demonstrate that by using biased ownership data from commercial databases, we end up with incorrect policy implications.

Finally, the issues discussed in this paper are timely as they highlight the need for better coverage and a better quality of the ownership and control data at a time when regulators, practitioners and academics expect an increase in the number of companies with dual-class shares due to the recent significant regulatory changes to the UK listing rules (e.g., Hill Listing Review, 2021; Lidman & Skog, 2021, pp. 580–2021; Reddy, 2021).

The remainder of this paper is structured as follows. Section 2 reviews the methodological challenges faced by researchers when identifying the ownership and control of UK listed companies. First, we discuss the methodological challenges researchers face when attempting to distinguish between ownership and control. Second, we show how duplication of ownership and control, mainly caused by the joint existence of beneficial and non-beneficial holdings, can make the measurement of ownership and control held by individual shareholders challenging. Finally, we discuss the methodological challenges encountered when identifying the ultimate ownership and control of a company. Section 3 provides empirical support for the latter arguments by replicating the results in Mira et al. (2019) using institutional ownership, CEO ownership and non-executive director ownership from FAME instead of their hand collected data. Section 4 provides practical guidance on how researchers may overcome the challenges highlighted in the previous sections. Finally, Section 5 concludes.

2. Methodological issues

2.1. Distinguishing between ownership and control

The Financial Conduct Authority (FCA) doubles up as the UK Listing Authority (UKLA).⁶ It is the body in charge of the rules governing the disclosure of share ownership in UK listed companies. The rules reflect the European Union Transparency Directive Amending Directive (2013/50/EU). From 1985 to 1989, a person⁷ had to notify the company, when the percentage of his *voting rights* exceeded or fell below 5% (Goergen & Renneboog, 2001a). However, these disclosure requirements changed after 1989. First, the threshold was lowered from 5% to 3%. Second, a person now also must notify the company about any further changes that make his

⁶ The FCA gradually phased out the term UKLA starting in 2017 as the term confused its stakeholders who frequently concluded that the UKLA was a separate body from the FCA. In fact, the UKLA was merely a term used to designate the FCA's primary market functions. See <https://www.fca.org.uk/markets/primary-markets> (consulted on 17 June 2020).

⁷ In UK Company Law and various legal and regulatory documents, the term ‘person’ as well as the pronouns ‘he’ and ‘him’ may refer to both ‘individuals’ and ‘bodies corporate’ (companies). The term ‘individual’ is used if corporations are to be excluded. See Mayson et al. (1996), section 0.1.9 ‘A note on terminology’ for more detail.

voting rights exceed (or fall below) 4%, 5% and any other 1% threshold up to 100%, if his holding is above the 3% threshold.⁸ In most company reports, shareholders holding 3% of the votes or equity are typically referred to as *substantial shareholders*.

More generally, ownership refers to cash flow rights, i.e., the holding of share certificates that confer to their holder a pro rata right to the company's cash flows and assets. This includes the right to receive a dividend assuming the company in question pays dividends. In turn, control typically refers to the holding of voting rights. Distinguishing between ownership and control is important as shareholders whose control rights exceed their cash flow rights have strong incentives to expropriate the other shareholders (Grossman & Hart, 1988). The greater the wedge between ownership and control, the greater are these incentives.

While the quality of the ownership and control data disclosed in the annual reports issued by UK companies has improved significantly in recent years, some detective work may still be required to identify ownership and control. In addition, researchers frequently require short time series of data on ownership and control, i.e., panel data, which typically cover some of the years when the disclosure on ownership and control was of lower quality. Identifying ownership and control may be particularly difficult if companies use different mechanisms to increase the control of some groups of shareholders above and beyond the control that could be derived from their ownership stake. Such mechanisms include dual-class shares, ownership pyramids and proxy votes (e.g., Adams & Ferreira, 2008; Goergen, 2018).

The primary reason for the use of such mechanisms has to do with the control of the company. Via an additional class of shares with reduced rights, the controlling shareholders are able to raise new equity capital while maintaining control over the company. A textbook example of a UK company where ownership differed from control is the *Daily Mail and General Trust plc* (hereafter *DMGT plc*), which owns the Daily Mail, the Mail on Sunday and the free newspaper Metro. DMGT plc was not a typical UK stock-market listed company with dispersed ownership and weak control. On the contrary, this was a family-controlled company with dispersed ownership but strong, i.e., concentrated control. In what follows, we use the case of DMGT plc based on the information provided in its 2019 annual report to demonstrate the impact of dual-class shares on the ownership and control structure of the company to highlight a number of methodological issues.

The *Chairman's Statement on Corporate Governance* in the 2019 annual report of DMGT plc (see page 42) claims that DMGT plc is a family firm, which is also reflected in its governance: "DMGT's approach to governance is distinctive; because our corporate procedures are strengthened by the significant benefits we derive from the family shareholding and the long-term view that this engenders". The chairman of the company is the great-grandson of the company's founder, the first Viscount Rothermere. The information in the annual report also states that the ordinary shares of DMGT plc are held by Rothermere Continuation Limited (RCL), which is registered in Jersey, one of the Channel Islands.⁹ RCL is controlled by a discretionary trust which is held for the benefit of Lord Rothermere and his immediate family.

The information related to the types or classes of shares issued by DMGT plc and its ownership structure can be extracted from the *Statutory Information* section of the annual report.¹⁰ First, RCL owns 100% of the ordinary shares. Second, DMGT plc's share capital is composed of 8% of *ordinary shares* (i.e., 19,890,364 ordinary shares of 12.5 pence each) (all owned by Rothermere) and 92% of *A shares* (i.e., 214,913,327 A shares of 12.5 pence each). While the *Corporate Governance* section does not explicitly state that A shares have no voting rights (all it does is to state that the other class, i.e., the *ordinary shares*, confer voting rights), note 38 on page 166 states the following: "The two classes of shares are equal in all respects, except that the A Ordinary Non-Voting Shares do not have voting rights and hence their holders are not entitled to vote at general meetings of the Company".

Hence, researchers should never (fully) rely on the *Corporate Governance* section: additional, critical information on the classes of shares and the number of votes these classes carry can typically be found in the notes further down in the company reports. To sum up, Rothermere and his family control 100% of the votes in DMGT plc. The question that arises is at what cost. In other words, what is the ownership of the Rothermere family in DMGT plc?

The *Remuneration Report* provides details on the shareholdings of the directors, including Rothermere. As we already know, Rothermere owns 19,890,364 or all the ordinary shares, amounting to 8% of the share capital, as well as 59,268,078 A shares (his beneficial holdings only).¹¹ Hence, Rothermere owns 33.37% (i.e., $8\% + (59,268,078 / 214,913,327) \times 92\%$) of DMGT plc's share capital. Rothermere controls 100% of DMGT plc by owning just 33.37% of the share capital. Hence, DMGT plc had dispersed ownership but strong control (see also Barca & Becht, 2001).

Although some non-trivial amount of work was required to determine the overall ownership stake of the Rothermere family, we were nevertheless able to proceed with the task at hand with the help of the information provided in the annual report. A more complex case, where researchers are advised to consult additional information in order to determine the ownership and control structure of a company, is discussed in Appendix 1.

As stated earlier in this section, dual-class shares are typically used by the insiders of a company to maintain control with a limited investment in the company's equity. By implication, the voting shares are held by the insiders of the company (such as is the case for

⁸ See FCA Handbook, DTR 5.3 "Notification of voting rights arising from the holding of certain financial instruments" as well as DTR 5.1 "Notification of the acquisition or disposal of major shareholdings" (in particular, DTR 5.1.2) (<https://www.handbook.fca.org.uk/handbook/DTR/>, consulted on 14 June 2021).

⁹ See pages 43 and 78 of the 2019 annual report.

¹⁰ See pages 78–79 of the 2019 annual report.

¹¹ See Table 9 on page 76 of the 2019 annual report. In addition, Rothermere holds another 4,687,424 non-beneficial A shares. This non-beneficial holding is disregarded for the purpose of our calculation. Section 2.2 of this paper provides a discussion about the differences between beneficial and non-beneficial holdings.

DMGT plc) whereas the non-voting shares are held by the outside shareholders. One UK company that is an exception to this rule is [Volvere plc](#). This is a company which invests primarily in undervalued and distressed businesses. The capital structure of this company is unusual and different from the typical control structure of a listed UK company. Specifically, Volvere plc has 5,675,232 ordinary shares, 49,735 A shares, 49,735 B shares and 26,499 million deferred shares outstanding.¹² Only the ordinary shares confer the right to vote (with one vote each) whereas the A and B shares, as well as the deferred shares, do not have any voting rights.¹³ Further, 42.1% of the ordinary shares and 99.1% of the non-voting A and B shares are held by the insiders of the company.¹⁴ Hence, contrary to the traditional scenario where the insiders retain the control over the company by holding all or most of the voting shares, in this particular case the insiders hold almost all of the non-voting shares. This again creates a wedge between ownership and control, but in the opposite direction to the one researchers expect to observe elsewhere in the world.

To sum up, although most UK companies adhere to the rule of one-share one-vote, there are companies in the UK that do not. Such companies have a wedge between ownership and control and in the vast majority of cases, but not always, the insiders are set to benefit from this wedge. For such companies, the wedge between ownership and control is informative above and beyond what can be inferred from ownership alone. Given the latest reforms to the UK Listing Rules, we expect the percentage of companies with a wedge between ownership and control to increase substantially over the next years.

2.2. Determining individual ownership and control

An important aspect when working with UK corporate ownership data is the existence of both beneficial and non-beneficial holdings. Such holdings cause two issues. First, they create a wedge between the ownership and control held by a person who holds both beneficial and non-beneficial holdings. Second, they may generate duplication in the measurement of individual and aggregate ownership and control.

A beneficial holding refers to a holding which confers its holder or owner – a person or an organisation – direct benefits, more specifically the right to receive income from the ownership. If an investor holds shares in a company but does not receive the benefits from them, then the investor is a non-beneficial holder. Importantly, while the voting rights are held by the beneficial owner of the shares, only holders of shares that are registered with the company can vote at the annual general shareholder meeting (AGM). This implies that in practice the non-beneficial holder will vote for the shares, after having possibly received instructions on how to vote from the beneficial owner. Hence, non-beneficial holdings might be included in the control, i.e., the ownership of votes, held by their holder ([Computershare, 2015](#)). A typical example of non-beneficial holdings consists of the directors holding shares for their extended family or the directors holding shares for the beneficiaries of a family trust. Although the distinction between beneficial and non-beneficial holdings is important from both a tax perspective and when distinguishing between ownership and control, it does not help scholars of corporate governance as it frequently creates duplication in the data. In turn, this duplication may make it difficult to determine the exact ownership and control held by *individual* shareholders.

The case of [Nuridin & Peacock plc](#) illustrates such duplication, including its consequences. This is a company operating low-cost wholesale warehouses. According to the 1995 annual report, the company issued only one type of shares: 155,000,000 ordinary shares of 10 pence each.¹⁵ In the *Substantial Interests* section of the annual report, the company states the name of the substantial shareholders, i.e., shareholders holding stakes of 3% and above.¹⁶ There are seven substantial shareholders and their holdings of the ordinary shares vary from 3.6% to 20.9%. The following information is stated at the bottom of the table reporting the substantial interests on page 21: “A majority of these shareholdings are in charitable trusts and the trustships cause considerable duplication. If this duplication is eliminated, the total percentage of these beneficial and non-beneficial interests amounting to 3% or more of the ordinary shares is 28.4%.” No other information regarding beneficial and non-beneficial information of the substantial shareholders is disclosed in the annual report. Although Nuridin & Peacock plc provides the names of the substantial shareholders, their individual beneficial and non-beneficial holdings and the overall degree of duplication in their holding, researchers are still not able to identify the *individual beneficial* ownership of the substantial shareholders, i.e., this is only available in aggregate. The individual beneficial ownership held by the substantial shareholders is of particular importance when classifying substantial shareholders into separate categories to capture, for example, the degree of ownership and control exercised – individually or jointly – by various types of substantial shareholders. Hence, this type of analysis will not be possible for the case of [Nuridin & Peacock plc](#). Similarly, the interests of the directors in this company are again stated in aggregate in the notes to the annual report.¹⁷ The reported information incorporates the individual beneficial ownership of the directors as well as the beneficial ownership of their families. Hence, again researchers cannot distinguish between the beneficial and non-beneficial holdings. As further discussed in [Appendix 2](#), this is a common issue with the disclosure of beneficial and non-beneficial holdings in the annual reports of UK companies.

These cases highlight that researchers are reliant on companies being sufficiently transparent about their ownership structure. Overall, the effort companies make to help users of their annual reports measure accurately the ownership structure when there is duplication in the holdings varies enormously from company to company. While the quality of the ownership and control data

¹² See note 24 to the accounts on page 40 of the 2008 annual report.

¹³ See page 8 of the 2008 annual report.

¹⁴ See page 10 of the 2008 annual report.

¹⁵ See note 20 to the accounts on page 51 of the 2002 annual report.

¹⁶ See page 21 of the 1995 annual report.

¹⁷ See note 21 to the accounts on page 53 of the 1995 annual report.

disclosed in the annual reports issued by UK companies has improved significantly in recent years, the above example suggests that some detective work is still required to identify ownership and control.

2.3. Measuring ultimate control

Researchers may also face a significant degree of complexity when attempting to determine the *ultimate* control of a company. Ultimate control refers to the shareholder with whom control lies in a chain of control. There are at least three ways to define control (Barca & Becht, 2001), i.e., a blocking minority, a majority and a supermajority of shareholder votes. Any shareholder holding at least 25% of the votes holds a blocking minority; 50% of the votes gives the shareholder a majority of votes; and a supermajority exists when a shareholder controls at least 75% of the votes.¹⁸ Key strategic decisions such as mergers, takeovers and liquidations, for example, require a supermajority of votes in the UK. Hence, a shareholder holding 25% or more of the votes is considered to hold a blocking minority and the shareholder has, e.g., the power to block any takeover offer made to the company's shareholders. Hence, while a blocking minority does not guarantee control it nevertheless confers a veto right to its holder.

Researchers should be cognisant that despite the above definitions, control over a company is not necessarily exercised directly (i.e., at the first tier) and it is common for control to be held indirectly (i.e., at the second tier or higher).¹⁹ The study by Barca and Becht (2001) is the first study to investigate the ultimate control of a sample of listed companies across Europe and the USA. The study focuses on control rather than ownership. Importantly, it takes into account that control may be held indirectly as well as directly. Figs. 1 and 2 illustrate why, for researchers intent on determining who is in control of a company, it is important to focus on ultimate control rather than direct control. Fig. 1 shows the first-tier or direct shareholders of ACME plc, a quoted company. The percentage stakes refer to the ownership of voting equity. Focusing on direct control, *Holding Company 2* is the largest shareholder in ACME plc with 20% of the votes. The other two known shareholders are a family with 15% of the votes and *Holding Company 1* with 10% of the votes. Based on this information, researchers should draw the following conclusions. First, ACME plc has three substantial shareholders but none of them holds at least a blocking minority, i.e., for each of them their individual stake is smaller than 25%. Hence, ACME plc is a widely held company (as opposed to a company with a controlling shareholder). Second, the aggregated direct control of ACME plc equals 45% ($=10\% + 15\% + 20\%$) which is the sum of the individual ownership of votes held by the substantial shareholders.

The question arises as to whether the two holding companies are widely held or not. If they are widely held, then *Holding Company 2* is effectively the largest shareholder in ACME plc. In contrast to Fig. 1, Fig. 2 displays the entire control chain by reporting the main shareholder in each of the two holding companies. It turns out that the same family that has a direct stake of 15% in ACME plc is also the largest shareholder of both holding companies. It holds all of the voting equity in *Holding Company 1* and more than the majority (i.e., 51%) of the votes in *Holding Company 2*. The family now controls both holding companies. As a result, the family holds 45% (i.e., $10\% + 15\% + 20\%$) of the votes in ACME plc. Nevertheless, if control is defined as a majority of the votes, ACME plc is still widely held.²⁰ However, if control is defined as a blocking minority, the conclusions drawn from Fig. 2 are diametrically opposed to those from Fig. 1 as ACME plc is now controlled by the family. What is the ownership stake of the family in ACME plc? It is 35.2% (i.e., $15\% + 10\% \times 100\% + 20\% \times 51\%$). To sum up, researchers intent on determining who is ultimately in control of a studied company may want to focus on ultimate rather than direct control.

Nevertheless, the determination of ultimate control adds another layer of complexity to the researcher's task. This may require researchers to explore the history of the company to uncover important clues about its current ownership and control. In what follows, we study *Hastings Group Holdings plc (HGH plc)*, a company that listed on the Premium Segment of the London Stock Exchange (LSE) on 12 October 2015. The history of this company has shaped its ownership and control structure, thereby creating a series of challenges when attempting to determine the company's ownership and, in particular, its ultimate control. HGH plc traces its origins back to 1997 when Hastings Insurance Services Limited (HISL) started trading as an insurance broker of private car insurance. In 2002, HISL entered the underwriting industry via its underwriting operating company, Advantage Insurance Company Limited (AICL). Four years later, HISL and AICL were then acquired by Insurance Australia Group. In 2009, the CEOs of HISL and AICL then led a management buy-out (MBO) of both companies with further help from Neil Utley and some of his relatives, as well as Ted Limited (a limited company based in Jersey, in turn owned by a discretionary trust), Keith Charlton, Richard Brewster and Narmali Utley. The two companies were combined under the same holding company, HIG. In preparation for its initial public offering (IPO), the holding company then underwent a reorganization in 2015, including a change of its legal form to a public limited company. This also resulted in the change in name to *Hastings Group Holdings plc (i.e., HGH plc)*.

The main shareholder of HGH plc at the time of going public was Hastings Investco Limited (HIL) holding 71.6%. Hence, based on this information related to the first tier of control, investors can conclude that the ownership and control of this company is highly concentrated in the hands of a single shareholder. However, as discussed earlier on in this section, the overall picture becomes more complicated when taking into account the second tier of control. As it turns out Hastings Investco Limited (HIL) holding was controlled by Hastings Holdco Limited (Holdco) which owned all the voting shares in the former. A total of 71.8% of the voting shares in Holdco

¹⁸ Note that in some countries the supermajority is lower or higher than 75%.

¹⁹ Faccio and Lang (2002), Barca and Becht (2001), Basu et al. (2016) are some of the studies which explore the ultimate corporate control in Europe as well as the USA. Note that Faccio and Lang (2002) assume that all unlisted companies are controlled by families. Barca and Becht (2001) find that this is not always the case. Therefore, the statistics reported by Faccio and Lang (2002) related to family control may be upward biased.

²⁰ While the family's stake of 45% is below a majority, bearing in mind that not all shareholders may be present or represented at the annual general shareholders' meeting (AGM), in practice the family may vote for the majority of the votes.

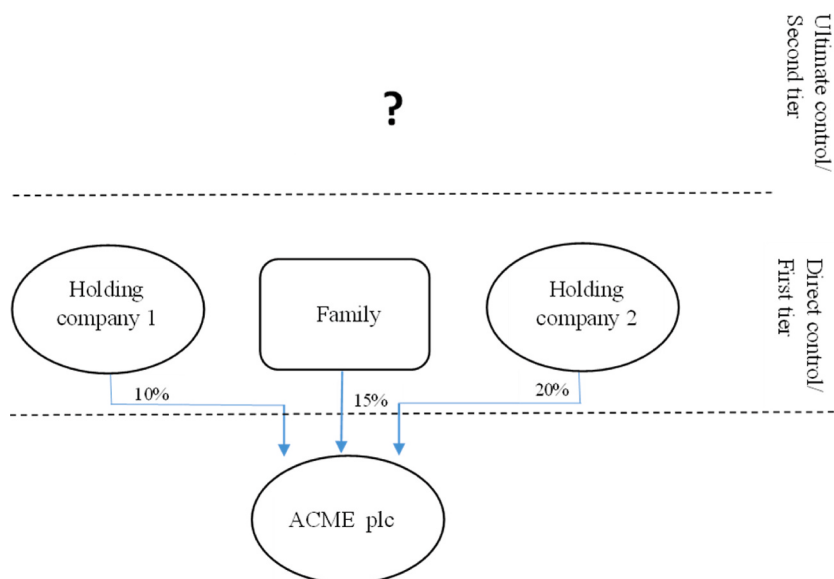


Fig. 1. First tier or direct control.

Source: Adapted from Goergen (2018).

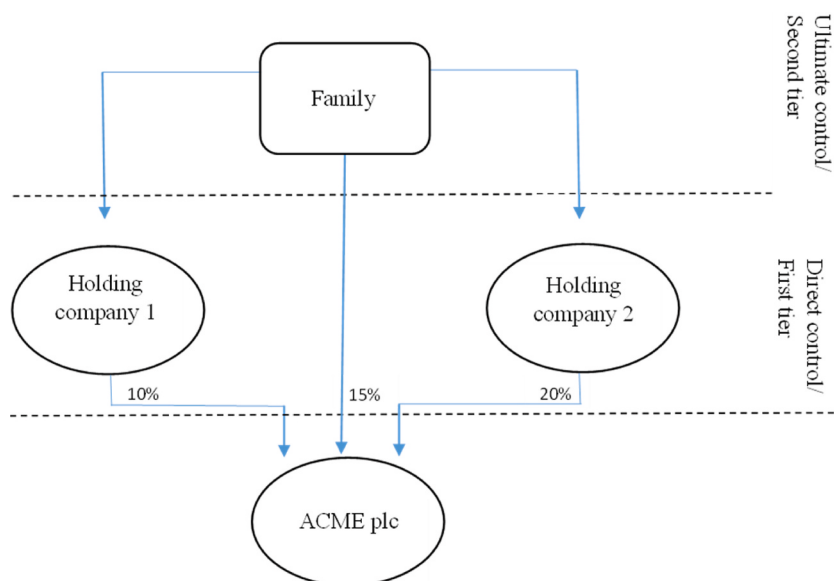


Fig. 2. Ultimate control.

Source: Adapted from Goergen (2018).

were owned by Goldman Sachs and the remainder were owned by Ted Limited, Keith Charlton and Narmali Utley.²¹ Hence, based on the second tier of control we can conclude that the control of HGH plc is concentrated but held by more than one substantial shareholder. While HIL's shareholders have not changed, it is unclear from the annual report how many shares each of them held on 14 March 2016, the reporting date for substantial shareholdings in the 2015 annual report.²² Hence, researchers must be aware that understanding the history and background of the company helps better understand the ownership of the company, which is crucial for

²¹ In addition to the above-mentioned voting shares, there were also preference shares and non-voting shares in both HIL and Holdco. Although it is important to mention these two classes of shares to highlight the complexity of the ownership structure of HGH plc before going public, for the sake of brevity we refrain from providing the details about their owners.

²² This situation is further complicated given that, following the IPO, HGH plc converted its preference shares as well as its loan notes into ordinary shares.

identifying the ultimate controlling shareholder.

3. The extent of the bias and its impact on the empirical findings

This section focuses on the ownership structure and it shows that biases in ownership caused by duplication of ownership or missing data have clear policy implications. The aim of this section is three-fold. First, we quantify the extent of the bias when using ownership data downloaded from commercial databases, such as Refinitiv and FAME, compared to hand collected data. Second, we explore how this bias affects prior results reported in Mira et al. (2019). Finally, we discuss the consequences of the identified bias and the potential impact on the policy implications. Mira et al. (2019) explore whether non-executive directors are rewarded (penalised) for good (bad) acquisition decisions while accounting for three types of ownership, i.e., institutional ownership, CEO ownership and non-executive ownership. The study tests the validity of the main hypothesis using a sample of 771 non-executive directors on the board of the 183 listed UK acquirers for acquisitions completed between 1 January 1994 and 31 December 2010. The authors track the number of non-executive directorships in listed firms held by each of the non-executives for up to five years after completion of the acquisition. They investigate whether this number is explained by the acquirer's performance and its ownership structure. The data related to the three types of ownership are collected from various editions of the *Corporate Register*, which merely reproduces the information contained in the firms' annual reports.

We embark on replicating the key regressions reported in Table V in Mira et al. (2019) by replacing the hand collected institutional ownership, CEO ownership and non-executive ownership with data from commercial databases. An extensive exploration of the available ownership data in various commercial databases indicates that Refinitiv and FAME are the databases which might be suitable for our purpose.²³ Further analysis reported in Table 1 indicates that the coverage of the ownership data starts earlier in Refinitiv compared to FAME, but the latter database does not provide all the required data. Specifically, the coverage of the ownership data starts in 1997 in Refinitiv whereas FAME provides these data starting five years later, i.e., in 2002. The original sample is based on 771 non-executive directors on the board of 183 acquirers for acquisitions completed between 1 January 1994 and 31 December 2010. Given that the first year of coverage for both explored commercial databases is after the first year of the sample period used by Mira et al. (2019), we end up with a Refinitiv sample comprised of only 630 non-executives related to 148 acquisitions completed between 1997 and 2010. The FAME sample is even smaller with 248 non-executives on the board of 45 acquirers, which completed at least one acquisition during 2002 and 2010.²⁴ Except for two acquirers in the original sample (i.e., Daily Mail & General Trust and Dee Valley Group), none of the acquirers has dual-class shares. We liaised extensively with the Refinitiv helpdesk and concluded that, while it is feasible to source institutional ownership from Refinitiv, the data on CEO ownership are sparse while the ownership of non-executive directors is not available at all. FAME provides the three types of ownership required to replicate the regression analysis in Mira et al. (2019), although the coverage of the CEO ownership and non-executive directors is also sparse. Given that Refinitiv does not provide data on the ownership of non-executive directors, we report descriptive statistics on the ownership data downloaded from Refinitiv and FAME in Table 1, and then tabulate the key regression results in Table 2 using the FAME data only.

The descriptives reported in Panel A of Table 1 show that institutional ownership is *overstated* in Refinitiv (column 2) and FAME (column 5) compared to the corresponding hand collected data (columns 1 and 3). The corresponding mean differences of 2.5 and 4.9 percentage points are significant at the 1% level (columns 3 and 6). The median differences are also statistically significant at the 5% level or better. Untabulated statistics show that there are 16 firm-year observations in the Refinitiv sample with institutional ownership held by the top 10 shareholders above 100%.²⁵ This evidence supports the argument that there is significant duplication in ownership which results in overestimating ownership.

Panel B of Table 1 reports the corresponding descriptives for CEO ownership by comparing the Refinitiv and FAME ownership data with the hand collected data. As stated above, non-executive ownership is not available from Refinitiv. Hence, Panel C reports descriptives related to the non-executive ownership from FAME only. The last two panels of Table 1 show that data availability is a major issue when using commercial databases. Specifically, CEO ownership and non-executive ownership is missing in FAME for about 73% and 96% of the observations, respectively. In line with prior literature, these missing values are subsequently replaced with zeroes. We differentiate between non-missing and missing ownership data from the commercial databases, and conduct separate pairwise mean and median difference tests comparing the hand collected data with the data from the commercial databases. The median difference tests reported in Panels B and C of Table 1 show that there are no significant difference between the non-missing CEO ownership and

²³ To start with, we aimed to use Orbis to download the three types of ownership for the sample used in Mira et al. (2019). However, Orbis does not provide individual director-level ownership, and we were therefore unable to download the CEO ownership and non-executive ownership. Next, CapitalIQ was considered as an alternative source of data from commercial databases. CapitalIQ provides ownership data going back 72 quarters only, which was December 2004 at the time of the download. This significantly reduces the sample of acquirers with available data. Even worse, CEO ownership is available for only three companies in the sample and the ownership of non-executive directors is not available at all. Hence, we focused on Refinitiv and FAME in Table 1 of this paper.

²⁴ Six acquirers from the original sample used in Mira et al. (2019) are not part of the Refinitiv universe while one acquirer from the original sample could not be located in the FAME universe.

²⁵ These observations relate to the following three acquirers: Allied Leisure plc (acquisition completed in 1999), Liberty International plc (acquisition completed in 2000) and Gaskell plc (acquisition completed in 1999). The sum of institutional ownership for Allied Leisure plc remains greater than 100% even after focusing on the UK institutional investors holding in excess of 3% of ownership in year 1999. This is reflected in the maximum value of Refinitiv institutional ownership of 213.3% reported in Panel A of Table 1. This may be due to misclassifying family trusts set up by the directors as institutional ownership, with the resulting duplication in beneficial and non-beneficial ownership.

Table 1

Descriptives for the hand collected ownership data and the ownership data from commercial databases for Mira et al. (2019)

This table reports descriptives for *Institutional Ownership* (Panel A), *CEO Ownership* (Panel B) and *Non-executive Ownership* (Panel C) for the year of the acquisition for data used to replicate the regressions reported in Table V of Mira et al. (2019). The first three columns compare descriptives for the hand collected ownership data and the respective ownership data downloaded from Refinitiv based on a sample of 630 observations for which the institutional ownership variables are available in Refinitiv from 1997 to 2010. The last three columns compare the respective descriptives for the hand collected data and the ownership data available in FAME from 2002 to 2010. Institutional ownership is available from Refinitiv and FAME for all the equivalent hand collected observations. Given the high percentage of missing data for director-level ownership, we compare the descriptives for the hand collected data and the data from the commercial databases separately for the non-missing and missing CEO ownership and non-executive ownership. *Institutional Ownership* is the proportion of the acquirer's equity held by UK institutional investors in excess of 0.03 in the year of the acquisition (i.e., year 0). *CEO Ownership* is the proportion of the acquirer's equity held by the CEO in year 0. *Non-executive Ownership* is the proportion of the acquirer's equity held by the non-executive in year 0. Non-executive ownership is not available in Refinitiv, hence the "NA" in Panel C. The tests for the differences in the paired means/medians examine whether there are differences between the hand collected data and Refinitiv/FAME data. The differences in means are assessed using a paired *t*-test whereas the differences in medians are tested using a *z*-test (sign-rank test for paired data). The minimum value (not reported) is equal to zero for all the variables reported in this table. *, ** and *** stand for statistical significance at the 10%, 5% and 1% level, respectively.

	1997–2010			2002–2010		
	Hand collected data	Refinitiv data	Differences (t/z-value)	Hand collected data	FAME data	Differences (t/z-value)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Institutional Ownership						
Number of observations	630	630		248	248	
Mean	0.218	0.243	−0.025*** (−2.60)	0.198	0.247	−0.049*** (−2.92)
Median	0.173	0.194	−0.021*** (−3.29)	0.168	0.203	−0.035** (−2.47)
Maximum	0.781	2.133		0.738	0.879	
Panel B: CEO Ownership						
<i>Pairwise analysis of the hand collected data and the non-missing observations from the commercial databases</i>						
Number of observations	69	69		68	68	
Mean	0.003	0.002	0.001*** (2.66)	0.011	0.005	0.006** (2.27)
Median	0.001	0.001	0.000 (0.63)	0.003	0.003	0.000 (1.60)
<i>Pairwise analysis of the hand collected data and the missing observations from the commercial databases (which are set to zero)</i>						
Number of observations	561	561		180	180	
Mean	0.009	0.000	0.009*** (6.95)	0.004	0.000	0.004*** (3.46)
Median	0.001	0.000	0.001*** (20.47)	0.001	0.000	0.000*** (11.53)
Panel C: Non-executive Ownership						
<i>Pairwise analysis of the hand collected data and the non-missing observations from the commercial databases</i>						
Number of observations	NA	NA		11	11	
Mean	NA	NA		0.010	0.015	−0.005 (−1.08)
Median	NA	NA		0.001	0.001	−0.000 (−0.45)
<i>Pairwise analysis of the hand collected data and the missing observations from the commercial databases (which are set to zero)</i>						
Number of observations	NA	NA		237	237	
Mean	NA	NA		0.001	0.000	0.000** (2.21)
Median	NA	NA		0.000	0.000	0.000*** (12.51)

non-executive ownership in FAME on the one side and the corresponding hand collected data on the other side. However, note that these descriptives are obtained based on a small number of observations – i.e., CEO ownership and non-executive ownership is available in FAME for 68 and 11 observations only, respectively. Importantly, the analysis of the missing ownership data indicates that observations are not more likely to be missing for very low hand collected ownership stakes as the mean and median differences between the hand collected data and the missing FAME ownership data replaced by zeroes are significant at the 5% level or better.²⁶ Hence, using the data for director-level ownership from commercial databases instead of the hand collected data induces a significant bias. Director-level ownership data are missing for the vast majority of the sample and replacing the missing with zeroes generates additional bias.

The descriptives reported in Table 1 support our two arguments. First, we provide compelling evidence that institutional ownership

²⁶ The maximum values (not tabulated) for the hand collected CEO ownership and non-executive ownership with corresponding missing values in FAME is 0.124 and 0.081, respectively. In other words, these ownership levels are not trivial.

Table 2

Replication of Table V in Mira et al. (2019) by using the hand collected and FAME ownership data for 2002-2010

This table reports the marginal effects from negative binomial regressions for the number of non-executive directorships held in year 5 regressed on the institutional ownership, CEO ownership, non-executive ownership, performance of the acquirer, and a set of control variables. The dependent variable is the number of non-executive directorships held in year 5 after the acquisition. All the regressions include the three types of ownership, the dividend-based performance measures, the number of non-executive directorships held by the given non-executive in the year before the acquisition, and the control variables. Year 0 is the year of the acquisition. *Institutional Ownership* is the proportion of the acquirer's equity held by UK institutional investors, if in excess of 0.03, in year 0. Institutional investors include banks, insurance companies, pension funds, unit trusts, investment trusts, investment offices and firms providing investment advice. *CEO Ownership* is the proportion of the acquirer's equity held by the CEO in year 0. *Non-executive Ownership* is the proportion of the acquirer's equity held by the given non-executive in year 0. The *Dividend Increases* dummy equals one if there is at least one increase in dividends with no cuts or omissions between year 1 and year 5, and zero otherwise. The *Dividend Cuts or Omissions* dummy equals one if there is at least one dividend cut or omission over years 1–5, and zero otherwise. *t*-values presented in parentheses are heteroscedasticity robust and adjusted for non-executive intragroup correlation. *, ** and *** stand for statistical significance at the 10%, 5% and 1% level, respectively.

	Hand collected data		FAME data	
	(1)	(2)	(3)	(4)
<i>Ownership Variables</i>				
Institutional Ownership _{Y0}	0.446 (0.53)	0.322 (0.40)	-1.108** (-2.01)	-1.024* (-1.90)
CEO Ownership _{Y0}	-12.688 (-1.32)	-13.105 (-1.32)	-11.617 (-0.52)	-16.322 (-0.73)
Non-executive Ownership _{Y0}	-9.264 (-0.36)	-7.550 (-0.32)	-1302.33 (-0.89)	-1215.42 (-0.86)
<i>Performance Measures</i>				
Dividend Increases _{Y1 to Y5}	0.503** (1.99)		0.604** (2.29)	
Dividend Cuts or Omissions _{Y1 to Y5}		-0.465* (-1.72)		-0.620** (-2.13)
Non-executive Directorships _{Y-1}	0.251*** (6.80)	0.247*** (6.74)	0.262*** (7.41)	0.256*** (7.23)
<i>Control Variables</i>				
Tenure _{Y0}	-0.030 (-1.59)	-0.030 (-1.59)	-0.032 (-1.61)	-0.032* (-1.68)
Age Dummy _{Y0}	-0.674*** (-3.88)	-0.672*** (-3.88)	-0.659*** (-3.87)	-0.658*** (-3.80)
Chair Dummy _{Y0}	0.439** (2.44)	0.433** (2.45)	0.432** (2.57)	0.435** (2.55)
Duality _{Y0}	2.401 (1.57)	2.602 (1.61)	0.600 (1.50)	0.926 (0.79)
Prop. of Non-exec on the Board _{Y0}	-2.473*** (-3.07)	-2.389*** (-3.01)	-2.445** (-2.16)	-2.338*** (-3.48)
Debt-equity Ratio _{Y0}	0.040 (0.90)	0.040 (0.93)	0.039 (1.47)	0.039 (0.97)
Ln (Market Value) _{Y0}	-0.062 (-0.68)	-0.024 (-0.25)	-0.119 (-0.82)	-0.057 (-1.33)
Relative Size _{Y0}	-0.411 (-1.03)	-0.267 (-0.69)	-0.121 (0.10)	-0.014 (-0.32)
Premium _{Y0}	-0.005 (-1.10)	-0.007* (-1.72)	-0.006*** (-3.70)	-0.008 (-1.39)
Cash Dummy _{Y0}	0.384 (1.49)	0.336 (1.32)	0.325 (1.57)	0.436** (2.19)
Stock Dummy _{Y0}	-0.041 (-0.13)	-0.147 (-0.50)	0.234 (0.91)	0.098 (0.04)
Divestment Dummy _{Y1 to Y5}	0.140 (0.46)	0.089 (0.29)	-0.108 (-0.47)	0.226 (0.82)
Constant	2.847* (1.93)	2.919** (2.00)	3.330*** (3.12)	3.751*** (2.94)
Industry Dummies	Yes	Yes	Yes	Yes
Time Dummies	Yes	Yes	Yes	Yes
No observations	248	248	248	248
Pseudo R ²	0.136	0.134	0.150	0.147
Chi ²	156.5***	160.6***	171.9***	173.3***

is overstated in two major commercial databases, i.e., Refinitiv and FAME, and that the bias is statistically and economically significant. Second, especially when working with a dataset starting in the late 1990s or early 2000s as is the case for our sample, availability of director-level ownership is a key concern when using commercial databases. The replacement of the missing data with zeroes creates further bias. It is likely that we observe an overestimation of the director-level data once coverage improves and the number of observations with available data in our sample increases (i.e., we cannot observe the extent of the overestimation because of the lack of available data). This evidence supports the argument that collecting the ownership data by hand is therefore necessary.

Next, we replicate the main regression analysis of Mira et al. (2019) as reported in their Table V by replacing the hand collected institutional ownership, CEO ownership and non-executive ownership data with the data downloaded from FAME. Again, we discard Refinitiv as a source of data as non-executive ownership is not available. The analysis reported in Table 2 of the paper (and also reported in the appendix to this letter) is based on a sample of 248 non-executive directors on the board of 45 UK acquirers completing acquisitions between 2002 and 2010. Columns (1) and (2) of Table 2 report the replication of the original regressions using the hand collected ownership data for the shorter period of 2002–2010 whereas columns (3) and (4) tabulate the respective results when using the institutional ownership, CEO ownership and non-executive ownership data from FAME.

The results suggest that the coefficients on the three measures of ownership, i.e., *Institutional Ownership*, *CEO Ownership* and *Non-executive Ownership*, are not significant when using the hand collected data in columns (1) and (2) of Table 1. However, *Institutional Ownership* becomes negative and significant at the 10% level or better when using the FAME data in columns (3) and (4). This new result confirms that using overstated institutional ownership from commercial databases change the findings of the study, which now suggest that institutional ownership plays a significant role in the labour market for directors.

In addition, the dividend-related measures of performance, i.e., *Dividend Increases* and *Dividends Cuts and Omissions*, are the only two performance measures that explain the number of board seats held by the non-executives five years after the acquisition. The results reported in Table 2 using the hand collected and the data from FAME show that the key findings in the original paper are upheld: *Dividend Increases* and *Dividends Cuts and Omissions* are significant at the 10% level or better.

Overall, the results in this section provide strong evidence that the bias in the ownership data from FAME is significant and that it affects the results as follows. First, on average, institutional ownership is overstated by about 5% compared to the hand collected data. Second, we draw different conclusions about the role of the institutional ownership in the labour market for directors when using overstated institutional ownership from FAME. Institutional ownership from FAME appears to reduce the number of directorships held by the non-executive directors after the acquisition, suggesting that institutional ownership reduces the need for monitoring conducted by the non-executive directors. By using biased ownership data from commercial databases, we end up with incorrect policy implications. Finally, our analysis clearly shows that hand collecting director-level ownership, i.e., CEO ownership and non-executive ownership, is a necessity and not an option if the quality of the data is paramount. We conclude that there is a need for improving both the coverage and the quality of the ownership data provided by commercial databases to allow academics and policymakers to draw reliable and generalizable conclusions, leading to the correct policy implications.

4. Potential remedies: a roadmap

Section 2 identified the following three main issues researchers may face when working with UK ownership and control data: (a) distinguishing between ownership and control; (b) duplication of ownership and control, typically caused by the existence of non-beneficial holdings, which may lead to the inaccurate measurement of ownership and control held by individual shareholders; and finally, (c) challenges encountered when determining ultimate control. In Section 3, we then quantified the extent of the bias when using ownership data from commercial databases. We found that the importance of institutional ownership is overstated when using FAME. In addition, director-level data were sparse. This indicates that hand collecting ownership data is a necessity. This section explores how researchers can address the methodological issues discussed in Section 2 and supported in Section 3. A summary of the issues discussed in this section as well as possible solutions can be found in Table 3.

4.1. How to distinguish between ownership and control

Although most UK companies have only one class of shares outstanding, the most recent reforms to the UK Listing Rules will likely cause a substantial increase in the number of companies using various mechanisms to create a wedge between ownership and control, including dual-class shares. The question arises as to how researchers can identify whether such a wedge exists and, if it exists, how to determine its magnitude.

As summarised in Table 3, our advice is first to check the section on substantial shareholdings and the notes to the accounts on the capital issued. If there is a mention about *different classes of shares* (e.g., class A and class B shares), then it is likely that a wedge between ownership and control exists.

Second, researchers should identify the number of votes each class of shares carries and how many shares of each class there are. This information is typically disclosed in the notes to the accounts related to the capital issued by the company. Researchers should note that *non-beneficial holdings* should be excluded when determining the *ownership* of individual shareholders. This is predominately because the holders of the non-beneficial shares do not directly benefit from the right to receive income from the holding. However, non-beneficial holdings should be included in the calculation of the *control* held by their holder. Indeed, it seems clear that directors holding shares on behalf of their infant children will vote these shares. However, it is less clear whether directors vote the shares they hold on behalf of their spouse. Nevertheless, UK studies (see e.g., Goergen & Renneboog, 2001b) tend to assume that the directors vote all the shares they hold non-beneficially. Similarly, directors are normally assumed to vote the shares they hold on behalf of a family

Table 3**A road map**

This table provides a summary of the remedies discussed in Section 4 of the paper.

Methodological issues applying to	How (or where) to identify if there is an issue	How to address these issues
Distinguishing between ownership and control	Check if there is mention of more than one class of shares (e.g., class A and class B shares) in e.g. the section on substantial shareholdings or the notes to the accounts on the capital issued. If so, there may be a difference between ownership and control.	Examine the notes to the accounts on the capital issued which usually contains information on how many votes each class of share confers and how many shares there are of each class. Note that non-beneficial holdings are usually excluded when determining ownership but they tend to be included in the calculation of control. For example, directors will vote for the shares they hold on behalf of their infant children (see Section 4.1). If the information contained in the accounts is insufficient, consult the articles of association, and other company documents (e.g. the listing particulars or the IPO prospectus) and data sources. Use this information to determine the ownership and control as well as the <i>wedge</i> or difference between the two. Note that, contrary to other countries, the wedge for UK companies may be negative. This would be the case if the outsiders, rather than the insiders of the company, were set to benefit from this wedge.
Duplication of ownership and control	Assess whether the sum of the percentage of individual substantial shareholdings exceeds 100%. If so, it is almost certain that there is duplication of ownership and/or control. <i>Non-beneficial holdings</i> are also typically an indicator of potential duplication. Identify whether there are any non-beneficial holdings for the substantial shareholders and/or directors. Also, carefully read the explanations provided by the company in the section on the substantial shareholdings for the presence of any other information in this regard. Identify whether some of the directors are substantial shareholders as their stakes may be reported twice. Check the notes to the accounts for any potential duplication of ownership and/or control of the directors due to their beneficial and/or non-beneficial holdings in entities already accounted for in the section on the substantial shareholdings.	Where available, collect the information on the duplication of ownership and/or control. Note that the voting rights carried by each class of shares required to calculate control are typically disclosed in the notes to the annual report. Similarly, the classes of shares outstanding as well as the number of shares in each class are reported in the notes to the accounts. Identify the overlap in terms of beneficial and/or non-beneficial holdings and adjust accordingly. If there are beneficial as well as non-beneficial holdings in a company, <i>include the non-beneficial holdings</i> when determining control held by individual shareholders but <i>exclude</i> them when determining ownership. To avoid duplication, if some directors are also substantial shareholders, their ownership stake should be removed from the latter when aggregating the ownership at the company level.
Determining ultimate control	Examine the annual reports or any other relevant sources (e.g., the prospectus relating to the initial public offering (IPO) and the offer document for a merger or acquisition) to identify information related to direct and ultimate control. Check the company history for further details on the founders and other potential substantial shareholders.	Collect the information related to the control stake of the substantial shareholder at the first, second and further tiers of control. At each step of the data collection keep a detailed record of the data collected. Calculate ultimate control as demonstrated in Section 2.3.

trust or a charity.

Third, after collecting the relevant information, researchers should determine the *wedge* or difference between ownership and control. The detailed mechanics of this process are explained in Section 2.1. of this paper. Note that the wedge can sometimes be positive (i.e., control is greater than ownership) whereas typically the wedge equals zero (i.e., ownership is equal to control). Importantly though, and contrary to other countries, the wedge in the UK may also be negative. This is a potential indication that the outsiders, and not the insiders, are set to benefit from the deviation of ownership and control. Hence, prior to using the wedge in a multivariate analysis, researchers should carefully examine its descriptive statistics and identify the frequency of the cases with a negative wedge. This in itself is a useful and informative statistic. They may also choose to use the wedge as a continuous variable or otherwise convert it into a dummy variable prior to using it in their regression analysis.

4.2. Dealing with duplication of ownership and control

As discussed in Section 2.2, while the distinction between beneficial and non-beneficial holdings may be important from a tax perspective, it does not help researchers as it may create duplication in the ownership and control held by individual shareholders. The question arises as to how researchers should identify any such duplication and how they should deal with it. Our advice is as follows.

First, as stated in Table 3 of this paper, researchers should check whether the sum of the individual substantial shareholdings exceeds 100% (e.g., see the case of Exploration Company plc in Appendix 2). If this is the case, it is certain that duplication of ownership is an issue. Also, they should check the additional information provided in the section on substantial shareholdings as well as the notes to the annual report to identify any mention of potential duplication of ownership. The task is then to identify the magnitude of the duplication and remove it from the individual as well as aggregated substantial shareholdings.

Second, researchers should then move onto the holdings of individual shareholders by identifying whether the substantial shareholders or any of the directors have any *non-beneficial holdings*. This is typically an indicator of potential duplication. Researchers should bear in mind that the non-beneficial holders do not have the right to receive income from such holdings. In fact, they only act on

behalf of the actual owners and cast a vote after possibly consulting the latter. Hence, non-beneficial holdings do not affect the actual ownership of the non-beneficial holders, but such holdings may still affect their control over the company as discussed in Section 3.1. Consequently, if any duplication is detected during the data collection, researchers should exclude the non-beneficial holdings when determining the ownership held by individual shareholders but include it when calculating their control.

Finally, they should be aware that some directors could potentially also be substantial shareholders and their stakes may then be reported twice – once in the section on the substantial shareholders and the second time in the section detailing the interests of the directors. Consequently, to avoid duplication, the ownership stake of these directors should be removed from the substantial shareholdings when aggregating the ownership at the company level. Also, they should check the notes to the accounts for any potential duplication due to the existence of both beneficial and non-beneficial holdings by the directors in the company itself but also in entities already accounted for in the section on substantial shareholdings and adjust ownership accordingly.

Failure to adjust for the potential duplication of individual ownership and control discussed above will result in upward biased ownership as well as possibly control. As shown in Section 3, this mismeasurement may lead to incorrect inferences as well as potentially inappropriate policy recommendations.

However, despite these significant consequences, collecting the required information on the duplication of ownership and control is not always straightforward. Some companies provide enough information allowing researchers to identify duplication at the individual as well as the aggregate level. In most cases, however, the degree of duplication of ownership is not clearly stated in the annual reports and researchers are therefore not able to determine the exact holdings of the substantial shareholders at the individual and/or aggregate level. As a result, researchers end up excluding such companies from their sample, potentially causing a bias in the affected study.

Our advice for researchers is to be persistent in their examination of the annual reports and not to underestimate the importance of the notes to the financial statements when working with ownership and control data. For the vast majority of cases, the notes to the financial statements will contain sufficient information to identify ownership and control. For example, the annual reports of some companies state the numbers of shares held by the substantial shareholders as well as the directors but not their percentage holdings. Hence, researchers first need to identify the total number and classes of shares outstanding and then determine the percentages of ownership. This information is reported in the notes to the accounts. Specifically, researchers are advised to check first the item in the Profit and Loss Account related to the basic and diluted earnings/loss per share. Most companies state the number of the respective note to the accounts which contains detailed information required to calculate the earnings per share, including the number of shares outstanding. If there is a difference in the number of shares used to determine the basic and adjusted earnings per share, usually the advice is to use the basic number of shares. The notes to the accounts also contain information on the beneficial and non-beneficial holdings of the directors.

4.3. *Dealing with the complexities arising when determining ultimate control*

The discussion in Section 2.3. highlights the importance of company history in shaping the current ownership and control of a company. Building on this lesson, this section discusses key issues researchers should be aware of when identifying the ultimate control of a company.

The first issue that researchers should acknowledge is that there are various definitions of control (e.g., a blocking minority, a majority and a supermajority of votes) and the chosen definition of control should be appropriate for their study. For example, studies in corporate finance frequently use a blocking minority to define control over a company.²⁷ This threshold, however, may vary depending on the specific research settings. Second, as shown in Section 2.3., control can be exerted indirectly, i.e., via intermediate holdings, and in most cases researchers should go beyond the first tier of control and identify the ultimate control. Identifying ultimate control is important as it allows to determine the true nature of the company's control and ascertain whether the company is widely held or has a controlling shareholder. This is of utmost importance for studies in business and management intent on comparing, for example, family companies with widely held companies. Indeed, families often hold control indirectly, via, e.g., an umbrella company managing the family's various holdings.

As summarised in Table 3, the identification of ultimate control is not without challenges. Annual reports, prospectuses issued in relation to the initial public offering (IPO) and/or the offer document relating to a merger or acquisition can typically be used as potential sources of information on the ultimate control of a company. Yet, in a few cases, the lack of disclosure, often combined with a move of the company's headquarters to a tax heaven, makes the determination of the company's ultimate control impossible.

5. Discussion and conclusion

Researchers working with UK data may find it difficult to access ownership and control data in a machine-readable format and of sufficient quality. Hence, frequently they resort to collecting these data manually. This paper discusses some of the methodological issues faced by researchers when determining ownership and control of UK listed companies. Importantly, it provides guidance, including practical steps, on how to address these issues. Specifically, with the help of six case studies, we identify the methodological issues researchers may face when attempting to distinguish between ownership and control, when measuring the ownership and

²⁷ See Ansari et al. (2014), amongst other studies, which uses a 25% controlling threshold to define a family firm in their sample.

control held by individual shareholders and when determining the ultimate controlling shareholder of a company. The extent of the bias when using ownership data from commercial databases instead of hand collected data is then quantified by replicating the study by Mira et al. (2019). Our results show that institutional ownership in FAME is overstated whereas the director-level ownership data are sparse. The observed bias in ownership data also affects the policy implications generated by the empirical analysis. The new regression results misleadingly indicate that institutional ownership from FAME reduces the need for monitoring conducted by the non-executive directors.

The above results support the argument that dealing with the methodological issues identified in the paper in an appropriate manner is of importance, as the failure to do so may lead to at least two biases. First, the resulting corporate ownership and control structure may suffer from mismeasurement, resulting in incorrect inferences as well as inappropriate policy recommendations with a potentially negative social impact. For example, if researchers ignore the potential duplication of individual ownership and control, this will result in upward biased ownership and control of individual shareholders. Further, researchers intent on identifying who ultimately controls a company may struggle to do so, unless they conduct some substantial detective work. Second, while the availability of information on ownership and control, as well as its quality, may speak volumes about the governance of a company, researchers typically end up excluding companies with unclear information from their samples. This may cause a bias in the affected study as the companies that have obscure ownership and control will not be included in the studied sample. Therefore, it is important for researchers to be aware of and address these methodological issues as well as for regulators to be cognisant of these potential biases.

This paper contributes to the methodology on measuring ownership and control by identifying challenges and working solutions when dealing with this type of data. First, we believe this is the first methodological paper on ownership and control which discusses data processing knowledge which is often transmitted from PhD supervisor to PhD supervisee or from seasoned researchers to early-career researchers. Compared to prior studies (e.g., Adams & Ferreira, 2008), our aim is not to review the literature but to discuss the practical aspects of the data collection and their processing. Readers should find this paper useful as it provides a discussion of the main methodological challenges as well as ways of dealing with these in a single place using case study analysis. Second, we quantify the extent of the bias when using ownership data from commercial databases compared to hand collected data and empirically demonstrate that the use of biased ownership data has a significant effect on the policy implications that are derived from the study. Finally, the issues discussed in this paper are timely as they call for greater disclosure of ownership and control at a time when regulators, practitioners and academics expect an increase in the percentage of dual-class companies as a result of the latest changes to the UK listing rules following the Hill Listing Review (2021).

The evidence presented in this paper provides further support for the calls from regulators, practitioners and academics for greater and more accurate disclosure related to ownership and control data. Improved transparency is core to advancing the governance of UK companies and it is vital for developing sound and reliable policy recommendations.

Data availability

Data will be made available on request.

Appendix 1. Distinguishing between ownership and control: the case of LWT Holdings

Although some non-trivial amount of work was required to determine the overall ownership stake of the Rothermere family discussed in Section 2.2 of the paper, we were nevertheless able to proceed with the task at hand with the help of the information provided in the annual report. This may not always be the case as the following example suggests.

LWT Holdings was a company broadcasting in the London area as well as producing television programmes and providing television production facilities. The company was taken over by Granada Group plc in May 1994. The company had 88,536,403 preference shares and 2,071,840 management shares outstanding in 1992.²⁸ We also know that the management shares could be converted into ordinary shares depending on the price of the preference shares. First, the obscure use of terminology, such as management shares, potentially impedes the understanding of researchers as well as other users of the annual reports. Second, although the company is transparent about the number of shares held by each director, it is not clear what conversion rate should be used when converting management and preference shares into ordinary shares.²⁹ This adds another layer of complexity to the determination of the ownership structure. Finally, no information is provided about the number of votes carried by each class of shares which makes it difficult to determine control. Hence, while the transparency of annual reports has significantly improved over time in the UK, this example from 1992 illustrates that it has not always been possible to identify the ownership and control of the company using the information contained in the annual reports.

In such cases, it makes sense to consult the articles of association of the company in question. These are typically available for free from the Companies House. Consulting the articles of association from 1989 of LWT Holdings, paragraph 3.3 (C) reveals that the conversion rate of the preference shares into ordinary shares is one. Paragraph 3.4 (C) provides the equivalent information for the

²⁸ See note 12 to the accounts on page 31 of the 1992 annual report.

²⁹ See page 15 of the 1992 annual report for the information on the number of shares held by each director. Further, LWT plc uses different conversion rates for management into ordinary shares depending on the purpose of the calculation. For example, in order to calculate basic earnings per share the company converts one management share into one ordinary share but the conversion rate used is a maximum of 4.048 when calculating the fully diluted earnings per share. Surprisingly, the company does not state the minimum conversion rate.

conversion of the management shares. Here, the conversion is more complicated as there is a conversion date (i.e., the date falling 22 business days after the announcement of the unaudited interim results for the six months end 20 June 1993 or 30 November 1993, whichever is earlier) and the conversion rate depends on the average middle market price of the ordinary shares during the twenty days preceding the conversion date. A table is provided at the same paragraph with the conversion rate applying to various average middle market prices. We suggest that researchers use the average middle market price for the ordinary shares during the 20 days preceding 31 December 1992, the date for the directors' interests as reported in the 1992 annual report. An alternative approach would consist of researchers using hindsight and applying the actual conversion rate of the management shares in 1993. The listing particulars of 1993 (also available from the Companies House) provide the necessary information. The interim results were announced on 29 July 1993 while the listing particulars are dated 25 August 1993. The price of the ordinary shares was 465p on 23 August 1993 (see p.2 of the listing particulars) and it exceeded the price required for the maximum conversion rate of 4.048 ordinary shares for each management share. Hence, researchers could use the actual conversion rate. Finally, paragraphs 3.3 (D) and 3.4 (D), respectively, state that each preference share and each management share carry one vote. Hence, the information to determine the percentages of votes held by each shareholder is available.

Appendix 2. Determining individual ownership and control: the case of Exploration Company plc

Exploration Company plc is an investment company. According to the 2002 annual report of Exploration Company plc, the company issued only one type of securities: 12,052,925 stock units of 5 pence each.³⁰ In the *Substantial Interests* section of the annual report, the company states that 47.97% of the issued stock units are held by El Oro Mining and Exploration Company. Just below this statement, the company provides details of additional beneficial and non-beneficial holdings of substantial shareholders, i.e., shareholders of 3% or more of the issued capital. In the notes to the table, the company explains that as a result of some substantial shareholders "being trustees of several family trusts, their non-beneficial interest contains a degree of duplication" (page 5). Although the company provides the names of these shareholders, the degree of duplication for each individual substantial shareholder or even in aggregate is not stated. As a result, researchers cannot accurately measure the holdings of individual substantial shareholders. The same issue applies to the *Remuneration Report* where the company states that the executive chairman acts as a trustee of several family trusts and hence his non-beneficial shareholding contains some degree of duplication without providing details.³¹ Finally, some of the non-executives on the board of directors of Exploration Company plc are also directors on the board of El Oro Mining and Exploration Company which holds almost half of the stock units issued by the former (i.e., there is again substantial duplication). Considering all these issues, it is safe to conclude that there is significant overlap in terms of the ownership for this company.³²

In such circumstances, researchers are advised to check whether additional information is provided in the corresponding annual report that will allow to quantify the degree of duplication in ownership and control. If this is not the case, similar to the example of LWT Holdings, researchers should then consult other sources of information that could include commercial databases, such as FAME, or public resources such as the filing archives of the Companies House. Further research shows that no additional information related to the ownership structure of the *Exploration Company plc in 2002* is available from any of the above sources. However, we expect that this type of information might be available for other companies, especially for more recent years. Companies for which relevant information related to the duplication of ownership and control is not available have to be excluded from the sample.

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³⁰ See note 6 to the accounts on page 21 of the 2002 annual report.

³¹ See page 11 of the 2002 annual report.

³² A simple calculation cos that the total holdings (i.e., the beneficial and non-beneficial holdings) of the substantial shareholders, including El Oro Mining and Exploration Company and the directors, exceed 100% by about 6%.

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