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# Accuracy in private company financial reporting for prediction of future cash flow

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#### ABSTRACT

UK and European private companies follow less stringent reporting standards compared to public ones, with simpler measurement rules. While extensive research focuses on public companies, the impact of these standards on private firms remains underexplored. Our study examines prediction errors using approximately 1.5 million observations of UK private companies for the period from 2006 to 2022, covering a wide range of economic conditions. We distinguish between microsized, small, medium-sized, and large private companies. For micro- and small firms, prediction errors for future cash flow are only slightly larger than those of public companies, supporting the European Union 2013 directive to minimize reporting burdens on small businesses. However, medium-sized and large private companies exhibit errors more than double those of public firms, indicating less informative disclosures. These results are robust in predicting beyond the next period and in times when financial distress is high, and therefore will be useful to both investors and creditors.

#### **KEYWORDS**

Prediction of future cash flow; financial reporting regulation; private companies

# Introduction and overview

# Regulatory background

One of the major changes in UK financial reporting in recent years has been the emergence of separate reporting regimes for different classes of private company, permitting them to follow less stringent reporting standards than public companies. The classes of company are defined according to a combination of the size measures of the company-total turnover, total assets, number of employees. A significant milestone was the introduction of The Financial Reporting Standard for Smaller Entities (FRSSE) in 1997. Its main thrust was to provide, for smaller companies, simplifications of the UK financial reporting measurement rules used for public companies.

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The relaxation of financial reporting then took on an international dimension. The International Accounting Standards Board (IASB) issued their International Accounting Standard for Small and Medium-sized Entities (2009).<sup>1</sup> In addition, there were developments from the European Union (EU); the EU Directive 2012/6 (EU, 2012) recognized a new class of small company, the micro-company; and the EU Directive 2013/34 (EU, 2013) had the objective of reducing disproportionate costs imposed on smaller companies. In response to these developments, the standards for private companies in the United Kingdom were significantly revised and became effective in 2016. They are contained in Financial Reporting Standard (FRS) 102 covering small, medium-sized, and large private entities (Financial Reporting Council, 2015a) and FRS 105 covering the very small micro-entities (Financial Reporting Council, 2015b). These standards (with periodic revisions) are currently applicable in the United Kingdom.

FRS 102 continues and extends the approach of the FRSSE but places the regulations within the context of the IASB and European approaches. In particular, it states that the benefits derived from information should exceed the cost of providing it, which gives the company significant discretion (Financial Reporting Council, 2015a, sec. 2.13). FRS 105 covers microentities and further simplifies asset and liability measurement relative to FRS 102. An important and new feature of FRS 105 is that the accounts are presumed to give a true and fair view if they comply with the standard (Financial Reporting Council, 2015b, sec. 3.2). This contrasts with the earlier FRSSE in which supplementary disclosures were sometimes necessary when compliance with the standard did not necessarily suffice. The new feature reflects the considerable simplicity of the standard that may have otherwise led to the cost savings on transaction measurement being swamped by extra disclosure costs.

# The issue and focus of our study

When private companies adopt recognition and measurement standards that are less rigorous than those for public companies, an important concern is the effects on the quality of financial reporting. The relaxation may eliminate the disproportionate cost of reporting, as suggested by the EU; but an important issue remaining is whether there is also any disproportionate reduction in the usefulness of the information provided, so that users' needs are not satisfied. We assess this issue by evaluating the ability of private company reporting to provide information about future cash flow.

Evaluating the prediction of cash flow is a well-established approach for public companies. It is also appropriate for private companies because both

<sup>&</sup>lt;sup>1</sup>Public companies from 2005 were required to adopt International Financial Reporting Standards.

FRS 102 and FRS 105 are based on the IFRS for small and medium-sized enterprises (SMEs) and predicting a company's future cash flow is a key objective in the IASB's conceptual framework (2018, p. 1.3). Perhaps more importantly, the prospect for future cash flow is of particular importance for private companies in view of its reliance on bank finance. Despite the need to assess the impact of the relaxation of reporting requirements, there is a significant lack of research on predicting the cash flow of private companies. A notable exception to this is Hope et al. (2017) who find that the accruals of U.S. firms are informative about future cash flow. The scarcity of private company research in this area is especially important in view of the relative paucity of information about the companies' prospects outside of the financial reporting cycle.

# The contribution of the study

In this study, we assess the prediction of U.K. private companies' future cash flow from their accounting data. We use the predictions for public companies as a benchmark because they are regulated by the more complex International Financial Reporting Standards (IFRS). The predictions, for both private and public companies, are based on the current value of aggregate cash flow, accruals, and capital expenditure, which is the accepted approach adopted in public company studies. We use the same model specification for both private and public companies to identify more accurately the effect of the relaxation in the measurement rules for private companies. We also investigate the separate role of accruals and discretionary accruals to give insight about the factors behind the results. The focus of the current study is to establish, in the light of the long-standing relaxation of rules for private companies, whether their reporting is effective in predicting future cash flow. The key results are outlined next.

Our study is based on about 1.5 million private company observations over the period from 2006 to 2022. We find that the prediction error for microcompanies is lower than for other classes of private company and only 30 percent above that of public companies. Despite the reduction in the reporting burden on micro-companies in FRS 105, their information seems useful for predicting future cash flow. Small private companies have only a slightly higher prediction error than micro-companies. These results indicate the success of the EU 2013 directive to reduce the reporting burden on small businesses while maintaining key benefits. However, medium-sized and large private companies have an error that is more than double that of public companies. Given that these are substantial companies with extensive stakeholder interests, the reporting standards may need to be reviewed. This supports the finding of the United Kingdom's Financial Reporting Council that the quality of reporting of the United Kingdom's largest private 4 😉 S. LIU AND L. SKERRATT

companies is mixed (Financial Reporting Council, 2024, sec. 6.1). In times of high financial distress, the prediction errors generally decrease slightly as reporting becomes more informative. However, the superiority of micro-/ small businesses over medium-sized and large private companies remains. These results will be of great interest to investors, banks, and other creditors.

The structure of the article is as follows. In the next section, we outline the motivation for the work and the distinctive features of our approach. Section 3 provides details of the prediction model and error metric. This is followed by the sample selection process. Section 5 presents our key results, comparing groups of private company (micro, small, medium-sized and large) with public companies, and distinguishing between the contribution made by past cash flow and accruals to forecast accuracy. Section 6 discusses supplementary and robustness tests, and the final section concludes.

#### Motivation and approach

# The importance of future cash flow

The prospective value and risk of future cash flow to the company is a key objective of financial reporting, and understanding the directors' stewardship of the company's resources is critical to stakeholders in assessing future cash flow. This is recognized in the IASB's recent revision of the conceptual framework, which is the basis of both public and private company financial reporting regulation (IASB, 2018, pp. A15, A17).

The literature on the prediction of public company future cash flow from accounting numbers is therefore, not surprisingly, considerable. One of the main areas is the evaluation of how informative current cash flow is about future cash flow and the additional contribution of accruals (Ball & Nikolaev, 2022; Barth et al., 2016; Habib, 2010; Mulenga & Bhatia, 2017; Nallareddy et al., 2020). It is therefore surprising that there are very few studies about the prediction of future cash flow of private companies. This omission is significant given the importance of the annual report relative to other sources of information about the company. Hope et al. (2017) gave a comprehensive background to the stakeholder demand theory for information about future cash flow of private companies. However, a few additional remarks are also worthwhile. Berger and Udell (2006) made the point that, in a lending context, there are substitutes for accounting information about future cash flow; for example, a subset of the firm's assets may be pledged as collateral, which is then the primary repayment source rather than future cash flow. In addition, there may be other ways to identify the credit worthiness of the company; for example, relationship lending, where soft information is gathered over time by the loan officer.

However, despite the availability of these substitutes, there appears to be a substantial demand for private company accounting information that can signal future cash flow. Minnis and Shroff (2017) reported that, in their survey of regulators and private company managers, lenders and creditors are among the top beneficiaries of private company financial reporting. This finding is consistent with the evidence of both Bharath et al. (2008) and Hellman et al. (2022) who report a reduction in the cost of debt for private companies following increased disclosure. The key point here is that the substitute lending technologies may be more costly (or less effective) than that based on forward-looking accounting information (often called transactional banking). Breuer et al. (2018) suggested an explanation for the superiority of this financial reporting-based transactional banking. They argued that it benefits companies by reducing their reliance on subjective opinions of loan officers. On the banking side, it reduces their costs by transferring them to companies and also reduces the information asymmetries between banks, allowing increased competition. It also facilitates the enforcement of banking contracts (MacLeod, 2007).

Stakeholders apart from lenders and creditors may also value the information in the annual report and accounts. Private companies can be large organizations<sup>2</sup> with employees, customers, and suppliers having little knowledge of the economic condition of the business. Cheney (2012) reflected on the considerable stakeholder demand for forward-looking cash flow information when commenting on the Financial Accounting Standards Board's framework for private company reporting. Apart from the demand from lenders and creditors, there is demand for information within a private company. For example, accounting information, and particularly cash flow information, is important for managerial purposes (Collis & Jarvis, 2002a); also, the annual report and accounts may be useful in reducing any information asymmetry between owners, particularly those who are not members of the same family (Collis et al., 2004).

Given all these well-documented demands for private company financial reporting, it is therefore important to understand the impact of the simpler standards applied to U.K. private companies.

# A focus on prediction

A distinctive feature of our tests is to make prediction a specific focus. One aspect of this is that we use out-of-sample tests; that is, the data used to calculate the predicted value exclude the cash flow realization used to calculate the prediction error. This is a more realistic approach than the in-sample regression tests undertaken by much of the cash flow prediction literature.

<sup>&</sup>lt;sup>2</sup>For example, a small company in the United Kingdom may have up to 50 employees.

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They assume that parameters of the model remain constant over the prediction and realization periods. This assumption may be highly unrealistic (Pitarakis, 2017; Poon & Granger, 2003; Rapach & Wohar, 2006). Therefore, it is important that tests of the predictive sufficiency of financial reporting should reflect the real position of stakeholders; that is, trying to predict out-ofsample future cash flow from prior data.

# Disaggregation of private companies into micro, small, medium, and large

An important issue we address, which is not considered in prior studies, is the heterogeneity among private companies. Private companies are exceptionally varied, ranging from a single-owner consultancy business to a nation-wide privately owned industrial operation. In order to understand the potential range of outcomes within the private company sample, the firm-year observations are divided into groups, according to the different reporting regimes for micro, small, medium, and large according to the legislation<sup>3</sup> at the time. This contrasts with prior work that groups private companies all together.

The partition of the sample by reporting regime is important for understanding and evaluating financial regulation, but it also reflects the interests of stakeholders (customers, employees, creditors, banks, and other investors). They make assessments in very broad brush ways; see, for example, Bouwman et al. (1995) and Breton and Taffler (2001). The regimes are based on a combination of size measures. Because stakeholders will have an impression of a company's approximate size, our classification and findings will be useful to them.

# Forecasting models and prediction error measures

# The forecasting model

We follow the prediction model of Lev et al. (2010), which they used to predict the cash flow of public companies for the following period. This is a wellaccepted prediction model and is used in many studies (for example, Nallareddy et al., 2020). We also use this model for our private company predictions so that the prediction errors between private and public companies reflect the differences between the measurement procedures of the different financial reporting regimes. An important aspect of their approach is that they used capital expenditure as an independent variable to predict future cash flow (because the expenditure increases the scale of operations) in addition to the usual cash flow and accruals. The prediction is constructed in two stages. The

<sup>&</sup>lt;sup>3</sup>Micro-companies were first defined by The Small Companies (Micro-Entities' Accounts) Regulations 2013. Private company observations before this date are classified as micro according to this legislation. Details of the classifications are given in the Appendix.

first stage is to estimate (at the prediction date, t) the relation between accounting numbers for period t-1 and the cash flow in period t. The second stage is to use the coefficients of this model to predict the cash flow in period t + 1, based on accounting numbers at t. This is a realistic test of the information contained in key accounting numbers about future cash flow. Our forecast construction, following Lev et al. (2010), does not contain control variables. Instead, we estimate the models at the two-digit Standard Industrial Classification code level so that industry-specific influences are reflected in the estimated coefficients.

The overall purpose of the analysis is to establish whether stakeholders, such as banks and creditors, of private companies have been put at a disadvantage (in prediction terms) due to the less stringent standards that the companies are allowed to follow. By disadvantage, we mean in comparison with the accounting standards that public companies are required to use. Therefore, the forecast errors for public companies are based solely on their accounting information and do not include other information that is available for public companies outside of the accounts (for example, reports by analysts and other financial intermediaries<sup>4</sup>).

The main model (M1) we use contains cash flow and individual accruals to predict future cash flow, estimated by regression at each industry level. It is given in Equation (1).

$$CFO_{t} = a + b.CFO_{t-1} + c.\Delta \operatorname{Re} c_{t-1} + d.\Delta \operatorname{In} v_{t-1} + e.\Delta \operatorname{Pa} y_{t-1} + f.\Delta \operatorname{DTa} x_{t-1} + g.\Delta \operatorname{Ot} h_{t-1} + h. D\& A_{t-1} + j.CAP\_EXP_{t-1} + u_{t}$$
(1)

where the variables (scaled by opening total assets) are:

| $CFO_t =$                   | the cash flow from operations for period <i>t</i> ,      |
|-----------------------------|--|
| $\Delta \text{Rec}_{t-1} =$ | the change in receivables during period <i>t</i> -1,     |
| $\Delta Inv_{t-1} =$        | the change in inventory during period <i>t</i> -1,       |
| $\Delta Pay_{t-1} =$        | the change in payables during period <i>t</i> -1,        |
| $\Delta DTax_{t-1} =$       | the change in deferred tax during period <i>t</i> -1,    |
| $\Delta Oth_{t-1} =$        | the change in other accruals during period <i>t</i> -1,  |
| $D&A_{t-1} =$               | the depreciation and amortization for period <i>t</i> -1 |
| $CAP\_EX_{t-1} =$           | the capital expenditure for period <i>t</i> -1, and      |
| u <sub>t</sub> =            | a random residual.                                       |
|                             |  |

We then use these estimated coefficients<sup>5</sup> to calculate the predicted cash flow for period t + 1 (Predicted<sub>t+1</sub>) from the accounting data at time t. This is calculated as in Equation (1a). The prediction error is then calculated by subtracting the predicted value from the realization, as follows:

Predicted<sub>t+1</sub> =  $\hat{a} + \hat{b}$ .CFO<sub>t</sub> +  $\hat{c}$ . $\Delta$ Rec<sub>t</sub> +  $\hat{d}$ . $\Delta$ Inv<sub>t</sub> +  $\hat{e}$ . $\Delta$ Pay<sub>t</sub> +  $\hat{f}$ . $\Delta$ DTax<sub>t</sub> +  $\hat{g}$ . $\Delta$ Oth<sub>t</sub>  $\hat{h}$ .D&A<sub>t</sub> +  $\hat{j}$ .CAP\_EX<sub>t</sub> (1a)

<sup>&</sup>lt;sup>4</sup>In fact, there would be little point in including this information because it is well established that it contains bias and has a very short-term focus. See, for example, and Bradshaw (2011), DeBondt and Thaler (1990), and Dimson and Marsh (1984).

 $<sup>^{5}</sup>$ If a coefficient in the regression is not significant at 5 percent, it is set to zero in the calculation stage.

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 $Prediction Error_{t+1} = Actual_{t+1} \text{ (the realization) minus the predicted value} = CFO_{t+1} - Predicted_{t+1}$ 

# **Prediction error measures**

The prediction error above, as is normal practice, is based on variables scaled by total assets; this is to avoid a number of statistical issues. However, measuring the forecast error as a proportion of the size of the business is not an intuitive measure. Any comparison between companies is affected by both the prediction error and the intensity with which assets are used in the business; a forecast error as a proportion of lagged assets may be large simply because the company has a low value of assets. In particular, this may affect the comparison between private and public companies because the former may be less capital intensive at the same level of earnings.<sup>6</sup>

For our analysis, we use a summary measure of prediction errors that is not affected by this capital intensity effect. We scale errors by the realization of future cash flow so that both the numerator and the denominator are scaled by lagged assets, making the error proportionate to the realization of future cash flow. In this way, the capital intensity effect is excluded from the error measure. The measure we use is the mean absolute proportionate error (MAPE), defined as follows:

 $MAPE_t =$  the mean absolute proportionate error of ncompanies, from aforecast at t.

$$\text{MAPEt} = \frac{\sum_{i=1}^{n} \left( \left| \frac{Actual_{i,t} - Predicted_{i,t}}{Actual_{i,t}} \right| \right)}{n}$$

The MAPE is used in many fields (Morley et al., 2018) and allows comparison between groups of observations. Our significance tests are based on the approximate randomization (permutation) method discussed in Noreen (1989) and Wilcox (2003).

# Sample selection

The data applied in this article are obtained from the Financial Analysis Made Easy (FAME) database supplied by Bureau Van Dijk. The database provides financial statement information for both public and private UK companies. The main advantage of the FAME database is that it contains comprehensive accounting data for privately held corporations and is a common source of data for work in this area (Ball & Shivakumar, 2005; Dedman et al., 2014).

<sup>&</sup>lt;sup>6</sup>For example, in our sample, the ratio of earnings to assets (for positive cash flow) is 0.063 for public companies, but 0.30 for private companies, indicating that private companies have a lower intensity of assets for a given level of earnings.

|  |               |                      |               |             | Pu           | blic    | Private   |
|--|---------------|----------------------|---------------|-------------|--------------|---------|-----------|
| Panel A: Sam                                 | ple selection | า                    |               |             |              |         |           |
| Firms with available variables in period $t$ |               |                      |               |             | 1,           | 357     | 327,252   |
| Micro  |               |                      |               |             |              | 171,276 |           |
| Small  |               |                      |               |             |              | 72,286  |           |
| Medium                                       |               |                      |               |             |              |         | 56,782    |
| large  |               |                      |               |             |              | 26,908  |           |
| Firm-vear obs                                | ervations     |                      |               |             |              |         | ,         |
| Public                                       |               |                      |               |             | 14           | 269     |           |
| Total privat                                 | e             |                      |               |             |              |         | 1.564.641 |
| Micro  |               |                      |               |             |              |         | 723,369   |
| Small  |               |                      |               |             |              |         | 305.771   |
| Medium                                       |               |                      |               |             |              |         | 352.912   |
| Large  |               |                      |               |             |              |         | 182,589   |
| Observations                                 | to number of  | firms                |               |             |              |         | ,         |
| Public                                       |               |                      |               |             | 10           | 0.5     |           |
| Total private                                |               |                      |               |             |              | 4.8     |           |
| Micro  |               |                      |               |             |              | 4.2     |           |
| Small  |               |                      |               |             | 4.2          |         |           |
| Medium                                       |               |                      |               |             |              | 6.2     |           |
| Large  |               |                      |               |             |              |         | 6.8       |
| Danal P. Cala                                | c and total a | scots for diffor     | ont cize of f | rme (fauroe | in Thoucando | ۱       |           |
| Fallel D. Sale                               | s anu totai a | Moon                 |               | D25         | Modian       | D75     | POO       |
| Public                                       | Salac         | 1 801 003            | 1 3 8 /       | 0 470       | 64 100       | 167 103 | 2 3/6 100 |
| rubiic                                       | Accots        | 031 / 57             | 3 784         | 1/ 082      | 77 376       | 547 607 | 2,340,100 |
|  | Assets        | 931, <del>4</del> 37 | 5,704         | 14,002      | 77,570       | 547,007 | 5,007,205 |
| All private                                  | Sales         | 25,771               | 12            | 60          | 608          | 9,338   | 31,387    |
|  | Assets        | 19,460               | 8             | 42          | 877          | 7,880   | 31,143    |
| Micro  | Sales         | 156                  | 4             | 19          | 64           | 182     | 421       |
|  | Assets        | 313                  | 4             | 12          | 44           | 188     | 895       |
| с II   | <b>C</b> 1    | 2.464                | 02.4          | 4.276       | 2 420        | 4 5 7 7 | 7.001     |
| Small  | Sales         | 3,464                | 834           | 1,276       | 2,439        | 4,577   | 7,001     |
|  | Assets        | 7,200                | 506           | 967         | 2,266        | 5,633   | 23,543    |
| Medium                                       | Sales         | 15,996               | 6,309         | 8,977       | 13,445       | 20,157  | 27,898    |
|  | Assets        | 12,972               | 3,936         | 5,540       | 8,467        | 13,840  | 27,547    |
| Large  | Sales         | 221 083              | 20 381        | 40 720      | 67 020       | 130 766 | 342 800   |
| Large  |               | 150 459              | 17 1/10       | 25 231      | 49 370       | 134,071 | AA7 577   |
|  | Assers        | 100,409              | 17,149        | 23,231      | 49,370       | 104,071 | 447,J7Z   |

Table 1. Sample selection and type of firms.

Note: Type of firms is defined by regulatory reporting regimes based on size thresholds from the Companies Act 2006.

We selected both private and public companies for the period of 2006–2022<sup>7</sup> from FAME. Table 1 (Panel A) shows our sample selection criteria for firms. We excluded banks, other financial institutions, and firms with negative total assets. We restricted the sample to public companies that explicitly report under IFRS and private companies that report under the United Kingdom's Generally Accepted Accounting Practice. We required companies to report a profit and loss account, which is needed to construct the cash flow forecast. As expected, the generally observed inverse relation between company size and risk is apparent from the ratio of firm-year observations to the number of firms. The average for private companies is 4.8, compared to 10.5 for public companies; this difference reflects the relatively short lives of private companies. There is also a difference within private companies. Micro-/small companies have the lowest ratios, while those for

<sup>&</sup>lt;sup>7</sup>We also need prior year data to calculate accruals, but this is not part of our sample period for the forecast tests.

medium-sized and large private companies are larger, reflecting their relative longevity.

Our sample size of some 1,564,641 observations on 327,252 private companies is comparable with other studies of private companies. Hope et al. (2013) had approximately 40,000 observations; Hope et al. (2017) had approximately 66,000 observations. In comparison with the size of companies in Hope et al. (2017, Table 2), our sample contains both smaller and larger companies. Overall, these comparisons indicate that our sample captures a range of companies suitable for the research issues.

# Main results: The predictive ability of cash flow and accruals

This section gives our main results. First, we analyze the forecast errors with MAPE. We examine the errors from both M1 and the reduced model (M2) without any accruals. We then investigate the impact of the regulatory changes in 2016, in which the financial reporting for private companies was revised and covered in two new standards, FRS 102 and FRS 105. The final analysis concerns the effect of options available to some private companies to file a cut down version of the accounts with Companies House, with the full accounts being available only to shareholders.

# MAPE

In this section, we compare the prediction errors across public and private companies using MAPE. Our first research question is as follows:

**RQ1**: Are the prediction errors of private companies, following less stringent accounting standards, different from those of public companies?

The results are given in Table 2, columns 1 and 2.<sup>8</sup> The results in M1 support the relaxation of reporting standards for micro-companies; although the MAPE is larger than that for public companies, the difference is small. Importantly, micro-companies have smaller errors than other private companies; for example, the MAPE for micro-companies is 1.142, while the MAPE for large private companies is 1.890. Small companies are similar to micro ones. Thus, it appears that, despite the less stringent standards followed by micro-/small companies, their reporting has nearly as much predictive value as that of public companies. This is accompanied by their relatively low standard deviations of the absolute prediction errors in column 2 of Table 2, indicating that the average errors are representative.

<sup>&</sup>lt;sup>8</sup>We also calculate other ratios (not given here) that illustrate that the distribution of errors is similar to other studies of private companies.

#### Table 2. Proportionate error of forecasts.

|                    | (1)<br>MAPE | (2)<br>sd. MAPE |
|--------------------|-------------|-----------------|
| M1 (Main model)    |             |                 |
| Public             | 0.895       | 1.068           |
| Micro              | 1.142*      | 1.109           |
| Small              | 1.310*      | 1.428           |
| Medium             | 1.856*      | 2.167           |
| Large private      | 1.890*      | 2.100           |
| M2 (Reduced model) |             |                 |
| Public             | 0.565‡      | 0.481           |
| Micro              | 1.179‡      | 1.190           |
| Small              | 1.234‡      | 1.333           |
| Medium             | 1.885‡      | 2.250           |
| Large private      | 2.063‡      | 2.295           |

*Notes*: Type of firms is defined according to regulatory reporting regimes from the Companies Act 2006.

M1 represents the main model, which contains cash flow, components of accruals, and capital expenditures as detailed in Equation (1). M2 is the reduced model, which includes cash flow and capital expenditures while excluding the components of accruals.

The prediction is constructed in two stages. The first stage is to estimate (at the prediction date, t) the relation between accounting numbers for period t-1 and the cash flow in period t for each industry and size group of companies. The second stage is to use the coefficients of this model to predict the cash flow in period t+1, based on accounting numbers at t for each industry and size group of companies.

MAPE is defined as the mean of absolute proportionate error calculated separately from estimating M1 and M2.

Sd. MAPE is the standard deviation of MAPE within each group of firms.

All statistics are computed after winsorizing the top 1 percentiles.

Additional measures are included to facilitate comparison with other studies of public companies.

\*indicates significant difference between each type of private company and public company is significant at the 5 percent level or better.

‡indicates significant difference between model 1 and model 2 for each type of company is significant at the 5 percent level or better.

Based on the generally observed inverse relation between company size and its variability, we would not expect this type of performance from micro-/small companies. For example, Meeks and Whittington (2023) documented the high survival rate of U.K. public companies since 1948, and Gaio and Henriques (2018) showed the greater risk of SMEs relative to other businesses in the EU.

The consistency of our results with an inverse size–risk relation is indicated in Table 1 (Panel A), where we use the ratio of the number of firm-year observations to the number of firms as a measure of longevity and risk. Public companies have the highest ratio (10.5) and micro-/small companies have a lower but perhaps above average ratio (4.2). There are a number of potential explanations for this consistency. One reason concerns the financial literacy of the owners based on Riepe et al. (2022) who argued that financial literacy is

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associated with risk aversion. Entrepreneurs who choose the vehicle of incorporation may be more financially aware than average. and Collis (2012) and Collis and Jarvis (2002a) found that there is a high level of financial literacy among the management of small private companies; Peel (2016) found that survival of small companies is strongly associated with the education of the management. Thus, although there is an inverse size-risk relation, it is reduced by the quality of management.

A second explanation is that micro-/small companies in our sample are observed prior to the impact of any economic problems. Because they are largely funded by debt, when economic circumstances are challenging, the required interest payments give them very little room for maneuver and they exit the sample far quicker than larger businesses. This is supported by evidence in Andreeva et al. (2016) and Peel (2016) who found that gearing<sup>9</sup> is an important determinant of failure in small companies.

In addition, the relaxation of reporting rules may have contributed to the lessening of the inverse size-risk ratio. Simple financial reporting may also bring benefits to managers and stakeholders alike. Reduced regulation may allow management to spend more time running the business rather than complying with complicated regulations, as suggested by Sorrentino and Smarra (2014). Support for this explanation is provided by Collis and Jarvis (2002b, Table 9) who report that directors believed that the preparation of the statutory accounts misallocated management time. In addition, Collis and Jarvis (2002b, Table 8) found that statutory accounts are used as a general check on the information that management uses to run the business. Given this background use, the simpler reporting for micro-/small businesses may facilitate this corroboration. Thus, overall, the business may be managed more effectively.

Finally, the result for micro-/small companies is consistent with the wideranging theory of "less is more" (Aikman et al., 2021, p. 321; Gigerenzer, 2004, p. 71). The hypothesis in our context is that current performance is the result of a mix of permanent and transitory factors. While predictions based on simple financial reporting rules may omit a number of permanent factors, their advantage is that they are less likely to capture those that are transitory and irrelevant for prediction. Thus, the simple regulations for micro-/small businesses may be sufficient.

In contrast, Table 2 shows that medium-sized and larger private companies have prediction errors and standard deviations that are more than double that of public companies. One possible explanation is that these companies are subject to more risk than other companies (public or private). This is supported by the relative large standard deviations of MAPE, which are double

<sup>&</sup>lt;sup>9</sup>Gearing measures an entity's financial leverage, showing the extent to which a firm's activities are funded by shareholders' equity versus creditors' funds.

that for public companies. Consequently, more complex recognition and measurement regulations may be appropriate for these companies. A similar conclusion is reached by the UK's Financial Reporting Council in their 2024 review of large private companies.

# The role of accruals in predicting future cash flow

In this section we narrow our focus and analyze the impact of accruals on the prediction error. The accruals principle in reporting is an important correction to cash flow as a measure of performance. It is therefore important to assess its effect on the predictability of future cash flow. The study by Hope et al. (2017) found that accruals and accruals quality are significant variables in a regression to explain future cash flow. However, as we argue above, a weakness of this approach is that it assumes that parameter values remain the same between the estimation period and the forecast period. Our research question is as follows:

**RQ2**: Are the accruals of private companies, following less stringent standards, as informative about future cash flow compared with those of public companies?

We measure the effect of total accruals by comparing predictions based on our full model in Equation (1) (using cash flow, individual accruals, and capital expenditure) with a reduced one using cash flow and capital expenditure alone. If total accruals are informative, then the errors from M2 will be larger than those from M1. The results are given in Table 2.

For micro-sized, medium-sized, and large private companies, this suggests that their accruals provide useful information about future cash flows. The MAPE values for M2 are larger than those for M1. In contrast, small companies have a lower MAPE value for M2, indicating that accruals convey more noise than signal about future cash flow. However, not too much should be made of this result because the reduction, although statistically significant, is very modest.

Accruals of private companies are more informative than in the case of public companies, for which M2 has a much smaller prediction error (0.565) than in M1 (0.895). This is somewhat surprising because the smaller private companies tend to be cash-based businesses, giving little scope for accruals to play a key role in prediction; but it would not be surprising if creditors and managers, with so much at risk, take future prospects very seriously and act accordingly. We do not investigate this result fully here, but it is comparable with Nallareddy et al. (2020) who report that, for U.S. public companies, from 1989 to 2015, accruals and their components had a very small incremental predictive ability over cash flow.

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# The effect of the private company regulatory changes in 2016

The year 2016 was significant for the financial reporting regulation of private companies in the United Kingdom. The FRSSE was withdrawn, and FRS 102 (covering small, medium-sized, and larger private companies) and FRS 105 (covering micro-companies) became mandatory. These new standards are based on the IFRS for SMEs, whereas the prior regulations were modifications of standards previously designed for public companies.<sup>10</sup> In this section, we assess the impact of this significant change in regulation. Our research question is as follows.

#### RQ3: What is the impact of the regulatory regime changes for private companies in 2016?

The results are shown in Table 3 (Panel A), giving key prediction error statistics pre-2016 and post-2016 for both full and reduced models; the significance tests in the final column show, for each model, whether the MAPE in the post-2016 period is significant from that in the pre-2016 period.

The values for MAPE for M1 show that in the period from 2016 to 2022, the prediction error rises slightly for micro-companies. There was a relaxation in standards for micro-companies, switching from the FRSSE to FRS 105; the FRSSE was an abbreviated version of U.K. standards for all companies, whereas FRS 105 is based on the International Financial Standard for Smaller Entities (IFRS for SMEs). The purpose of the switch was to ease the disproportionate burden of financial regulation. It results in a slight rise in the MAPE, but micro-companies have the lowest MAPE of all private companies, both before and after 2016.

In the case of small companies, the pre-/post-2016 breakdown is especially relevant, because Table 2 shows that they are the only group of private companies for which total accruals are not informative about future cash flow. The results in Table 3 show that this characteristic is more pronounced in the post-2016 period. In the cases of medium-sized and large private companies, the regime changes are consolidatory in nature because their MAPE values are not significantly different pre-2016 and post-2016.

# The option for private companies to file non-full accounts

Private companies are sometimes permitted to file, for public access, a cut down version of their regular accounts that are then available only to shareholders. This was an early concession to some private companies in the Companies Act 1981. Government policy now is to eliminate these options, because companies need to provide the full information for their shareholders and consequently there is little cost saving. In this section, we investigate the

<sup>&</sup>lt;sup>10</sup>In 2005, public companies were required to adopt International Financial Reporting Standards.

| Table J. Tu   | Tuner tests 0    |                 |                   | orecasts. |                        |                         |  |
|---|------------------|-----------------|-------------------|-----------|------------------------|-------------------------|--|
|   |                  | Pre             | -2016 (2006–20    | 015)      | Post-2016 (2016-2022)  |                         |  |
|   |                  | MAPE (M1)       | MAPE              | E (M2)    | MAPE (M1)              | MAPE (M2)               |  |
| Panel A: Pre  | - and post-201   | 6 regulatory ch | anges             |           |                        |                         |  |
| Public  | •                | 0.911           | 0.5               | 577       | 0.875                  | 0.550*                  |  |
| Micro   |                  | 1.110           |                   | 151       | 1.234*                 | 1.261*                  |  |
| Small   |                  | 1.323           | 1.2               | 267       | 1.293*                 | 1.188*                  |  |
| Medium  |                  | 1.862           | 1.9               | 923       | 1.847                  | 1.836*                  |  |
| Large private   | e                | 1.899           | 2.1               | 132       | 1.878                  | 1.959*                  |  |
|   | Full ac          | counts          | Non-full accounts |           | Difference betwee      | tween full and non-full |  |
|   | MAPE (M1)        | MAPE (M2)       | MAPE (M1)         | MAPE (M2) | Diff (M1)              | Diff (M2)               |  |
| Panel B: Full accounts and non-full accounts<br>Pre-2016<br>Micro 1.050 1.059 1.158 1.211 0.000+ 0.122+ |                  |                 |                   | 0.123±    |                        |                         |  |
| Small   | 1 315            | 1 263           | 1 338             | 1 275     | 0.023±                 | 0.012                   |  |
| Medium  | 1.843            | 1.891           | 1.988             | 2.132     | 0.145±                 | 0.241±                  |  |
| Post-2016   |                  |                 |                   |           |                        |                         |  |
| Micro   | 1.19             | 1.225           | 1.291             | 1.308     | 0.101‡                 | 0.083‡                  |  |
| Small   | 1.29             | 1.19            | 1.298             | 1.183     | 0.008                  | -0.007                  |  |
| Medium  | 1.841            | 1.83            | 1.952             | 1.922     | 0.111‡                 | 0.092                   |  |
|   |                  |                 | MAPE (M1)         |           | MAPE (M1) from Table 2 |                         |  |
| Panel C: Hig  | h financial dist | ress firms      |                   |           |                        |                         |  |
| Public  |                  | 0.793           |                   | 0.895     |                        |                         |  |
| Micro   |                  |                 | 1.277             |           | 1.142                  |                         |  |
| Small   |                  |                 | 1.2               | 271       | 1.310                  |                         |  |
| Medium  | um               |                 | 1.7               | 730       | 1.856                  |                         |  |
| Large private   |                  | 1.852           |                   | 1.890     |                        |                         |  |

#### Table 3. Further tests on proportionate error of forecasts.

Notes: Type of firms is defined according to regulatory reporting regimes from the Companies Act 2006.

M1 represents the main model, which contains cash flow, components of accruals, and capital expenditures as detailed in Equation (1). M2 is the reduced model, which includes cash flow and capital expenditures while excluding the components of accruals.

The prediction is constructed in two stages. The first stage is to estimate (at the prediction date, t) the relation between accounting numbers for period t-1 and the cash flow in period t for each industry and size group of companies. The second stage is to use the coefficients of this model to predict the cash flow in period t + 1, based on accounting numbers at t for each industry and size group of companies.

MAPE is defined as the mean of absolute proportionate error calculated separately from estimating M1 and M2. All statistics are computed after winsorizing the top 1 percentiles.

\*indicates significant difference between pre-2016 and post-2016 for each type of company within each model is significant at the 5 percent level or better.

‡indicates significant difference between full accounts and non-full accounts for each type of company within each model is significant at the 5 percent level or better.

Financial distress is measured using the prediction model of financial distress developed by Zmijewski (1984). Zmijewski Score = -4.336 - [4.513 \* (Net Income/Total Assets)] + [5.679 \* (Total Liabilities/Total Assets)] + [0.004 \* (Current Assets/Current Liabilities)]

High financial distress firms are firms with a Zmijewski score higher than 0.5.

effect of filing non-full accounts on the prediction errors. FAME identifies whether or not full accounts have been filed and we use their records in the test.<sup>11</sup> The research question is:

**RQ4**: Do the options for some private companies to file non-full accounts decrease predictive ability?

<sup>&</sup>lt;sup>11</sup>Note that we do not test for all the filing options. In order to construct a forecast, we require all our sample companies to have filed a profit and loss account; that is, not to have exercised any option not to do so.

The results are given in Table 3 (Panel B) distinguishing between pre-2016 and post-2016 regulation changes, and also between the different classes of private company. The significance tests show the differences between MAPE values for companies filing non-full accounts compared to those filing full accounts.

One key result is that, in both periods, the prediction errors are significantly larger for those companies not filing full accounts. However, for small companies the difference between pre-/post-2016 periods is very small, although statistically significant. This effect of non-full filing for micro- and mediumsized companies supports the view of the Economic Crime and Corporate Transparency Act 2023 that the options to file non-full accounts hinder informative reporting and are being reduced.

# Supplementary tests

We undertook a number of supplementary tests to check the robustness of our findings. We undertook the usual Heckman (1979) procedure for selection bias, which arises because only those companies with sufficient data to construct predictions are included. Using the Heckman procedure, we found that the results were qualitatively similar to Table 2.

We also analyzed predictions for two and three periods ahead because banks and employees are especially interested in this cash flow too; also, the IASB's conceptual framework talks about future cash flow in general and not just about the immediate future. We re-ran our tests and predict cash flow for 2 and 3 years ahead. The results are similar to our main findings.

Finally, we investigated the predictive quality of financial reporting in companies that have a high probability of financial distress. This is an important issue because it is in these circumstances that informative financial reporting for private companies is at a premium, because there is little other public information about the companies' prospects. We used the coefficients of the Zmijewski (1984) probit financial distress model to identify observations having a high probability of financial distress company-years because it requires relatively few financial ratios. Other approaches are possible. For example, Siggelkow and Marquez Fernandez (2024) showed that nonfinancial variables are useful when financial data are scarce; however, this is not relevant in our case because the less demanding rules for SMEs relate to measurement rather than to disclosure. More importantly, Cheraghali and Molnár (2024, Table 1) showed that different estimation methods can be superior to those based on probit. But their superiority is in reducing the classification of nondistressed firms as distressed (false positive). If our sample of distressed firms contains those that should not be included, then this reduces the likelihood of finding any distinctive features; that is, the bias reduces the chances of finding any distinctive features and our results in Table 3 (Panel C) are an underestimate of the situation.

For small, medium-sized, and large private companies, in conditions of high financial distress, the MAPE value in M1 is lower than in Table 2, indicating that the predictions are more accurate in these circumstances. This finding is similar to those in Chen et al. (2023) for public companies. An important component of this increase in predictive accuracy (a lower MAPE) is accruals because the result diminishes as total accruals are removed in M2.

The increase in overall accuracy does not hold for micro-companies. A potential reason is that the companies' activities are largely cash-based; in difficult economic circumstances, the trading of these companies is likely to be even more cash-based, as they receive and give less credit. Consequently, their accruals may be too small to carry much forward-looking information. On the positive side, the forecasts for micro-companies are more accurate than those for medium-sized and large companies in high financial distress environments.

# Summary

The prediction of future cash flow is an important aspect of financial reporting quality. The attribute is commonplace when standard-setters discuss the objectives of reporting. Private companies in the United Kingdom have followed less stringent standards than public companies for a considerable length of time; this has been largely through simpler measurement rules for transactions. Furthermore, this U.K. strategy is now endorsed by the EU and aimed at reducing the reporting costs imposed on private companies. Surprisingly, there is little, if any, systematic evidence whether private company reporting now serves the needs of stakeholders, particularly banks. There is a heavy reliance on disclosed financial statements in view of the paucity of information in the public domain about private companies' prospects outside of the financial reporting cycle.

We contribute to this issue and examine the predictability of approximately 1.5 million U.K. private company observations from 2006 to 2022, a period long enough to cover a variety of macro-economic conditions, which enhances the relevance of our findings. We also distinguish between the different classes of private company: micro-sized, small, medium-sized, and large, a feature not included in the limited prior work on private companies. The predictions are measured against those of public companies, using the same prediction variables in order to capture more accurately the effect of the less demanding reporting standards. The prediction model we use is standard in the literature for analyzing the usefulness of both private and public company reporting.

The broad conclusions of our work are as follows. For micro-companies, their average prediction error is only slightly larger than that for public companies, but is lower than for other classes of private company. This suggests that the reduction in reporting regulations has not significantly reduced the quality of reporting; there is a practical, reasonable balance

between the complexity of standards and effective reporting. For small companies, the average prediction error is slightly above that for micro ones, but it is probably tolerable for stakeholders considering the expense of financial reporting costs. For micro-, small, and public companies the average prediction errors are representative of the vast majority of companies in the group; the sample results are clustered around the mean. These results indicating the similarity between micro-/small and public companies may seem counterintuitive because of the significant amount of information that is publicly available about public companies. However, one potential explanation is that it illustrates the "less is more" theory; perhaps much of the financial standards of public companies relate to the current period rather than to future periods. Another explanation lies in the possibility that the large amounts of publicly available information have little predictive value beyond the current period; for example, it is clear from analyst research that their information superiority over simple prediction models is very short term. These results for micro-/small private companies will be of interest to both regulators and banks/creditors/ employees alike; for these companies it is, in fact, possible to reduce their financial reporting burden without significantly affecting the predictive value of the disclosures.

Medium-sized and large private companies are different; they have an average prediction error that is more than double that of public companies. There is also significant variation within each group. Given that these are substantial companies with extensive stakeholder interests, the quality of reporting may need to be reviewed, particularly for the outlying companies. This finding supports the conclusion of the United Kingdom's Financial Reporting Council, based on a very small sample, that the quality of reporting of the United Kingdom's largest private companies is somewhat mixed. We do not explore here whether economic risk is the cause or whether further regulation is needed. We leave that to future research.

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# Data availability statement

Data are available on request.

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# Appendix: Definitions of groups of private firms

Type of firm is defined according to regulatory reporting regimes from the Companies Act 2006.

A micro-entity must meet at least two of the following conditions:

- (1) Turnover must be not more than £632,000,
- (2) The balance sheet total must be not more than £316,000, and
- (3) The average number of employees must be not more than 10.

# Pre-2016:

A small company must meet at least two of the following conditions:

- (1) Turnover of not more than £6.5 million,
- (2) A balance sheet total of not more than £3.26 million, and
- (3) Not more than 50 employees.

A medium-sized company must meet at least two of the following conditions:

- (1) A turnover of not more than £25.9 million,
- (2) A balance sheet total of not more than £12.9 million, and
- (3) Not more than 250 employees.

# Post-2016:

A small company must meet at least two of the following conditions:

- (1) Annual turnover must be not more than £10.2 million,
- (2) The balance sheet total must be not more than £5.1 million, and
- (3) The average number of employees must be not more than 50.

A medium-sized company must meet at least two of the following conditions:

- (1) The annual turnover must be no more than £36 million,
- (2) The balance sheet total must be no more than £18 million, and
- (3) The average number of employees must be no more than 250.

Large private companies are private companies that are bigger than medium-sized companies in both the pre-2016 and post-2016 periods.