Schmalenbach Journal of Business Research (2025) 77:885–914
https://doi.org/10.1007/s41471-025-00212-x

ORIGINAL ARTICLE

The Reporting of Alternative Performance Measures in Germany and the Introduction of the ESMA Guidelines

Jens Görmar · Martin Thomsen · Christoph Watrin

Received: 2 May 2022 / Accepted: 30 March 2025 / Published online: 5 May 2025

Abstract We provide descriptive evidence of the development of the disclosure of Alternative Performance Measures (APMs) in Germany over time, as well as insights into their attributes after introduction of the ESMA Guidelines. Using a hand-collected dataset of APMs, we generally find an increase in the fraction of firms that disclose at least one APM, and larger firms are more likely to engage in APM disclosure. Additionally, we find that adjusted earnings are substantially higher than the corresponding GAAP earnings, so the sum of exclusions is, on average, profit-increasing rather than profit-decreasing. Furthermore, the introduction of the ESMA Guidelines is not associated with a decrease in the likelihood of APM reporting; rather, it reduces the speed of the increase in the likelihood of APM reporting and the magnitude of exclusions. This study offers timely insights into the development of APM reporting in Germany.

Keywords Alternative Performance Measures · GAAP earnings · ESMA Guidelines on Alternative Performance Measures · Regulation · Corporate disclosure · Voluntary disclosure

JEL Classifications G01, G38, K20, K22, M41, M48

Jens Görmar · Christoph Watrin
Institute of Accounting and Taxation, University of Muenster, Muenster, Germany

Jens Görmar
E-Mail: Jens.Goermar@wiwi.uni-muenster.de

Christoph Watrin
E-Mail: Christoph.Watrin@wiwi.uni-muenster.de

✉ Martin Thomsen
Chair of Corporate Taxation, University of Siegen, Siegen, Germany
E-Mail: Martin.Thomsen@uni-siegen.de

1 Introduction

Managers must follow generally accepted accounting principles (GAAP) when calculating earnings. In the European Union, capital-market-oriented firms have used International Financial Reporting Standards (IFRS) to calculate their consolidated earnings and profits since 2005. However, some managers argue that IFRS do not consider each firm's unique situations, which aligns with the "one size does not fit all" principle of Bradshaw and Soliman (2007). Therefore, firms may be willing to disclose adjusted earnings metrics in addition to IFRS measures to provide a more accurate view of their performance from their perspective. These adjusted earnings metrics are referred to as Alternative Performance Measures (APMs).[1] However, the need for and credibility of APMs has been controversial for many years, as discussed in previous studies (e.g., Bhattacharya et al. 2004, 2007; Entwistle et al. 2010; Black et al. 2018).

While firms might believe that disclosure of adjusted earnings numbers provides a more accurate view of their performance (Curtis et al. 2014; Lougee and Marquardt 2004),[2] opponents of APM measures are concerned that managers might opportunistically exclude not only the influences of unusual events but also regular expenses to boost their firms' earnings. In a 2015 letter to his shareholders, star investor Warren Buffett noted that "it has become common for managers to tell their owners to ignore certain expense items that are all too real". He criticized analysts who do not question these APM numbers, stating, "Whatever their reasoning, these analysts are guilty of propagating misleading numbers that can deceive investors" (Buffett 2016).[3]

US scholars began researching APMs in the early 2000s (e.g., Bradshaw and Sloan 2002; Brown and Sivakumar 2003; Bhattacharya et al. 2003, 2004). To improve the comparability, reliability, and comprehensibility of APMs in the US, Regulation G[4] came into effect in 2003 (Heflin and Hsu 2008; Chen 2010). The topic remains relevant and controversial, even in the European Union. In 2016, then Chairman of the International Accounting Standards Board (IASB), Hans Hooger-

[1] Prior literature uses different terms for adjusted earnings measures, e.g., "non-GAAP measures", "street measures", "pro forma measures", and "alternative performance measures". "Non-GAAP measures" usually describes all adjusted earnings measures, "street measures" refers to analyst-adjusted earnings measures, "pro forma measures" refers to managers' adjusted earnings measures (Black et al. 2018), and "alternative performance measure" is the terminology that the ESMA Guidelines uses. Consequently, as our analyses cover the changes in adjusted earnings reporting after the implementation of the ESMA Guidelines, we use the term "alternative performance measure" (APM).

[2] For example, SAP stated in its 2021 integrated report, "We believe that the disclosed [...] non-IFRS financial information provides useful information to investors [...]" (SAP 2021).

[3] In a similar vein, the then-chief accountant of the SEC, Lyn Turner, criticized APMS in 2000 by skeptically calling them "EBS", namely, "everything but the bad stuff", meaning that firms opportunistically define their "earnings before" measures (Turner 2000).

[4] In the US, APMs were mostly unregulated until Regulation G came into effect on March 28, 2003. Regulation G requires firms that report APMs to (1) disclose the most directly comparable GAAP number, (2) provide a clearly understandable quantitative reconciliation of the APM and the respective GAAP measure, and (3) ensure that the APM is not misleading to investors (Heflin and Hsu 2008; Chen 2010; Jennings and Marques 2011).

vorst, noted, "There is growing evidence showing an increasing use of non-GAAP measures and of these measures becoming increasingly misleading" (Hoogervorst 2016).[5] Our study aims to contribute to this debate by providing new insights into the use of APM reporting in Germany. In a similar vein as Regulation G, the European Securities and Markets Authority (ESMA) introduced the Guidelines on Alternative Performance Measures (ESMA Guidelines) in 2016 to regulate APM reporting in the EU (ESMA 2015). Despite their importance for accounting policy, evidence of how APM reporting in the EU changed after the ESMA Guidelines were introduced is still lacking. Due to systematic differences between the ESMA Guidelines and Regulation G, the findings of the US literature (e.g., Heflin and Hsu 2008) cannot be extrapolated to the EU in general and Germany in particular without further investigation. This leaves the association between the ESMA Guidelines and APM reporting an open question, which this study seeks to answer. In our study, we focus on three APMs: adjusted EBIT, adjusted EBITDA, and adjusted EPS. We focus on these three measures because Hitz (2010) identifies adjusted EBIT and adjusted EBITDA as the most popular APMs (besides adjusted EPS and adjusted net income). Furthermore, adjusted EPS is by far the most investigated APM in US literature (Black et al. 2018).[6] Our analysis has two main components:

In our first set of analyses, we aim to provide descriptive evidence of APM disclosure in Germany over time. Empirical evidence on APM reporting in Germany is relatively limited. Hitz (2010) was the first to shed light on APM reporting in German DAX and MDAX firms and, thus, serves as a reference point for our study. Given the popularity of APM disclosure in the US (e.g., 71% of S&P 500 firms disclose an APM in 2014, Black et al. 2021a), we build on the findings of Hitz (2010) and extend his work by investigating a more recent period that allows for timely interpretation of our results and a larger sample over a longer period. Additionally, in contrast to Hitz (2010), who analyzes press releases, we analyze the use of APM disclosure in quarterly reports. By doing so, we are able to investigate a sample that is as comprehensive as feasible, and we can examine whether the reporting of APMs differs within the fiscal year.

We investigate the APM disclosure behavior of German firms listed on the DAX, MDAX, SDAX, and TecDAX over 10 years from 2010 to 2019.[7] Our sample pe-

[5] Currently, the IASB is working on a new Standard (*General Presentation and Disclosures*) to replace the current IAS 1 (*Presentation of Financial Statements*). One of the goals of the new standard is "reconciliation between some management-defined performance measures and subtotals specified by IFRS Standards" (IASB 2022).

[6] Please note that EBIT and EBITDA—without any further modifications—are technically APMs, as they are not defined by IFRS. As we try to compare a GAAP measure with its corresponding APM, we treat EBIT and EBITDA as GAAP measures (i.e., GAAP EBIT and GAAP EBITDA). Consequently, every additional declaration of adjusted EBIT or adjusted EBITDA is defined as an APM. However, it is worth mentioning that prior literature (e.g., Hitz and Jenniges 2008) finds that the definitions of EBIT and EBITDA vary between firms.

[7] As the ESMA Guidelines came into effect in 2016, this year is relevant for choosing which firm to include in our sample. In 2016, the DAX contained the 30 leading German firms quoted on the Frankfurt Stock Exchange. The MDAX (SDAX) included the 50 firms that rank immediately below the 30 DAX (80 DAX and MDAX) firms. Therefore, these three indices contained the 130 biggest and most liquid (based on free float market capitalization) German firms. Additionally, the TecDAX contained the 30 biggest and most

riod ends in 2019 as several macro-economic factors (e.g., COVID-19 pandemic in 2020–2021; energy crisis since 2021; Russia's invasion in Ukraine since 2022) may extraordinarily affect the firms' economic situation as well as the firms' reporting behavior in the time after 2019. Consequently, our sample period provides insights into a relatively recent and economically stable period. Using hand-collected APM data from financial reports, our analyses reveal the following: We find that the importance of APM reporting increased in Germany during our sample period; we show that the fraction of firms disclosing at least one APM (and, thus, quarterly reports containing at least one APM) increased from 33.6% in Q1 2010 to 58.8% in Q4 2019. Thus, by the end of 2019, more than every second firm in our sample had disclosed at least one APM. These findings are mostly supported by prior research. Hitz (2010) finds that 35.5% of the investigated DAX and MDAX earnings announcements in 2005 and 2006 contained APMs, which is comparable to the share we find for the year 2010. Moreover, Ruhwehdel et al. (2017) find APMs in 74% of the annual reports in 2016. However, this study focuses only on larger firms (i.e., only firms included in the DAX and MDAX). Our findings are comparable when we limit our analysis to DAX (Q4 2019: 72.4%) and MDAX (Q4 2019: 68.8%) firms, respectively.

In line with prior research (Hitz 2010), we also find that about 50% of the reports containing APMs include only one adjusted measure, mostly adjusted EBIT.[8] If firms decide to disclose two different APMs (29.0%), the combination of adjusted EBIT and adjusted EBITDA is most often used. Prior research of German APM reporting also finds evidence of the popularity of adjusted EBIT and adjusted EBITDA (e.g. Hillebrandt and Sellhorn 2002; Volk 2007; Hitz and Jenniges 2008; Hitz 2010). In further tests, we find that the average difference between adjusted earnings and GAAP earnings increases from quarter 1 (Q1) to quarter 4 (Q4) and is most notable in the fourth quarter. Consistent with prior literature (Hitz 2010; Black et al. 2018), we also observe that the sum of the exclusions in most firm-quarters is profit-increasing rather than profit-decreasing.

In our second set of analyses, we explore APM disclosures around the introduction of the ESMA Guidelines. Using logistic regression, we generally find that introducing the ESMA Guidelines is not associated with decreased APM disclosure, with the exception of adjusted EPS. This finding seems somehow surprising given that the introduction of the ESMA Guidelines required relatively transparent APM disclosure (i.e., detailed reconciliations) and increased the costs of APM reporting (Kolev et al. 2008; Brown et al. 2012b; Karpoff et al. 2009). However, this finding is in line with prior US-based research. In the long run, APM reporting has grown consistently in the US in the past decades despite the introduction of Regulation G (Entwistle et al. 2005; Marques 2006; Heflin and Hsu 2008; Black et al. 2012; Bentley et al. 2018). The reason could be that existing regulation might support firms' APM reporting by guiding them on how to disclose "correctly". Moreover,

liquid firms of the technology sector in 2016. At that time, firms listed in the TecDAX could not be listed in the DAX, MDAX, or SDAX, respectively.

[8] It is striking that German firms report adjusted EPS less often than both adjusted EBIT and adjusted EBITDA. This is even more surprising given that adjusted EPS is the most studied APM in academic (mostly US-based) literature.

it might help APMs no longer be seen as misleading. Further tests reveal that the increase in the likelihood of APM disclosure is significantly slower in the post-ESMA period compared to the pre-ESMA period. Additionally, we test whether the introduction of the ESMA Guidelines is associated with a lower magnitude of firms' exclusions. We find the difference between adjusted and GAAP EBIT is lower in the post-ESMA period. This finding indicates that the ESMA Guidelines are associated with a substantial reduction in the magnitude of earnings exclusions. However, we do not find that the difference between other adjusted and GAAP earnings (i.e., EPS and EBITDA) is significantly lower in the post-ESMA period than in the pre-ESMA period.

We contribute to the limited empirical APM literature focusing on German firms and extend existing findings. Most prior literature in this field is rather practice-oriented and points out the strong popularity of "earnings before" measures (e.g., Hillebrandt and Sellhorn 2002; Kueting and Heiden 2002, 2003; Volk 2007; Bassen et al. 2012; Ruhwehdel et al. 2017, 2018). It is worth mentioning that both approaches (i.e., empirical and practice-oriented) add valuable insights to the existing literature. However, practice-oriented studies are crucial for understanding reporting practices in Germany, whereas our approach is rather theoretical based and thus, is more in line with international (mostly US based) literature. Our study is most closely related to Hitz (2010), which we augment by providing a detailed and sophisticated overview of APM reporting in Germany using a large sample over a 10-year sample period. Our results emphasize the importance of better understanding APM reporting in Germany. By doing so, researchers can help policymakers and regulators evaluate the form of future political interventions.

The remainder of this paper proceeds as follows: In the next section, we present prior literature and the regulatory background. Section 3 provides our sample selection and descriptive results on the development of APM reporting in Germany. Section 4 presents our findings on the consequences of APM reporting after the introduction of the ESMA Guidelines. In Section 5, we conclude.

2 Background On APMs

2.1 Prior Literature

The use of APM reporting is an intriguing phenomenon given the ongoing debate on whether managers opportunistically exclude regular expenses to boost their firm's earnings or whether they provide a more accurate view of the firm's situation. On the one hand, studies viewing APMs as opportunistic find that APMs usually exceed GAAP earnings (Bradshaw and Sloan 2002) and are defined inconsistently across firms and time (Bhattacharya et al. 2004; Black et al. 2021a; Hitz and Jenniges 2008). Prior research also suggests that exclusions are made to meet or beat certain earnings benchmarks with APMs when GAAP numbers fall short of meeting or beating these benchmarks (Black and Christensen 2009; Black et al. 2017; Bradshaw et al. 2018; Doyle et al. 2013; Fan et al. 2010; Isidro and Marques 2015; McVay 2006) and that managers focused on long-term value report APMs less aggressively

than those focused on short-term value (Black et al. 2021b). Additionally, prior literature provides evidence that excluding recurring items suggests opportunistic motives (Barth et al. 2012; Black and Christensen 2009; Brown et al. 2012a, b; Christensen et al. 2014; Doyle et al. 2003). Furthermore, Curtis et al. (2021) and Guest et al. (2022) found evidence of an association between high executive pay and APM reporting.

On the other hand, managers exclude nonrecurring items when calculating APMs to provide an earnings measure that is relatively close to the core earnings of a firm (Bhattacharya et al. 2003; Curtis et al. 2014; Lougee and Marquardt 2004). Furthermore, academic research finds evidence that the earnings information in APM reporting is more value-relevant than GAAP metrics (Black et al. 2018, 2021a). Additionally, investors respond more strongly to APMs (e.g., Bradshaw and Sloan 2002; Bhattacharya et al. 2003) and are not misled by APM reporting (Johnson and Schwartz 2005). Overall, there is evidence that APMs can convey useful information going beyond the informativeness of GAAP numbers (Bhattacharya et al. 2003; Black et al. 2021a; Brown and Sivakumar 2003; Entwistle et al. 2010; Huang and Skantz 2016). Different monitoring mechanisms, such as boards of directors (Frankel et al. 2011; Isidro and Marques 2013), blockholders (Christensen et al. 2019), litigation risk (Bentley et al. 2018), and analyst coverage (Christensen et al. 2020), are used to create less aggressive APMs. Moreover, more transparent qualitative information on APMs is associated with less aggressive APM reporting (Chen et al. 2021).[9]

2.2 Regulation in the EU: ESMA Guidelines

Before 2016, there were almost no binding rules in Germany limiting the disclosure of APMs.[10] Thus, the ESMA published the ESMA Guidelines on Alternative Performance Measures in 2015. These guidelines apply to all relevant communications released on or after July 3, 2016 by issuers whose securities are admitted to trading on a regulated market or by persons in charge of the prospectuses. All APMs are subject to these guidelines if they are disclosed via regulated information channels, such as management reports or prospectuses.[11] For firms whose fiscal year equals the legal year, regulated information covering Q2 of 2016 onward is subject to the ESMA Guidelines (post-ESMA period). Regulated information covering Q1 of 2016 or prior quarters is not subject to the ESMA Guidelines (pre-ESMA period). In

[9] For a more detailed overview of APM literature, Herr et al. (2022) provide an extensive summary of more than two decades of US, European, and Australian/Asian research on APMs.

[10] Before the introduction of the ESMA Guidelines, there were only non-binding recommendations of the CESR (Committee of European Securities Regulators; predecessor authority of the ESMA), issued in 2005 (Ruhwehdel et al. 2018).

[11] Please note that APMs disclosed in financial statements are not subject to the guidelines. However, as it does not seem reasonable for firms to calculate APMs on different bases depending on where they are published while labeling them the same, we assume that the impact of the guidelines is comparable for financial statements.

Germany, the BaFin (Bundesanstalt für Finanzdienstleistungsaufsicht—German securities regulator) is responsible for enforcing the ESMA Guidelines (BaFin 2022).[12]

With these guidelines, the ESMA aims to enhance the quality of APMs. Specifically, the ESMA Guidelines aim to improve the comparability, reliability, and comprehensibility of APMs. Disclosed APMs should be appropriate and useful for stakeholders' decision-making. Therefore, the presentation of APMs should enhance the analyzability and comprehensibility of information (ESMA 2015). On the one hand, the increased transparency requirements might prevent opportunistic managers from disclosing misleading APMs. On the other hand, managers who disclose informative APMs could abstain from disclosing APMs.

Although the ESMA Guidelines might seem like the EU equivalent of the US Regulation G, they have important differences: Unlike the Securities and Exchange Commission (SEC), the ESMA does not possess regulatory power (Herr et al. 2022). Thus, the ESMA Guidelines' effectiveness depends on the various countries and their willingness to enforce them. The additional intermediary (BaFin) might weaken the intended objectives of the ESMA compared to the SEC and reduce the pressure of implementation for firms (Ruhwehdel et al. 2018). Additionally, Regulation G covers APMs in any public communication, including voluntary disclosure (Heflin and Hsu 2008), while the scope of the ESMA Guidelines is more restricted.

It is ex ante not clear that the ESMA Guidelines will similarly affect APM reporting as US Regulation G. Therefore, we shed light on this open empirical question in Section 4.

3 APM Reporting in Germany

3.1 Sample Selection

Our initial sample consists of all firms listed on one of the four major German indices, namely, the DAX, MDAX, SDAX, or TecDAX, on December 31, 2016. We use 2016 as the reference year as this is the year when the ESMA Guidelines came into effect. Therefore, we begin with 160 firms and a period of 10 years from 2010 to 2019 (Table 1). Because we conduct our study quarterly, our initial sample includes 6400 firm-quarter observations. Necessary reductions (see Table 1) result in a final sample of 5489 firm-quarter observations of 156 firms. Specifically, 3309 firm-quarter observations belong to the pre-ESMA period (i.e., between the first quarter of 2010 and the first quarter of 2016), while 2180 firm-quarter observations belong to the post-ESMA period (i.e., between the second quarter of 2016 and the fourth quarter of 2019).

[12] After Wirecard's accounting scandal was uncovered, the legislator has fundamentally reorganized the monitoring of firms' financial statements with the "Act to Strengthen Financial Market Integrity" ("Gesetz zur Stärkung der Finanzmarktintegrität"). Since the beginning of 2022, the former two-stage procedure—with the DPR (Deutsche Prüfstelle für Rechnungslegung—German Financial Reporting Enforcement Panel) monitoring in the first stage and the BaFin monitoring in the second stage—was abolished and replaced by a single-stage procedure with only the BaFin being responsible (Kleinmanns 2016, BaFin 2022). Consequently, the DPR was dissolved by the end of 2021.

Table 1 Sample Selection

Criteria	Firm-years
Initial sample: all firm-quarters of German corporations (i.e., DAX, MDAX, SDAX, and TecDAX) between 2010 and 2019	6400
Less firm-quarters with missing quarterly reports	*(–53)* = 6347
Less firm-quarters with reports in foreign currency	*(–153)* = 6194
Less firm-quarters of firms that are not listed over the full sample period	*(–417)* = 5777
Less firm-quarters that are involved in a fraud scandal	*(–40)* = 5737
Less firm-quarters with missing data on financial statements, share prices or shares outstanding	*(–248)* = 5489

In this table, we report the sample selection process. The sample covers the 2010–2019 period. All the financial statement data are acquired from the annual fundamentals database produced by Compustat Global. To ensure that our sample is not reduced by missing financial statement data, missing share prices, or missing shares outstanding, we manually collected the missing data from the quarterly reports of the respective firms. Firms with missing quarterly reports: Adler Real Estate, Allianz, Beiersdorf, Capital Stage, GFK, Hapag Lloyd, Hornbach Holding, Linde Medigene, RTL, and Sartorius. Firms with reports in foreign currencies: Dialog Semiconductor, Qiagen, Steinhoff, and partially Fresenius Medical Care and Linde. Firms not listed over the full sample period: ADO Properties, Braas Monier, Covestro, Deutsche Pfandbriefbank, Evonik, GFK (delisted in 2017), Hella, Innogy, Kion Group, LEG Immobilien, Norma, Osram, RIB Software, Rocket Internet, S + T, Schaeffler, Scout24, Siltronic, SLM Solutions, Stabilus, Talanx, Tele Columbus, Telefonica Deutschland Holding, TLG Immobilien, Uniper, Vonovia, WCM, and Zalando. Wirecard engaged in multiple fraudulent accounting activities, as revealed in 2020. Accordingly, the prosecution suspected that fraud had occurred since 2015. Since mid-2020, Wirecard has been insolvent (McCrum 2019, 2020). Therefore, we have excluded Wirecard from our sample

Hitz (2010) finds evidence that German firms—if they decide to disclose APMs—most often disclose adjusted EBIT and adjusted EBITDA besides adjusted EPS/adjusted net income. In addition, adjusted EPS is by far the most studied APM in US literature (Black et al. 2018). Consequently, we focus on these three measures in our paper. APMs of German firms are not available in electronic databases. Therefore, we manually collect all disclosed EPS, EBIT, and EBITDA earnings figures from publicly available quarterly and annual reports and differentiate between GAAP and APM values. We hand-collect the data from annual and quarterly reports by searching for specific combinations of words. Specifically, we use keyword searches and terms such as "adjusted", "pro forma", "alternative", "performance", "earnings before", "special items", "EBIT", "EBITDA", "EPS", "measure", and "per share". If we cannot locate APMs using these terms, we look for other words that we believe are related to APM descriptions. If a firm discloses at least one of the three APMs in the annual or quarterly report, we consider this specific firm as an APM discloser. By not further automating our hand-collection (in contrast to Leung and Veenman 2018), we can instantly and individually perform plausibility checks for each APM and thereby minimize both Type 1 and Type 2 errors. Most of the existing literature uses press releases to identify APMs, while we use annual and quarterly reports. This approach allows us to scan the reports of (almost) all firms and quarters in our sample. Therefore, we obtain an extensive sample that is as comprehensive as feasible. Additionally, by manually collecting GAAP and APM values from the same annual or quarterly report, we can ensure that we compare the corresponding pairs of GAAP and APM values.

3.2 Development of APM Reporting Over Time

Table 2, Panel A, presents descriptive statistics for the full sample. Across the entire sample period, we observe that almost half of the quarterly reports (47.0%) contain at least one APM, which is an increase compared to the finding in Hitz (2010: 35.5%). Adjusted EPS (*APM_EPS*) can be found in 20.4% of the quarterly reports in our sample, while adjusted EBIT (*APM_EBIT*) and adjusted EBITDA (*APM_EBITDA*) are used in more reports, with 31.3 and 28.1% of the reports containing these measures, respectively. Therefore, we find higher shares of reports containing adjusted EPS, adjusted EBIT, and adjusted EBITDA than Hitz (2010): adjusted EPS: 6.8%; adjusted EBIT: 28.7%; adjusted EBITDA: 17.2%. One reason for the difference might be that our sample period includes more recent years. Assuming an increasing trend in APM reporting over time, this leads to higher shares of reports containing APMs. However, comparable to the findings presented in Hitz (2010), adjusted EBIT remains the most popular APM of these three measures.

Panel B displays the share of reports containing a specific (combination of) APMs. Around 50% of the reports that include APMs contain only one adjusted measure, mostly adjusted EBIT (*APM_EBIT*: 23.5%). When firms choose to disclose two APMs in the same report (29.0% of the reports), the combination of adjusted EBIT and adjusted EBITDA is the most commonly used (15.3%). Approximately 20.5% of

Table 2 APM Disclosure

Panel A: Descriptive statistics on the disclosure of APMs

–	N	Mean	S.D.	p25	p50	p75
APM	5489	0.470	0.499	0.000	0.000	1000
APM_EPS	5489	0.204	0.403	0.000	0.000	0.000
APM_EBIT	5489	0.313	0.464	0.000	0.000	1000
APM_EBITDA	5489	0.281	0.450	0.000	0.000	1000

Panel B: Share of reports that contain a specific (combination of) APMs

Reports containing	1 APM	2 APMs	3 APMs
APM_EPS	9.22%	–	–
APM_EBIT	23.46%		
APM_EBITDA	17.80%		
APM_EPS & APM_EBIT	–	7.44%	
APM_EBIT & APM_EBITDA		15.32%	
APM_EPS & APM_EBITDA		6.28%	
APM_EPS & APM_EBIT & APM_EBITDA		–	20.47%
Total	50.48%	29.04%	20.47%

In Panel A, we report descriptive statistics for the main APM variables. In Panel B, we report how often firms report 1, 2 or 3 APMs if a firm decides to disclose adjusted measures (i.e., firms without APM reporting are excluded). All the variables are defined in Appendix, Table 8

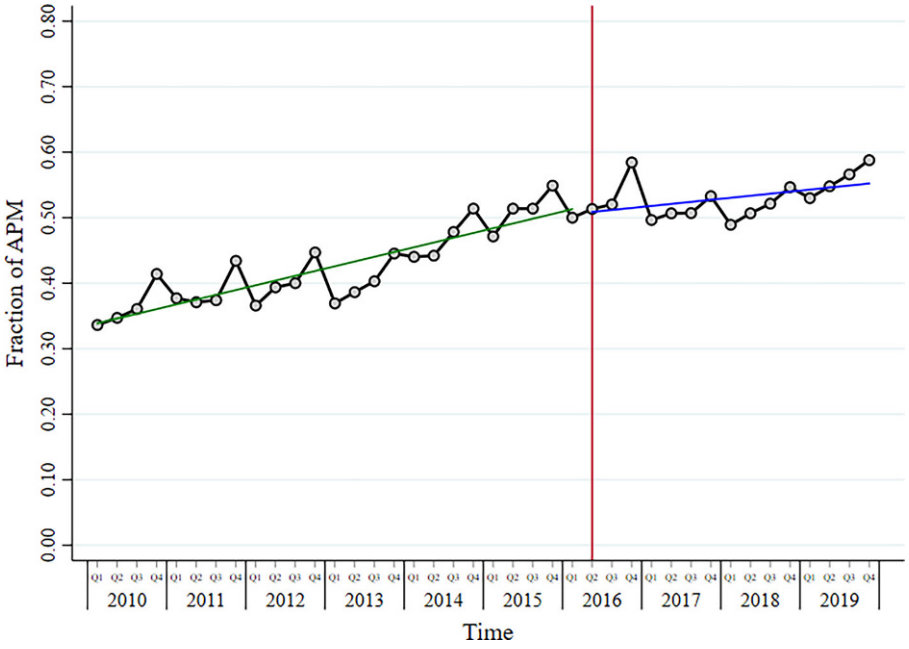

Fig. 1 Development of firms reporting at least one APM between 2010 and 2019 (Notes. This figure plots the quarterly fraction of firms reporting at least one APM over the sample period, namely, 2010–2019. The red line indicates the introduction of the ESMA Guidelines (Q2 2016). The green line indicates the average increasing trend of APM reporting in the pre-ESMA period. The blue line indicates the average increasing trend of APM reporting in the post-ESMA period. All the observations are subject to the criteria described in Table 1)

all quarterly reports with APM disclosure in our sample comprise all three APMs.[13] It is worth noting that adjusted EPS is less frequently reported than adjusted EBIT and/or adjusted EBITDA in Germany. This finding is particularly surprising given that prior literature (primarily from the US) focuses on adjusted EPS when examining APMs. However, with respect to Germany, our finding is in line with Hitz (2010).

Figure 1 illustrates the quarterly development of APM disclosing firms during the sample period (2010–2019).[14] We utilize Fig. 1 as the initial visual evidence to ascertain whether APM reporting in Germany is increasing over time. Figure 1 reveals two insights that the paper explores further: (1) The results demonstrate that the proportion of firms reporting at least one APM increases from 33.6% in Q1 2010 to 58.8% in Q4 2019, indicating an average increase of approximately 0.65

[13] In additional (untabulated) tests, we find that the simultaneous disclosure of all three APMs is reasonably distributed across the sample period, with a slightly lower frequency in 2010 and 2011. Additionally, we observe that the disclosure of all three APMs is uniformly distributed throughout the year, with a slightly lower frequency in the first quarter (Q1). However, the majority of firms disclosing all three adjusted measures (84.7%) are listed in the DAX or MDAX.

[14] As the reported fractions are on the firm-quarter level and, thus, contain each firm only once, the shares of firms reporting an APM are equal to the shares of reports containing an APM.

percentage points per quarter within the sample period. (2) Fig. 1 shows within year variation of APM reporting that spikes in Q4 of each year.

Moreover, in additional untabulated tests, we observe this upward trend for each of the three adjusted measures. APM_EPS increases from 14.3% in Q1 2010 to 23.6% in Q4 2019. Similarly, APM_EBIT (APM_EBITDA) increases from 23.5% (17.6%) to 35.1% (35.8%) over the 10-year sample period. Thus, the outcomes presented in Fig. 1 are not driven by any specific APM. The increasing number of firms disclosing APMs is consistent with the results of prior German (Hitz 2010; Ruhwehdel et al. 2017, 2018) and US (Bhattacharya et al. 2004; Bentley et al. 2018) literature. Additionally, the proportion of reports with APMs is comparable to (at least German) prior research: For Germany, Hitz (2010) finds that 35.5% of his sample of DAX and MDAX firms' earnings announcements of 2005 and 2006 contain APMs. This share is comparable to our 33.6% in Q1 of 2010. For the US, however, 70.9% of S&P 500 firms in 2014 reported adjusted EPS (Black et al. 2021a), whereas only approximately one in four (23.6%, untabulated) German firms in our sample disclosed adjusted EPS in 2019.

Furthermore, Fig. 1 displays that within each year, the proportion of firms disclosing at least one APM increases from Q1 to Q4 before declining in Q1 of the following year. For instance, in Q1 of 2012, 36.6% of our sample firms reported at least one APM. During 2012, this figure rose to 39.4% in Q2, 40.0% in Q3, and 44.6% in Q4. However, in Q1 of 2013, the proportion of firms reporting an APM dropped to 36.9%, over seven percentage points lower than the previous quarter (Q4 2012) but 0.3 percentage points higher than the previous year (Q1 2012). This pattern indicates that more firms engage in APM reporting towards the end of each fiscal year than at the beginning. This finding aligns with prior US literature suggesting that firms are more likely to disclose adjusted EPS in the fourth quarter than in the first three quarters (Heflin and Hsu 2008). Furthermore, Black et al. (2017) find that only if firms miss earnings expectations despite their engagement in earnings management they are significantly more willing to report APMs. Consequently, one possible explanation for our finding could be that firms use their last opportunity to make adjustments in order to meet or beat earnings benchmarks. Because firms do not know whether or not they reached their benchmarks until the end of the fiscal year, we find more APM reporting at the end of a fiscal year than at the beginning.

3.3 Differences Between Adjusted Earnings and GAAP Earnings

Table 3 presents the descriptive statistics for the firms that disclose adjusted earnings and GAAP earnings. The results for the three different earnings measures used in this study are reported: EPS (Panel A), EBIT (Panel B), and EBITDA (Panel C).

In Panel A, the average difference between adjusted EPS (0.017) and GAAP EPS (0.012) is 0.005 and statistically significant. In economic terms, the mean values shown in Panel A represent the percentage profit relative to the share price. For instance, for every €1 of stock price, the average firm in our sample reports 1.7 cents (i.e., 1.7%) of adjusted EPS. Panel A also provides the difference between adjusted EPS and GAAP EPS by fiscal quarter. In each quarter, the mean adjusted EPS is significantly higher than the corresponding mean GAAP EPS. The differ-

Table 3 Comparing adjusted earnings and GAAP earnings of firms that report both measures

	Panel A: EPS			Panel B: EBIT			Panel C: EBITDA		
	N	Mean	Diff.	*N*	Mean	Diff.	*N*	Mean	Diff.
Full Sample									
Adjusted earnings	1055	0.017	0.005***	1524	0.033	0.008***	983	0.049	0.002***
GAAP earnings	1055	0.012	(6.69)	1524	0.025	(7.41)	983	0.047	(3.18)
Quarter 1									
Adjusted earnings	257	0.018	0.003***	366	0.028	0.002***	223	0.047	0.001
GAAP earnings	257	0.015	(3.26)	366	0.026	(3.37)	223	0.046	(1.57)
Quarter 2									
Adjusted earnings	266	0.017	0.004***	378	0.034	0.004***	251	0.050	0.001
GAAP earnings	266	0.013	(3.06)	378	0.030	(5.27)	251	0.049	(1.48)
Quarter 3									
Adjusted earnings	272	0.014	0.003**	392	0.033	0.007***	254	0.047	0.003**
GAAP earnings	272	0.011	(2.21)	392	0.026	(6.12)	254	0.044	(2.56)
Quarter 4									
Adjusted earnings	260	0.019	0.011***	388	0.035	0.015***	255	0.052	0.005*
GAAP earnings	260	0.008	(4.76)	388	0.020	(4.50)	255	0.047	(1.68)

This table presents the descriptive statistics for adjusted earnings and GAAP earnings. We report the results for the three different earnings measures used in this study: EPS (Panel A), EBIT (Panel B), and EBITDA (Panel C). In each Panel, we only include firm-quarters in which both measures are reported (e.g., we exclude firm-quarters which report only GAAP EPS but not adjusted EPS in Panel A). The column "Diff." reports the difference between the means of adjusted earnings and GAAP earnings. The t-statistics of the differences in the means are reported in parentheses below the coefficient estimates. Asterisks denote significance at the 1% (***), 5% (**), and 10% (*) levels

ence between these two measures is relatively small in the first three quarters (i.e., Q1 = 0.003, Q2 = 0.004, and Q3 = 0.003) and largest in quarter 4 (0.011), meaning that the average difference increases from Q1 to Q4. This finding is—at least partially—consistent with prior US research. Bradshaw and Sloan (2002) investigate US firms between 1985 and 1997 and find a difference between adjusted EPS and GAAP EPS in quarters 1 through 4. However, they observe that the difference between these two measures increases over the years and is most pronounced in the fourth quarter.

In Panel B, we find that adjusted EBIT (0.033) is significantly higher than GAAP EBIT (0.025), both measures scaled by the market value of equity. The largest difference is observable in the fourth quarter (0.015), consistent with the finding presented in Panel A for EPS. The difference between adjusted EBITDA and GAAP EBITDA (Panel C) is relatively low (0.002) and significant only in the third and fourth quarters.

To analyze the relation between adjusted earnings and GAAP earnings in more detail, Table 4 presents the percentage of adjusted earnings above or below GAAP earnings for each earnings measure used in this study (i.e., EPS, EBIT, and EBITDA). We find that in 79.35% of the firm-quarters, adjusted EPS is higher than GAAP EPS (EBIT: 78.22%; EBITDA: 72.95%), whereas, in 16.88% of the firm-quarters, adjusted EPS is lower than GAAP EPS (EBIT: 14.63%; EBITDA: 18.31%).[15] This is comparable to the findings of Hitz (2010), who finds that 73.1% of the earnings adjustments is profit increasing rather than profit decreasing. Consequently, substantially more firms report adjusted earnings in excess of GAAP earnings than those that disclose adjusted earnings below GAAP earnings.[16]

In untabulated tests, we find that the difference between adjusted earnings and GAAP earnings varies substantially within the group of firms that disclose adjusted earnings above the corresponding GAAP earnings. In approximately 35% of the firm-quarters, adjusted EPS is up to 25% higher than GAAP EPS, and in approximately 15% of the firm-quarters, adjusted EPS is at least twice as high as GAAP EPS. Regarding EBITDA, we find that in about 60% of the firm-quarters, adjusted EBITDA is up to 25% higher than the respective GAAP EBITDA, whereas the fraction of extreme adjusted EBITDA (i.e., where adjusted EBITDA exceeds GAAP

[15] Additionally, in less than 10% of the firm-quarters (EPS: 3.79%; EBIT: 7.15%; EBITDA: 8.75%), no difference between adjusted earnings and GAAP earnings is observable.

[16] In untabulated tests, we also split the observations by quarter (i.e., Q1–Q4). On average, larger positive differences between adjusted earnings and GAAP earnings are more likely to occur in the fourth quarter, whereas smaller differences occur in the first or second quarter. Additionally, we test whether differences arise depending on the reporting frequency. Prior literature suggests that opportunistic and altruistic APM disclosers systematically differ in terms of their disclosure frequency (Black and Christensen 2009). Therefore, we split our sample into frequent and sporadic APM disclosers. Regarding EPS, a firm is defined as a frequent adjusted EPS discloser if it discloses adjusted EPS in all (i.e., 100%) the firm-quarters that it is a part of in our dataset. Accordingly, a firm is defined as a sporadic adjusted EPS discloser if it does not disclose adjusted EPS in every firm-quarter (i.e., less than 100%) that it is a part of in our dataset. However, we do not find any systematic differences between frequent and sporadic disclosers. The difference between adjusted EPS and GAAP EPS (as a percentage of GAAP EPS) is, on average, relatively similar between both groups. We reveal similar results when we analyze EBIT and EBITDA instead of EPS.

Table 4 Differences between adjusted earnings and GAAP earnings

	Adjusted earnings below or above GAAP earnings (in %)		
	Adjusted earnings *below* GAAP earnings (in %)	Adjusted earnings *equaling* GAAP earnings	Adjusted earnings *above* GAAP earnings (in %)
EPS	16.88	3.79	79.35
EBIT	14.63	7.15	78.22
EBITDA	18.31	8.75	72.95

This table shows the fraction of firm-quarter observations of adjusted earnings below or above GAAP earnings. We report the results for the three different earnings measures used in this study: EPS, EBIT, and EBITDA

EBITDA by more than 100%) is only 4.07% and therefore substantially lower than for EPS.

In contrast, if adjusted earnings are lower than the respective GAAP earnings, most deviations are rather small. The disclosure of adjusted earnings below the GAAP earnings by more than 25% seems rather unlikely. For example, in less than 1% of the firm-quarters, all three earnings measures (i.e., EPS, EBIT, EBITDA) are much smaller (i.e., more than 100%) than the corresponding GAAP earnings.

Overall, in the majority of the firm-quarters, the sum of the exclusions is profit-increasing, and in only a minority of the firm-quarters do the exclusions lead to a profit decrease. This finding aligns with prior US research (Black et al. 2018) but still seems noteworthy given that extraordinary and one-time items can be both profit-increasing and profit-decreasing.

4 Regulation of APM Reporting: ESMA Guidelines

4.1 Research Design

As pointed out in Section 3.2, visual evidence of Fig. 1 suggests that the fraction of firms that report at least one APM continues increasing after the introduction of the ESMA Guidelines. However, this finding is based on univariate analyses only. Consequently, in this section, we use multivariate analyses to investigate more formally how APM disclosures develop in Germany after the introduction of the ESMA Guidelines. Thus, to analyze whether the introduction of the ESMA Guidelines is associated with a decrease in the likelihood of APM disclosure, we estimate the following logistic regression (1):

$$\begin{aligned} Prob\left(APM_{i,q}=1\right) = \Lambda(&\beta_0 + \beta_1 POST_q + \beta_2 SPI_{i,q} + \beta_3 SPI\_MAG_{i,q} \\ &+ \beta_4 INTAN_{i,q} + \beta_5 TECH_i + \beta_6 LOSS_{i,q} + \beta_7 UPEARN_{i,q} \\ &+ \beta_8 BIG\_BATH_{i,q} + \beta_9 STD\_ROA_{i,q} + \beta_{10} SIZE_{i,q} \\ &+ \beta_{11} LEVERAGE_{i,q} + \beta_{12} QUARTER\_4_q + \beta_{13} TIME_t + \varepsilon_{i,q}) \end{aligned} \tag{1}$$

where $\Lambda(.)$ is the logistic response function $e^{\beta' x}/(1+e^{\beta' x})$. All variables are defined in Appendix, Table 8. *APM* equals 1 if firm i discloses at least one APM in quarter q and zero otherwise. In further analyses, we estimate Eq. 1 for each APM

separately (i.e., *APM_EPS, APM_EBIT*, and *APM_EBITDA*). *APM_EPS* equals 1 if firm *i* discloses adjusted EPS in quarter *q* and zero otherwise. Similarly, we code *APM_EBIT* (*APM_EBITDA*) as 1 if a firm discloses adjusted EBIT (EBITDA) in a specific quarter and zero otherwise. *POST* is an indicator variable that equals 1 if a firm-quarter belongs to the post-ESMA period (i.e., Q2 of 2016 or later) and zero otherwise.

We draw on prior literature to include controls for differences in firm characteristics that could be related to the APM disclosure. Bradshaw and Sloan (2002) find that firms with special items are likelier to report APMs. Consequently, we include a corresponding indicator variable (*SPI*) in our equation.

Additionally, to control for the magnitude of the reported special items, we include *SPI_MAG* in Eq. 1. Firms that report negative special items in quarter *q* and whose earnings before special items are negative cannot report positive adjusted earnings by excluding special items from GAAP earnings. Therefore, in those cases, firms are less likely to disclose adjusted earnings. Thus, to control for these cases, we include *BIG_BATH* as an indicator in our model. According to prior literature, high-tech firms are likely to invest heavily in intangible assets, which confounds the informativeness of GAAP earnings (Collins et al. 1997; Francis and Schipper 1999; Lev and Zarowin 1999). Thus, Lougee and Marquardt (2004) expect firms with a high level of intangible intensity to be more likely to disclose APMs. Consequently, we include *INTAN* and *TECH* (Francis and Schipper 1999; Heflin and Hsu 2008) in our Eq. 1. To control for a firm's motivation to meet or beat certain earnings benchmarks (Burgstahler and Dichev 1997; Lougee and Marquardt 2004), we include *LOSS* and *UPEARN* in Eq. 1.

Based on prior literature (Michelson et al. 2000; Lougee and Marquardt 2004), we also control for earnings smoothing (*STD_ROA*), firm size (*SIZE*), and leverage (*LEVERAGE*). Furthermore, prior literature (Mendenhall and Nichols 1988) suggests that reporting in the fourth quarter of each year differs systematically from that in the preceding quarters (i.e., Q1, Q2, and Q3) of each year. Therefore, we include a corresponding indicator variable *QUARTER_4*. Additionally, we include a continous time trend variable (*TIME*) to capture the general trend in disclosures over time. *TIME* is defined as the fiscal year for a given firm-year observation minus the number 2010, which is the first year included in the dataset. Thus, *TIME* takes values of 0–9, which correspond to the sample years 2010–2019.

To test whether the introduction of the ESMA Guidelines is associated with a decrease in the magnitude of APM exclusions, we estimate Eq. 2 using OLS regression as follows:

$$\begin{aligned} EXCL_{i,q} &= \beta_0 + \beta_1 POST_q + \beta_2 SPI_{i,q} + \beta_3 MSPI\_MAG_{i,q} + \beta_4 INTAN_{i,q} \\ &+ \beta_5 TECH_i + \beta_6 MLOSS_{i,q} + \beta_7 MEC_{i,q} + \beta_8 BIG\_BATH_{i,q} \\ &+ \beta_9 STD\_ROA_{i,q} + \beta_{10} SIZE_{i,q} + \beta_{11} LEVERAGE_{i,q} + \beta_{12} QUARTER\_4_q \\ &+ \beta_{13} TIME_t + \beta_{14} MILLS + \varepsilon_{i,q} \end{aligned} \tag{2}$$

Again, all variables are defined in Appendix, Table 8. *EXCL* represents three different measures (i.e., *EXCL_EPS, EXCL_EBIT*, and *EXCL_EBITDA*) and is generally a continuous variable representing a firm's exclusions in quarter *q*. *EXCL_EPS* is the difference between the adjusted EPS and the respective GAAP EPS, scaled by price. *EXCL_EBIT* and *EXCL_EBITDA* represent the difference between adjusted and GAAP EBIT and EBITDA, respectively, both scaled by market value of equity.

Consequently, *EXCL* is observable only for firms that disclose APMs. A firm's decision to disclose an APM is voluntary, and the reasons why a specific firm might disclose APMs are complex (Isidro and Marques 2020). For example, the magnitude of an APM might influence a firm's decision to report this specific APM. Therefore, this management choice is presumably a result of certain conditions (i.e., unmeasured factors) rather than a random choice, which leads to a potential self-selection problem (Guillamon-Saorin et al. 2017). We follow prior literature (Christensen et al. 2014; Guillamon-Saorin et al. 2017; Isidro and Marques 2020) and rule out this concern by implementing the two-stage Heckman model (Heckman 1979). In the first stage (selection model), we use Eq. 1 to model the decision regarding whether a firm discloses an APM in a specific quarter. We then calculate the inverse Mills ratio (*MILLS*) and add *MILLS* in Eq. 2 to control for the self-selection. We also include industry-fixed effects in our model.

Generally, we use the control variables used in Eq. 1. To omit concerns that including three of these independent variables mean using part of the dependent variable to explain itself, we replace *SPI_MAG, LOSS*, and *UPEARN* by including the modified, industry level versions in our Eq. 2, namely *MSPI_MAG, MLOSS* and *MEC* (Heflin and Hsu 2008).[17]

4.2 Descriptive Results

Table 5 reports the univariate analysis for the full sample. The percentage of firms disclosing at least one APM (*APM*) is significantly lower in the pre-ESMA period (43.0%) than in the post-ESMA period (53.1%). We find similar results when investigating each APM separately. These findings indicate that introducing the ESMA Guidelines is not associated with decreased APM disclosure.

Table 5 also reports descriptive statistics for the level of exclusions. The difference between adjusted EPS and GAAP EPS (scaled by price) is significantly lower in the post-ESMA period (0.004) than in the pre-ESMA period (0.006). This finding indicates that introducing the ESMA Guidelines is associated with a decrease in the magnitude of APM exclusions.[18] However, we do not find a substantial de-

[17] For example, the magnitude of special items (*SPI_MAG*) proxies the magnitude of exclusions (i.e., if a firm reports a higher level of special items, it is likely to exclude a relatively high share of these from GAAP earnings). Therefore, including *SPI_MAG* in Eq. 2 would lead to the inclusion of part of the dependent variable among the independent variables. A similar explanation applies to *LOSS* and *UPEARN*.

[18] In untabulated tests, we investigate the development of adjusted and GAAP EPS for each quarter individually. We find that the decrease in the magnitude of APM exclusions is not clearly observable in the first quarter. However, the gap between adjusted and GAAP EPS in the post-ESMA period is substantially smaller in the second quarter, and GAAP EPS even exceeds adjusted EPS in Q2 of 2017. Additionally, adjusted EPS seems to mimic GAAP EPS in the third quarters of the post-ESMA period. Finally, the diffe-

Table 5 Univariate Analysis

	N	Mean	Median	Diff.
APM	*5489*	*0.470*	*0.000*	–
PRE	3309	0.430	0.000	–0.101***
POST	2180	0.531	1000	(–7.37)
APM_EPS	*5489*	*0.204*	*0.000*	–
PRE	3309	0.196	0.000	–0.020****
POST	2180	0.216	0.000	(–1.72)
APM_EBIT	*5489*	*0.313*	*0.000*	–
PRE	3309	0.297	0.000	–0.041***
POST	2180	0.338	0.000	(–3.21)
APM_EBITDA	*5489*	*0.281*	*0.000*	–
PRE	3309	0.246	0.000	–0.088***
POST	2180	0.334	0.000	(–7.14)
EXCL_EPS	*1055*	*0.005*	*0.002*	–
PRE	614	0.006	0.003	0.002**
POST	441	0.004	0.002	(2.15)
EXCL_EBIT	*1524*	*0.006*	*0.003*	–
PRE	871	0.007	0.003	0.001
POST	653	0.006	0.002	(0.70)
EXCL_EBITDA	*983*	*0.002*	*0.001*	–
PRE	524	0.002	0.001	0.000
POST	459	0.002	0.001	(0.69)

In Table 5, we report univariate Analysis for the dependent variables used in our study. The last column reports the difference in means between the pre- and post-ESMA periods and the t-statistics of the mean differences

*, **, and *** indicate significant mean differences at the 10%, 5%, and 1% levels, respectively

All the variables are defined in Appendix, Table 8

crease between the pre-ESMA period and the post-ESMA period for *EXCL_EBIT* and *EXCL_EBITDA*, respectively. Additionally, univariate results should be interpreted cautiously, as they do not offer within-firm comparisons or control for firm characteristics. Furthermore, most control variables (untabulated) do not differ significantly between the pre- and post-ESMA periods, mitigating concerns that our results could be driven by changes over time in certain firm characteristics.

4.3 Multivariate Results

We use a logistic regression to test the association between a firm's probability of APM disclosure and the introduction of the ESMA Guidelines. Table 6 reports the results of regression Eq. 1. Our main variable of interest is *POST*. In column (1) of Table 6, we show the regression results for *APM* as dependent variable. The coefficient on *POST* is insignificant, indicating that the introduction of the ESMA

rence between these measures seems to be smaller in the fourth quarters of post-ESMA years than in those of pre-ESMA years.

Table 6 Association between the ESMA Guidelines and the probability of APM disclosure

	(1)	(2)	(3)	(4)
	APM	*APM_EPS*	*APM_EBIT*	*APM_EBITDA*
Intercept	–4.118***	–8.286***	–3.358***	–4.345***
	(–14.03)	(–17.63)	(–11.05)	(–16.04)
POST	–0.137	–0.413***	–0.067	–0.079
	(–1.18)	(–2.71)	(–0.53)	(–0.62)
SPI	0.603***	0.211*	0.300***	0.604***
	(6.49)	(1.89)	(3.16)	(6.24)
SPI_MAG	4.273	0.803	2.845	3.702
	(0.95)	(0.17)	(0.71)	(0.92)
INTAN	4.999***	6.460***	1.974***	4.917***
	(21.76)	(23.31)	(9.37)	(19.44)
TECH	–0.373***	–0.684***	–1.302***	–0.436***
	(–3.91)	(–5.53)	(–11.20)	(–4.15)
LOSS	–0.027	–0.164	0.159	–0.060
	(–0.23)	(–0.86)	(1.27)	(–0.46)
UPEARN	–0.077	–0.235***	–0.035	0.005
	(–1.17)	(–2.77)	(–0.50)	(0.07)
BIG_BATH	0.195	–0.097	0.330*	0.468**
	(1.00)	(–0.35)	(1.69)	(2.39)
STD_ROA	44.085***	–7.989	24.490***	49.487***
	(10.33)	(–1.29)	(5.31)	(11.15)
SIZE	0.320***	0.351***	0.333***	0.157***
	(14.45)	(11.94)	(13.46)	(7.49)
LEVERAGE	0.034***	0.053***	0.040***	0.041***
	(5.78)	(5.40)	(5.19)	(6.63)
QUARTER_4	–0.378***	–0.182	–0.292***	–0.371***
	(–4.16)	(–1.57)	(–2.97)	(–3.87)
TIME	0.110***	0.111***	0.055**	0.100***
	(5.47)	(4.23)	(2.57)	(4.56)
Industry FE	Yes	Yes	Yes	Yes
N	5449	5449	5449	5449
Pseudo R^2	19.48%	30.36%	21.55%	16.07%
Count R^2	69.5%	86.4%	74.9%	75.6%

In Table 6, we report the regression results of Eq. 1, which is a logistic regression of the probability that a firm reports adjusted earnings in a specific quarter. We report *z*-statistics in parentheses below the coefficient estimates

*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively

All the variables are defined in Appendix, Table 8

Guidelines is not associated with a substantial decrease in APM disclosure.[19] This means introducing the ESMA Guidelines is not associated with less firms disclosing at least one APM even though the introduction of the ESMA Guidelines was intended to regulate and standardize APM reporting (ESMA 2015).[20] This finding is in contrast to the findings of US studies after the introduction of Regulation G; these studies find a decline in APM disclosure frequency in the years after the regulation (Heflin and Hsu 2008; Marques 2006). However, this decline was only temporary, resulting into an increasing trend in APM reporting in the long run.

Most of the control variables are in line with prior research. For example, we find that the coefficients on *INTAN* and *SIZE* are significantly positive. However, the coefficient on *LOSS* is insignificant, while prior literature finds evidence that loss firms are frequent APM reporters (Bhattacharya et al. 2003). The coefficient on *TIME* is significantly positive indicating the general upward trend in disclosures that is not related to the regulation (i.e., the introduction of the ESMA Guidelines).

In columns (2) to (4), we report the regression results of estimating Eq. 1 separately for each APM. The coefficient on *POST* is significantly negative for *APM_EPS* (–0.413; *z*-value: –2.71), indicating that the introduction of the ESMA Guidelines is associated with a decrease in *APM_EPS* disclosure. However, the coefficient on *POST* is insignificant for *APM_EBIT* (–0.067) and *APM_EBITDA* (–0.079). Thus, introducing the ESMA Guidelines is not associated with a decrease in the likelihood that firms disclose *APM_EBIT* or *APM_EBITDA*.[21]

In additional tests, we replace *TIME* by adding year fixed effects to our Eq. 1. However, all coefficients on our variable of interest *POST* remain insignificant (untabulated; *z*-values between 0.07 and 0.83). Given that we include additional time dependent variables in our regression this finding is not surprising as the year fixed effects absorb the main effect of *POST* (Guay et al. 2016; Joshi 2020; De Simone and Olbert 2022; Edwards et al. 2024). To further elaborate the possible time trend in our data (see Fig. 1), we use multivariate analysis to analyze this trend separately for the pre- and post-ESMA period (untabulated). We find an average increase in

[19] In our main analysis, we use industry fixed-effects. We re-estimate Eq. 1 by adding firm fixed-effects. Although this substantially reduces our number of observations from 5449 to 2501 observations (i.e., only those observations are included that have at least one change in the dependent variable within the sample period), we still find a insignificant (*z*-value: –1.09) coefficient on *POST*. Additionally, to refine the post-ESMA period, we replace the indicator variable *POST* by indicator variables for each year (i.e., 2016, 2017, 2018, and 2019). Note that the first quarter (Q1) of the year 2016 is not included in the indicator variable for the year 2016 because this quarter still belongs to the pre-ESMA period. We find that the coefficients on the years 2016 and 2017 are insignificant which is in line with the results for the *POST* coefficient in Table 6 (column 1). However, the coefficients on the years 2018 and 2019 are significantly negative (*z*-values: –2.39 and–2.35).

[20] In additional tests, we estimate Eq. 1 separately for each index (i.e., DAX, MDAX, SDAX, and TecDAX). The coefficient on *POST* is insignificant in all models (except TecDAX), indicating that the overall effect reported in our main analysis is not driven by firms listed on specific indices. Additionally, we re-estimate Eq. 1 for each quarter (i.e., Q1, Q2, Q3, and Q4) and find that the coefficient on *POST* is insignificant in all four quarters.

[21] In untabulated tests, we control for time trends by using equally long pre- and post-ESMA periods. We reduce our pre-ESMA period to the same number of quarters as the post-ESMA period (15 quarters each), resulting in a sample from Q3 of 2012 to Q4 of 2019. We find insignificant coefficients on *POST* in all four models.

the pre-ESMA period of 0.726% per quarter (*t*-value: 9.13) while we find an average increase in the post-ESMA period of only 0.311% per quarter (*t*-value: 1.84). The overall average increase is 0.561% per quarter (*t*-value: 13.48). Therefore, our findings indicate an increasing trend of the likelihood of APM reporting despite the introduction of the ESMA Guidelines. However, this increase is slower in the post-ESMA period than in the pre-ESMA period.

To more formally test the effect of the ESMA Guidelines on the magnitude of firms' exclusions, Table 7 displays the regression results of estimating Eq. 2. We test Eq. 2 separately for each of the three APMs. For *EXCL_EBIT* (column 2), the coefficient on *POST* is significantly negative (–0.003), indicating that the difference between adjusted earnings and GAAP earnings is significantly lower in the post-ESMA period than in the pre-ESMA period. Economically, we find that for every 1 € of stock price (market value of equity), the difference between adjusted EBIT and GAAP EBIT is 0.3 cents lower in the post-ESMA period than it is in the pre-ESMA period. Therefore, introducing the ESMA Guidelines is associated with a reduction in the magnitude of exclusions from adjusted EBIT. This finding aligns with prior US literature, suggesting an, at least temporary, decline in exclusion magnitude after Regulation G (Entwistle et al. 2005; Heflin and Hsu 2008). However, we do not find a significant coefficient on *POST* when *EXCL_EPS* or *EXCL_EBITDA* is the dependent variable (columns 1 and 3). Therefore, we do not find an association between the introduction of the ESMA Guidelines and the magnitude of exclusions from adjusted EPS or EBITDA.[22]

The inverse Mills ratio (*MILLS*), which is included to control for the potential self-selection bias, is insignificant in two of three tests (columns 1 and 3). The significant coefficient on *MILLS* when *EXCL_EBIT* is the dependent variable indicates the importance of controlling for the self-selection problem. In additional tests (untabulated), we re-estimate Eq. 2 as a standard OLS regression instead of the Heckman two-stage procedure. Without controlling for the selection concern, the coefficients on *POST* and the corresponding *t*-values remain nearly unchanged when *EXCL_EPS* or *EXCL_EBITDA* is the dependent variable. However, when *EXCL_EBIT* is the dependent variable, the coefficient on *POST* (–0.001) becomes insignificant (*t*-value: –0.88), emphasizing the importance of controlling for self-selection problems in Table 7.

4.4 Additional Test: APMs During Economic Crises

In this section, we expand our study by adding the years 2007–2009 and 2020–2021 to our sample period and, thus, provide new insights into how firms disclose adjusted EPS during economic crises. In Fig. 2, we plot the development of adjusted EPS and GAAP EPS over the period 2007–2021. Thus, we include two economic crises in our sample: the financial crisis (2008–2009) in the pre-ESMA period and the COVID-19 pandemic in the post-ESMA period (2020–2021). Without a doubt, these two crises differ substantially. While a banking crisis played a major role in the financial

[22] Similar to our additional tests for Eq. 1, we re-estimate Eq. 2 separately for each index and for each quarter. We do not find that our results are driven by specific firms or specific parts of the year.

Table 7 Association between the ESMA Guidelines and the magnitude of firms' exclusions

	(1)	(2)	(3)
	EXCL_EPS	*EXCL_EBIT*	*EXCL_EBITDA*
Intercept	0.004	0.047***	0.053
	(0.25)	(2.69)	(0.61)
POST	0.000	–0.003*	–0.002
	(0.36)	(–1.80)	(–0.67)
SPI	–0.001	–0.008***	–0.001
	(–1.04)	(–3.50)	(–0.33)
MSPI_MAG	0.108	–0.017	–0.007
	(0.82)	(–0.16)	(–0.07)
INTAN	0.005	–0.002	–0.023
	(0.46)	(–0.39)	(–0.65)
TECH	0.000	0.009**	0.003
	(0.16)	(2.20)	(1.14)
MLOSS	0.014***	0.007***	0.004
	(6.40)	(2.94)	(1.41)
MEC	–0.005***	–0.006***	–0.004*
	(–3.13)	(–3.11)	(–1.93)
BIG_BATH	0.034***	0.023***	0.013***
	(16.72)	(9.18)	(4.97)
STD_ROA	–0.031	–0.217**	–0.210
	(–0.32)	(–2.09)	(–0.52)
SIZE	–0.000	–0.001	–0.001
	(–0.46)	(–1.58)	(–0.70)
LEVERAGE	0.000	–0.000***	0.001***
	(1.32)	(–2.94)	(2.60)
QUARTER_4	0.000	0.010***	0.001
	(0.37)	(4.87)	(0.24)
TIME	–0.001**	0.000	–0.000
	(–2.52)	(0.23)	(–0.14)
MILLS	–0.000	–0.024***	–0.018
	(–0.05)	(–2.89)	(–0.92)
Industry FE	Yes	Yes	Yes
N (selected)	1055	1524	983
Rho	–0.017	–0.968	–0.839
Sigma	0.012	0.025	0.021

In Table 7, we report the regression results of Eq. 2, which is an OLS regression that investigates the association between the introduction of the ESMA Guidelines and the magnitude of firms' exclusions. We report *z*-statistics in parentheses below the coefficient estimates. All the variables are defined in Appendix, Table 8. The correlations between the different *EXCL* variables (i.e., *EXCL_EPS, EXCL_EBIT*, and *EXCL_EBITDA*) are high (all above 0.59). Additionally, *EXCL_EPS* has the highest correlation with *LOSS* (Pearson: 0.59; Spearman: 0.35). Most of the correlations of the variables used exhibit small magnitudes. Nevertheless, to ensure that multicollinearity is not a problem in our model, we follow prior research (e.g., Gleason and Lee 2003; Kroll et al. 2008; Atwood et al. 2012) by regressing the dependent variable on all of the independent variables and calculating the variance inflation factors (VIFs) of each variable. The average VIF is 1.50 and the maximum is 2.28; these values fall below the commonly accepted VIF threshold of 10

*, **, and *** indicate significance at the 10%, 5%, and 1%% levels, respectively

crisis (e.g., Eaton et al. 2016), the COVID-19 crisis arose due to political actions intended to treat a global pandemic (e.g., Borio 2020). Based on these differences, the inclusion of both crises in our sample period allows us to investigate the relation between GAAP EPS and adjusted EPS in the context of nationwide economically difficult periods for firms in both the pre-ESMA period and the post-ESMA period and to compare the two.

Figure 2 shows that the financial crisis affected firms' earnings in 2008 and 2009. Starting in Q2 of 2008, GAAP EPS decreases substantially, and it becomes negative in Q3 of 2008; moreover, it remains negative until the end of 2009. In contrast, during the same time period, adjusted EPS becomes negative only in Q4 of 2009, and it is consistently higher than GAAP EPS. In addition to showing different levels, the measures do not exhibit the same development within the period. We observe that GAAP EPS is extremely volatile during the financial crisis, whereas adjusted EPS is relatively persistent.[23]

In contrast, adjusted EPS seems to mimic GAAP EPS during the COVID-19 pandemic. In Q2 of 2020, adjusted EPS and GAAP EPS decrease only slightly; however, in Q3 2020, they decrease substantially, while Q4 2020 is already at an almost pre-pandemic level. In both 2020 and 2021, adjusted EPS and GAAP EPS show a nearly simultaneous trend. Thus, adjusted EPS seems to be highly dependent on GAAP EPS.[24]

Overall, Fig. 2 reveals that during the pre-ESMA period, when APMs were mostly unregulated, firms used adjusted EPS to smooth earnings during the crisis. However, during the more regulated post-ESMA period, the gap between GAAP EPS and adjusted EPS is marginal.

5 Conclusion

This study aims to extend the limited and practice-oriented literature on APM in Germany by utilizing an extensive, hand-collected dataset. The paper has two objectives. First, it aims to provide a sophisticated and detailed overview of APM reporting in Germany by analyzing a large and recent sample over a 10-year period. Second, it aims to verify whether the introduction of ESMA Guidelines is associated with changes in APM reporting.

The study results indicate that the fraction of firm-quarters reporting at least one APM significantly increased over the sample period. This trend is consistent throughout the sample and is not driven by one specific APM or by firms from one specific index. However, larger firms, such as DAX and MDAX firms, are more

[23] More formal tests (untabulated) show that the mean difference between adjusted EPS and GAAP EPS is approximately 0.018 during the financial crisis. Recall that the mean difference in our main sample period (i.e., 2010–2019) is approx. 0.005 (see Table 3, Panel A). Therefore, the gap between adjusted EPS and GAAP EPS is significantly higher (*t*-value: 3.09) during the financial crisis than it is from 2010 to 2019.

[24] The mean difference between adjusted EPS and GAAP EPS is approximately 0.005 during the COVID-19 pandemic; therefore, it is comparable to 2010–2019, namely, before the COVID-19 pandemic (Table 3, Panel A: 0.005). The corresponding *t*-value (–0.14) reveals that the difference between these two time periods is statistically insignificant.

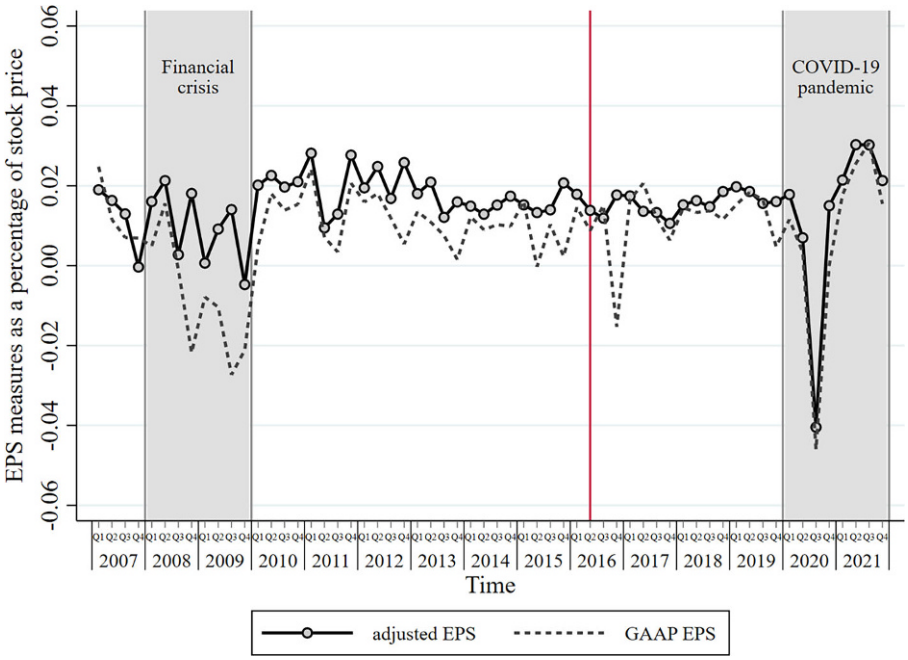

Fig. 2 The relation of adjusted EPS and GAAP EPS during economic crises (Notes. This figure compares the time trends of adjusted EPS and GAAP EPS during economic crises. By adding the years 2007–2009 and 2020–2021 to our sample period, we include two economic crises (gray shaded areas) in our figure. While the financial crisis (2008–2009) falls into the pre-ESMA period, the COVID-19 pandemic falls into the post-ESMA period. The red line indicates the introduction of the ESMA Guidelines in Q2 2016)

likely to engage in APM disclosure than firms listed in the SDAX or TecDAX. The study also find that firms are more likely to disclose adjusted EBIT or adjusted EBITDA than adjusted EPS. Additionally, managers are more likely to exclude costs than earnings when defining APMs. The study also reveals that adjusted earnings are, on average, higher than GAAP earnings in each quarter (Q1–Q4), with the most notable differences appearing in the fourth quarter.

Furthermore, the study finds that the introduction of the ESMA Guidelines is not associated with a substantial decrease in APM disclosure. However, the ESMA Guidelines are associated with a decrease in the magnitude of exclusions from adjusted EBIT, while no association exists between the introduction of the ESMA Guidelines and exclusions from adjusted EPS and adjusted EBITDA.

This study has some limitations. As with research on regulatory events, our empirical designs are restricted by the alignment of event and calendar time, and we cannot identify causal relationships. Additionally, although the ESMA Guidelines are EU-wide, we acknowledge that our findings might not be generalizable to other EU countries, as firms' general characteristics and disclosure behaviors might vary significantly across countries. Furthermore, readers should keep in mind that the key takeaways of our study represent a status quo of the current reporting behavior. However, future APM reporting will be reshaped by a new accounting standard

(IFRS 18), which is effective for fiscal years beginning on or after 1 January 2027. IFRS 18 requires a more structured income statement and makes management-defined performance measures part of the audited financial statements. This specific requirement would be an interesting avenue by which future research could expand the overall understanding (i.e., credibility and transparency) of APM disclosure.

This study contributes to the literature by providing detailed and timely descriptive evidence on APMs in Germany over time. It also incrementally contributes to knowledge of the financial disclosure behavior of German firms and helps us better understand the APM reporting of German listed firms. Overall, our results suggest that APM reporting by German firms has, to date, been underestimated.

6 Appendix

Table 8 Variable definitions (in alphabetical order)

Variable	Definition
APM	Indicator variable that equals 1 if a firms discloses at least one alternative performance measure in a specific quarter, and zero otherwise. (hand-collected data)
APM_EBIT	Indicator variable that equals 1 if a firms discloses adjusted EBIT in a specific quarter, and zero otherwise. (hand-collected data)
APM_EBITDA	Indicator variable that equals 1 if a firms discloses adjusted EBITDA in a specific quarter, and zero otherwise. (hand-collected data)
APM_EPS	Indicator variable that equals 1 if a firms discloses adjusted EPS in a specific quarter, and zero otherwise. (hand-collected data)
BIG_BATH	Indicator variable that equals 1 if both special items (**SPIQ**) and earnings before special items (**IBQ**) are negative and zero otherwise
EXCL	Represents three different measures (i.e., *EXCL_EPS, EXCL_EBIT*, and *EXCL_EBITDA*) and is generally a continuous variable that represents a firm's exclusions in quarter *q*. (hand-collected data)
EXCL_EBIT	Difference between adjusted EBIT (hand-collected) and GAAP EBIT (hand-collected) scaled by the market value of equity (**PRC*SHROUT**)
EXCL_EBITDA	Difference between adjusted EBITDA (hand-collected) and GAAP EBITDA (hand-collected) scaled by the market value of equity (**PRC*SHROUT**)
EXCL_EPS	Difference between the adjusted EPS (hand-collected) and the respective GAAP EPS (hand-collected), scaled by price (**PRC**)
INTAN	Ratio of intangible assets (**INTANQ**) to total assets (**ATQ**) in quarter *q*
LEVERAGE	Leverage, calculated as total liabilities for the quarter (**LTQ**) divided by total equity for the quarter (**CEQQ**)
LOSS	Indicator variable that equals 1 if a firm's earnings are negative and zero otherwise
MEC	*MEC* is the mean *UPEARN* of firm *i*'s industry in quarter *q* without the *UPEARN* of firm *i*
MILLS	Inverse Mills ratio, calculated by using the two-stage Heckman model
MLOSS	*MLOSS* is the mean *LOSS* of firm *i*'s industry in quarter *q* without the *LOSS* of firm *i*
MSPI_MAG	*MSPI_MAG* is the mean industry magnitude of *SPI_MAG* for firm *i* in quarter *q* without the *SPI_MAG* of firm *i*
POST	Indicator variable that equals 1 if a firm-quarter belongs to the post-ESMA period (i.e., Q2 of 2016 or later) and zero otherwise
QUARTER_4	Indicator variable that equals 1 if quarter *q* is a fourth quarter and zero otherwise
ROA	Return on assets, calculated as the ratio of quarterly pretax income (**PIQ**) to quarterly total assets (**ATQ**)
SIZE	Firm size, defined as the natural logarithm of quarterly total assets (**ATQ**)
SPI	Indicator variable that equals 1 if a firm reports special items (**SPIQ**) in a specific quarter and zero otherwise
SPI_MAG	Absolute value of special items (**SPIQ**) in quarter *q* scaled by total assets in quarter *q* (**ATQ**)
STD_ROA	Standard deviation of a firm's quarterly return on assets, which is calculated as the ratio of quarterly pretax income (**PIQ**) to total assets (**ATQ**)
TECH	Indicator variable that equals 1 if the three-digit SIC code of a firm is 283, 357, 360–368, 481, 737, or 873 and zero otherwise

Table 8 (Continued)

Variable	Definition
TIME	Fiscal year for a given firm-year observation minus the number 2010, which is the first year in the dataset. Thus, *TIME* takes on values of 0–9, which correspond to sample years 2010–2019
UPEARN	Indicator variable that equals 1 if a firm's earnings in quarter q are at least as high as its earnings in the previous year (i.e., four quarters ago) and zero otherwise

Compustat data item abbreviations are written in all caps and bold font (**COMPUSTAT**)

Availability of data and materials The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

Data Availability Data are available from the sources cited in the text.

Conflict of interest J. Görmar, M. Thomsen and C. Watrin declare that they have no competing interests.

References

Atwood, T.J., Michael S. Drake, James N. Myers, and Linda A. Myers. 2012. Home country tax system characteristics and corporate tax avoidance: international evidence. *The Accounting Review* 87(6):1831–1860. https://doi.org/10.2308/accr-50222.

BaFin. 2022. Bilanzkontrolle. https://www.bafin.de/DE/Aufsicht/BoersenMaerkte/Transparenz/Bilanzkontrolle/bilanzkontrolle_node.html. Accessed 17 Feb 2024.

Ball, Ray, Sudarshan Jayaraman, and Lakshmanan Shivakumar. 2012. Audited financial reporting and voluntary disclosure as complements: a test of the confirmation hypothesis. *Journal of Accounting and Economics* 53(1):136–166. https://doi.org/10.1016/j.jacceco.2011.11.005.

Barth, Mary E., Ian D. Gow, and Daniel J. Taylor. 2012. Why do pro forma and Street earnings not reflect changes in GAAP? Evidence from SFAS 123R. *Review of Accounting Studies* 17:526–562. https://doi.org/10.1007/s11142-012-9192-9.

Bassen, Alexander, Tomo Bojanic, Ralf Frank, Ekaterina Laskavaya, and Oliver Madsen. 2012. Ausweis von Pro-Forma-Kennzahlen kapitalmarktorientierter Unternehmen. *Kapitalmarktorientierte Rechnungslegung* 7:360–365.

Bentley, Jeremiah W., Theodore E. Christensen, Kurt H. Gee, and Benjamin C. Whipple. 2018. Disentangling managers' and analysts' non-GAAP reporting. *Journal of Accounting Research* 56(4):1039–1081. https://doi.org/10.1111/1475-679X.12206.

Bhattacharya, Nilabhra, Ervin L. Black, Theodore E. Christensen, and Chad R. Larson. 2003. Assessing the relative informativeness and permanence of pro forma earnings and GAAP operating earnings. *Journal of Accounting and Economics* 36(1):285–319. https://doi.org/10.1016/j.jacceco.2003.06.001.

Bhattacharya, Nilabhra, Ervin L. Black, Theodore E. Christensen, and Richard D. Mergenthaler. 2004. Empirical evidence on recent trends in pro forma reporting. *Accounting Horizons* 18(1):27–43. https://doi.org/10.2308/acch.2004.18.1.27.

Bhattacharya, Nilabhra, Ervin L. Black, Theodore E. Christensen, and Richard D. Mergenthaler. 2007. Who trades on pro forma earnings information? *The Accounting Review* 82(3):581–619. https://doi.org/10.2308/accr.2007.82.3.581.

Black, Dirk E., and Theodore E. Christensen. 2009. US mangers' use of 'pro forma' adjustments to meet strategic earnings targets. *Journal of Business Finance & Accounting* 36(-4):297–326. https://doi.org/10.1111/j.1468-5957.2009.02128.x.

Black, Dirk E., Ervin L. Black, Theodore E. Christensen, and William G. Heninger. 2012. Has the regulation of pro forma reporting in the US changed investors' perceptions of pro forma earnings disclosures? *Journal of Business Finance & Accounting* 39(7&8):876–904. https://doi.org/10.1111/j.1468-5957.2012.02297.x.

Black, Dirk E., Theodore E. Christensen, Jack T. Ciesielski, and Benjamin C. Whipple. 2018. Non-GAAP reporting: Evidence from academia and current practice. *Journal of Business Finance & Accounting* 45(3-4):259–294. https://doi.org/10.1111/jbfa.12298.

Black, Dirk E., Ervin L. Black, Theodore E. Christensen, and Kurt H. Gee. 2021b. CEO pay components and aggressive non-GAAP earnings disclosure. *Journal of Accounting, Auditing & Finance* https://doi.org/10.1177/0148558X21989907.

Black, Dirk E., Theodore E. Christensen, Jack T. Ciesielski, and Benjamin C. Whippe. 2021a. Non-GAAP earnings: a consistency and comparability crisis? *Contemporary Accounting Research* 38(3):1712–1747. https://doi.org/10.1111/1911-3846.12671.

Black, Ervin L., Theodore E. Christensen, T. Taylor Joo, and Roy Schmardebeck. 2017. The relation between earnings management and non-GAAP reporting. *Contemporary Accounting Research* 34(2):750–782. https://doi.org/10.1111/1911-3846.12284.

Borio, Claudio. 2020. The Covid-19 economic crisis: dangerously unique. *Business Economics* 55:181–190. https://doi.org/10.1057/s11369-020-00184-2.

Bradshaw, Mark T., and Richard G. Sloan. 2002. GAAP versus the street: an empirical assessment of two alternative definitions of earnings. *Journal of Accounting Research* 40(1):41–66. https://doi.org/10.1111/1475-679X.00038.

Bradshaw, Mark T., and Mark Soliman. 2007. Discussion of "letting the 'tail wag the dog': the debate over GAAP versus street earnings revisited". *Contemporary Accounting Research* 24(3):725–739. https://doi.org/10.1111/j.1911-3846.2007.tb00121.x.

Bradshaw, Mark T., Theodore E. Christensen, Kurt H. Gee, and Benjamin C. Whipple. 2018. Analysts' GAAP earnings forecasts and their implications for accounting research. *Journal of Accounting and Economics* 66(1):46–66. https://doi.org/10.1016/j.jacceco.2018.01.003.

Brown, Lawrence D., and Kumar Sivakumar. 2003. Comparing the value relevance of two operating income measures. *Review of Accounting Studies* 8:561–572. https://doi.org/10.1023/A:1027328418571.

Brown, Nerissa C., Theodore E. Christensen, and W. Brooke Elliott. 2012a. The timing of quarterly 'pro forma' earnings announcements. *Journal of Business Finance & Accounting* 39(3):315–359. https://doi.org/10.1111/j.1468-5957.2012.02281.x.

Brown, Nerissa C., Theodore E. Christensen, W. Brooke Elliott, and Richard D. Mergenthaler. 2012b. Investor sentiment and pro forma earnings disclosures. *Journal of Accounting Research* 50(1):1–40. https://doi.org/10.1111/j.1475-679X.2011.00427.x.

Buffett, Warren. 2016. Letter to shareholders 2015. https://www.berkshirehathaway.com/letters/2015ltr.pdf. Accessed 17 Ferbruary 2024..

Burgstahler, David, and Ilia Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24(1):99–126. https://doi.org/10.1016/S0165-4101(97)00017-7.

Chen, Chih-Ying. 2010. Do analysts and investors fully understand the persistence of the items excluded from Street earnings? *Review of Accounting Studies* 15:32–69. https://doi.org/10.1007/s11142-008-9079-y.

Chen, Han-Chung, Yen-Jung Lee, Sheng-Yi Lo, and Yong Yu. 2021. Qualitative characteristics of non-GAAP disclosures and non-GAAP earnings quality. *Journal of Accounting and Economics* 72(1):101402. https://doi.org/10.1016/j.jacceco.2021.101402.

Christensen, Theodore E., Michael S. Drake, and Jacob R. Thornock. 2014. Optimistic reporting and pessimistic investing: do pro forma earnings disclosures attract short sellers? *Contemporary Accounting Research* 31(1):67–102. https://doi.org/10.1111/1911-3846.12009.

Christensen, Theodore E., Hang Pei, Spencer R. Pierce, and Liang Tan. 2019. Non-GAAP reporting following debt covenant violations. *Review of Accounting Studies* 24:629–664. https://doi.org/10.1007/s11142-019-09492-1.

Christensen, Theodore E., Enrique Gomez, Matthew Ma, and Jing Pan. 2020. Analysts' role in shaping non-GAAP reporting: evidence from a natural experiment. *Review of Accounting Studies* 26:172–217. https://doi.org/10.1007/s11142-020-09564-7.

Collins, Daniel W., Edward L. Maydew, and Ira S. Weiss. 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics* 24(1):39–67. https://doi.org/10.1016/S0165-4101(97)00015-3.

Curtis, Asher, Valerie Li, and Paige H. Patrick. 2021. The use of adjusted earnings in performance evaluation. *Review of Accounting Studies* 26:1290–1322. https://doi.org/10.1007/s11142-021-09580-1.

Curtis, Asher B., Sarah E. McVay, and Benjamin C. Whipple. 2014. The disclosure of non-GAAP earnings information in the presence of transitory gains. *The Accounting Review* 89(3):933–958. https://doi.org/10.2308/accr-50683.

De Simone, Lisa, and Marcel Olbert. 2022. Real effects of private country-bycountry disclosure. *The Accounting Review* 97(6):201–232. https://doi.org/10.2308/TAR-2020-0714.

Depoers, Florence. 2000. A cost benefit study of voluntary disclosure: some empirical evidence from French listed companies. *European Accounting Review* 9(2):245–263. https://doi.org/10.1080/09638180050129891.

Doyle, Jeffrey T., Russell J. Lundholm, and Mark T. Soliman. 2003. The predictive value of expenses excluded from pro forma earnings. *Review of Accounting Studies* 8:145–174. https://doi.org/10.1023/A:1024472210359.

Doyle, Jeffrey T., Jared N. Jennings, and Mark T. Soliman. 2013. Do managers define non-GAAP earnings to meet or beat analyst forecasts? *Journal of Accounting and Economics* 56(1):40–56. https://doi.org/10.1016/j.jacceco.2013.03.002.

Eaton, Jonathan, Samuel Kortum, Brent Neiman, and John Romalis. 2016. Trade and the global recession. *American Economic Review* 106(11):3401–3438.

Edwards, Alexander, Michelle Hutchens, and Anh V. Persson. 2024. Third-party reporting and cross-border tax planning. *Contemporary Accounting Research* https://doi.org/10.1111/1911-3846.12943.

Entwistle, Gary M., Glenn D. Feltham, and Chima Mbagwu. 2005. The voluntary disclosure of pro forma earnings: a U.S.-Canada comparison. *Journal of International Accounting Research* 4(2):1–23. https://doi.org/10.2308/jiar.2005.4.2.1.

Entwistle, Gary M., Glenn D. Feltham, and Chima Mbagwu. 2010. The value relevance of alternative earnings measures: a comparison of pro forma, GAAP, and I/B/E/S earnings. *Journal of Accounting, Auditing & Finance* 25(2):261–288. https://doi.org/10.1177/0148558X1002500205.

European Security and Markets Authority. 2015. Final report ESMA guidelines on alternative performance measures. https://www.esma.europa.eu/sites/default/files/library/2015/11/2015-esma-1057_final_report_on_guidelines_on_alternative_performance_measures.pdf. Accessed 17 Feb 2024.

European Security and Markets Authority. 2019. Report on the use of alternative performance measures and on the compliance with ESMA's APM guidelines. https://www.esma.europa.eu/sites/default/files/library/esma32-334-150_report_on_the_thematic_study_on_application_of_apm_guidelines.pdf. Accessed 17 Feb 2024.

Fan, Yun, Abhijit Barua, William M. Cready, and Wayne B. Thomas. 2010. Managing earnings using classification shifting: evidence from quarterly special items. *The Accounting Review* 85(4):1303–1323. https://doi.org/10.2308/accr.2010.85.4.1303.

Francis, Jennifer, and Katherine Schipper. 1999. Have financial statements lost their relevance? *Journal of Accounting Research* 37(2):319–352. https://doi.org/10.2307/2491412.

Francis, Jennifer, Nanda Dhananjay, and Per Olsson. 2008. Voluntary disclosure, earnings quality, and cost of capital. *Journal of Accounting Research* 46(1):53–99. https://doi.org/10.1111/j.1475-679X.2008.00267.x.

Frankel, Richard, Sarah McVay, and Mark Soliman. 2011. Non-GAAP earnings and board independence. *Review of Accounting Studies* 16:719–744. https://doi.org/10.1007/s11142-011-9166-3.

Gleason, Cristi A., and Charles M.C. Lee. 2003. Analyst forecast revisions and market price discovery. *The Accounting Review* 78(1):193–225. https://doi.org/10.2308/accr.2003.78.1.193.

Guay, Wayne, Delphine Samuels, and Daniel Taylor. 2016. Guiding through the Fog: Financial statement complexity and voluntary disclosure. *Journal of Accounting and Economics* 62(2):234–269. https://doi.org/10.1016/j.jacceco.2016.09.001.

Guest, Nicholas, S.P. Kothari, and Robert Pozen. 2022. Why do large positive non-GAAP earnings adjustments predict abnormally high CEO pay? *The Accounting Review* https://doi.org/10.2308/TAR-2019-0003.

Guillamon-Saorin, Encarna, Helena Isidro, and Ana Marques. 2017. Impression management and non-GAAP disclosure in earnings announcements. *Journal of Business Finance & Accounting* 44(3):448–479. https://doi.org/10.1111/jbfa.12238.

Heckman, James J. 1979. Sample selection bias as a specification error. *Econometrica* 47(1):153–161. https://doi.org/10.2307/1912352.

Heflin, Frank, and Charles Hsu. 2008. The impact of the SEC's regulation of non-GAAP disclosures. *Journal of Accounting and Economics* 46(2):349–365. https://doi.org/10.1016/j.jacceco.2008.07.002.
Herr, Sascha B., Peter Loson, and Jochen Pilhofer. 2022. Alternative performance measures: a structures literature review of research in academic and professional journals. *Schmalenbach Journal of Business Research* 74:389–451. https://doi.org/10.1007/s41471-022-00138-8.
Hillebrandt, Franca, and Thorsten Sellhorn. 2002. Pro-Forma-Earnings: Umsatz vor Aufwendungen? *Kapitalmarktorientierte Rechnungslegung* 4:153–154.
Hitz, Joerg-Markus. 2010. Press release disclosure of 'Pro Froma' earnings metrics by large German corporations—Empirical evidence and regulatory recommendations. *Accounting in Europe* 7(1):63–86. https://doi.org/10.1080/17449480.2010.485376.
Hitz, Joerg-Markus, and Verena Jenniges. 2008. Publizitaet von Pro-forma-Ergebnisgroessen am deutschen Kapitalmarkt. *Kapitalmarktorientierte Rechnungslegung* 4:236–245.
Hoogervorst, Hans. 2016. Performance reporting and the pitfalls of non-GAAP metrics. https://www.ifrs.org/content/dam/ifrs/news/speeches/2016/hans-hoogervorst-eaa-annual-conference-may-2016.pdf. Accessed 17 Feb 2024.
Huang, Qianyun, and Terrance R. Skantz. 2016. The informativeness of pro forma and street earnings: an examination of information asymmetry around earnings announcements. *Review of Accounting Studies* 21:198–250. https://doi.org/10.1007/s11142-015-9345-8.
IASB. 2022. Primary financial statements. https://www.ifrs.org/projects/work-plan/primary-financial-statements/#about. Accessed 17 Feb 2024.
Isidro, Helena, and Ana Marques. 2013. The effects of compensation and board quality on non-GAAP disclosures in Europe. *The International Journal of Accounting* 48(3):289–317. https://doi.org/10.1016/j.intacc.2013.07.004.
Isidro, Helena, and Ana Marques. 2015. The role of institutional and economic factors in the strategic use of non-GAAP disclosures to beat earnings benchmarks. *European Accounting Review* 24(1):95–128. https://doi.org/10.1080/09638180.2014.894928.
Isidro, Helena, and Ana Marques. 2020. Industry competition and non-GAAP disclosure. *Accounting and Business Research* 51(2):156–184. https://doi.org/10.1080/00014788.2020.1798209.
Jennings, Ross, and Ana Marques. 2011. The joint effect of corporate governance and regulation on the disclosure of manager-adjusted non-GAAP earnings in the US. *Journal of Business Finance & Accounting* 38(3-4):364–394. https://doi.org/10.1111/j.1468-5957.2011.02238.x.
Johnson, W. Bruce, and William C. Schwartz Jr.. 2005. Are investors misled by "pro forma" earnings? *Contemporary Accounting Research* 22(4):915–963. https://doi.org/10.1506/CKET-2ERA-NNRP-ATXF.
Joshi, Preetika. 2020. Does private country-by-country reporting deter tax avoidance and income shifting? Evidence from BEPS action item 13. *Journal of Accounting Research* 58(2):333–381. https://doi.org/10.1111/1475-679X.12304.
Jung, Woon-Oh, and Young K. Kwon. 1988. Disclosure when the market is unsure of information endowment of managers. *Journal of Accounting Research* 26(1):146–153. https://doi.org/10.2307/2491118.
Karpoff, Jonathan M., D. Scott Lee, and Gerald S. Martin. 2009. The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis* 43(3):581–611. https://doi.org/10.1017/S0022109000004221.
Kleinmanns, Hermann. 2016. ESMA veroeffentlicht Leitlinien zu alternativen Leistungskennzahlen – ein Schritt in die richtige Richtung? *Zeitschrift für Internationale Rechnungslegung* 3:131–136.
Kolev, Kalin, Carol A. Marquardt, and Sarah E. McVay. 2008. SEC scrutiny and the evolution of non-GAAP reporting. *The Accounting Review* 83(1):157–184. https://doi.org/10.2308/accr.2008.83.1.157.
Kroll, Mark, Bruce A. Walters, and Peter Wright. 2008. Board vigilance, director experience, and corporate outcomes. *Strategic Management Journal* 29(4):363–382. https://doi.org/10.1002/smj.649.
Kueting, Karlheinz, and Matthias Heiden. 2002. Pro-Forma-Ergebnisse in deutshcen Geschäftsberichten – kritische Bestandsaufnahme aus Sicht der Erfolgsanalyse. *Steuer- und Bilanzpraxis* 22:1085–1089.
Kueting, Karlheinz, and Matthias Heiden. 2003. Zur Systematisierung von Pro-Forma Kennzahlen – Gleichzeitig: Fortsetzung einer empirischen Bestandsaufnahme. *Deutsches Steuerrecht* 36:1544–1552.
Leung, Edith, and David Veenman. 2018. Non-GAAP earnings disclosure in loss firms. *Journal of Accounting Research* 56(4):1083–1137. https://doi.org/10.1111/1475-679X.12216.
Lev, Baruch, and Paul Zarowin. 1999. The boundaries of financial reporting and how to extend them. *Journal of Accounting Research* 37(2):353–385. https://doi.org/10.2307/2491413.
Lougee, Barbara A., and Carol Marquardt. 2004. Earnings informativeness and strategic disclosure: an empirical examination of "pro forma" earnings. *The Accounting Review* 79(3):769–795. https://doi.org/10.2308/accr.2004.79.3.769.

Marques, Ana. 2006. SEC interventions and the frequency and usefulness of non-GAAP financial measures. *Review of Accounting Studies* 11:549–574. https://doi.org/10.1007/s11142-006-9016-x.

McCrum, Dan. 2019. Wirecard's suspect accounting practices revealed. Financial Times. https://www.ft.com/content/19c6be2a-ee67-11e9-bfa4-b25f11f42901. Accessed 17 Feb 2024.

McCrum, Dan. 2020. Wirecard: the timeline. Financial Times. https://www.ft.com/content/284fb1ad-ddc0-45df-a075-0709b36868db. Accessed 17 Feb 2024.

McVay, Sarah E. 2006. Earnings management using classification shifting: an examination of core earnings and special items. *The Accounting Review* 81(3):501–531. https://doi.org/10.2308/accr.2006.81.3.501.

Mendenhall, Richard R., and William D. Nichols. 1988. Bad news and differential market reactions to announcements of earlier-quarters versus fourth-quarter earnings. *Journal of Accounting Research* 26:63–86. https://doi.org/10.2307/2491180.

Michelson, Stuart E., James Jordan-Wagner, and Charles W. Wootton. 2000. The relationship between the smoothing of reported income and risk-adjusted returns. *Journal of Economics and Finance* 26:141–159. https://doi.org/10.1007/BF02752709.

Ruhwehdel, Franca, Pascal Hemmersbach, and Philipp Mosch. 2017. Pro Forma-Ergebnisse im Value Reporting von DAX und MDAX – Aenderungsbedarfe durch die neuen ESMA-Leitlinien zu Alternativen Leistungskennzahlen? *Controlling – Zeitschrift für Erfolgsorientierte Unternehmenssteuerung* 4:19–26.

Ruhwehdel, Franca, Fabian Haehn, and Marco Roeper. 2018. Berichterstattung über Alternative Performance Measures in DAX und MDAX nach Inkrafttreten der ESMA-Leitlinien. *Kapitalmarktorientierte Rechnungslegung* 11:508–515.

SAP. 2021. SAP integrated report. https://www.sap.com/investors/en.html?pdf-asset=903be721-1b7e-0010-bca6-c68f7e60039b&page=1. Accessed 17 Feb 2024.

Tucker, Jennifer W. Is openness penalized? Stock returns around earnings warnings. *The Accounting Review* 82(4):1055–1087. https://doi.org/10.2308/accr.2007.82.4.1055.

Turner, Lynn E. 2000. Speech by SEC staff: Remarks to the 39th Annual Corporate Counsel Institute. https://www.sec.gov/news/speech/spch418.htm. Accessed 17 Feb 2024.

Verrecchia, Robert E. 1990. Information quality and discretionary disclosure. *Journal of Accounting and Economics* 12(4):365–380. https://doi.org/10.1016/0165-4101(90)90021-U.

Volk, Gerrit. 2007. Pro-forma-Kennzahlen in der Ergebnisberichterstattung 2005 der DAX30-Unternehmen. *Zeitschrift für Internationale Rechnungslegung* 4:251–258.