

# Kinked Accounting?

## Loss Avoidance in Europe and (Not) the US

June 2021

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### Abstract

Prior literature shows that the zero earnings discontinuity, which illustrates earnings management to avoid small losses, has disappeared in the United States. We examine whether a similar development has occurred in the European Union and find that this is not the case: the discontinuity in Europe is still pronounced and has remained remarkably stable. We hypothesize that the tendency to avoid small losses of close to zero constitutes only one facet of a more general tendency to reduce reported losses in years with negative cash flows, which would result in a less timely recognition of losses than expected under conditional conservatism as embodied in accounting standards. For the United States, we find that loss avoidance in this broader sense follows a similar developmental pattern over time as that of the zero earnings discontinuity. For the last two decades, losses have been recognized in a timelier manner than gains, which is consistent with conditional conservatism. In Europe, in contrast, the asymmetric timeliness of loss recognition is consistently reversed, which suggests that conditional conservatism is overcompensated by earnings management to reduce reported losses. We conclude that the adoption of International Financial Reporting Standards has not resulted in a decline in loss avoidance behavior in the European Union.

*Keywords:* Earnings management, Zero earnings discontinuity, IFRS, US GAAP, Earnings distribution, Loss avoidance

*JEL:* M48, G38, M41

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## 1. Introduction

A large body of literature has shown that earnings management is a widespread phenomenon.<sup>1</sup> An essential part of earnings management can be explained by the desire to avoid having to report losses. In particular, small losses of close to zero are often converted into small gains, which gives rise to the well-known zero earnings (ZE) discontinuity (also referred to as the ZE kink), as first shown by Burgstahler and Dichev (1997) and confirmed by many other studies.<sup>2</sup> Strikingly, the ZE discontinuity disappeared at the turn of the millennium, as documented by Gilliam et al. (2015) for United States (US) data. The reasons for this are not entirely clear. The decline in the second half of the 1990s could be explained by changes in the continued listing rules of the New York Stock Exchange (NYSE) (Dechow et al., 2003). Another hypothesis is that the Sarbanes-Oxley Act (SOX) successfully pushed back earnings management (Gilliam et al., 2015). The data also appear to be compatible with a gradual decline unrelated to SOX (Chardonnnens et al., 2021). It is also possible that investors in the stock market shifted their focus from a simple profit target to a more sophisticated assessment mediated by financial analysts such that the ZE target became less important for listed firms.

Some arguments make a similar decline in Europe seem logical.<sup>3</sup> A decade after SOX, the European Union (EU) established its own set of rules for audits, public oversight of audits and investor protection (Directive 2014/56/EU; Regulation (EU) No 537/2014). Additionally, the importance of financial analysts as intermediaries between investors and the stock

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<sup>1</sup>For an overview, see Ronen and Yaari (2008).

<sup>2</sup>See, e.g., Degeorge et al. (1999); Dechow et al. (2003); Leuz et al. (2003); Burgstahler and Eames (2006); Burgstahler and Chuk (2017). Earnings management appears to be a natural explanation for the kink in earnings distributions (Burgstahler and Chuk, 2017), but other explanations might also play a role, see Beaver et al. (2007); Durtschi and Easton (2005, 2009).

<sup>3</sup>For evidence in Japan, see Enomoto and Yamaguchi (2017).

market has increased strongly since the 1990s, leading to a broader and deeper coverage of European stocks, which could have shifted the focus to analyst forecasts. The most substantial innovation, however, was the mandatory adoption of International Financial Reporting Standards (IFRS) in the EU in 2005. In the words of Ball (2016, p. 547), the IFRS “are designed to curtail managers’ discretion to manipulate provisions in ways that were considered valid under many of the adopting countries’ prior rules, for example, with the objective of smoothing reported earnings or hiding losses.” It also seems conceivable to expect a direct spillover effect of accounting practices from the US to Europe because in a globalized world, a firm’s profitability is assessed in the context of its international peers. As a consequence, reporting practices might also be aligned with peer companies.

However, there are also reasons to believe that loss avoidance has been preserved in Europe. It is well known that incentives and the institutional environment are crucially important for financial reporting practices (Soderstrom and Sun, 2007; Ball, 2016).<sup>4</sup> As the principles-based IFRS provide greater discretion than the rules-based US GAAP (Ball, 2016, p. 553), the outcome in a stable institutional environment might well be a persistent practice of loss avoidance. Prior studies on the immediate effects of IFRS adoption on earnings management in the EU provide mixed results. On the one hand, Barth et al. (2008) and Chen et al. (2010a) find evidence of less earnings management and more timely loss recognition after IFRS adoption. On the other hand, Capkun et al. (2016) maintain that IFRS provide greater flexibility that has led to more income smoothing. In the same vein, Lin et al. (2012, p. 641) find that “accounting numbers under IFRS generally exhibit more earnings management, less timely loss recognition, and less value relevance compared to those

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<sup>4</sup>For the role of incentives, see, e.g., Watts (2003a); Ewert and Wagenhofer (2005); Gassen et al. (2006); Ball et al. (2008); Beyer et al. (2010); Ewert and Wagenhofer (2012).

under U.S. GAAP.” This result applies to a sample of German high-tech firms that switched from US GAAP to IFRS in 2005. André et al. (2015, p. 482) “document an overall decline in the degree of conditional conservatism after the adoption of IFRS”. The authors “argue that IFRS are conceptually conditionally conservative but that inappropriate application of conditional conservatism principles is likely to prevent financial reporting from reaching the level of conservatism targeted by the International Accounting Standards Board.” This would constitute earnings management intended to avoid a timely recognition of losses.

From these considerations, we derive our first research question: is the disappearance of the ZE discontinuity in the US mirrored by a similar decline in the EU? Our hypothesis is that in the EU, firms’ incentives, governance structures, investor relations and institutional environment have not changed substantially, so many European firms still adhere to the practice of loss avoidance shown in previous research. Past evidence stems from Burgstahler et al. (2006) who find higher levels of earnings management in weak legal systems and in private firms (EU sample for 1997 to 2003). Daske et al. (2006) show that a discontinuity arises with respect to different targets, namely, targets to report positive earnings, to achieve positive earnings changes and to outperform analyst consensus forecasts (EU sample for 1986 to 2001). Importantly, “[t]hese discontinuities are much more pronounced in the EU compared to the US” (p. 137). For UK firms, Gore et al. (2007) document a link between discontinuities and potentially managed working capital accruals.

Our second research question concerns whether the time pattern of the ZE discontinuity carries over to loss avoidance in a broader sense. We suggest that the tendency to avoid reporting losses of close to zero constitutes only one facet of a more general tendency to exercise accounting discretion to reduce the magnitude of reported losses. We hypothesize that loss avoidance in this broader sense follows a similar development pattern over time as

that of the ZE discontinuity.

We apply a method proposed by Ball and Shivakumar (2005, 2006) to capture asymmetric timeliness in the recognition of gains and losses, which involves a piecewise linear (“kinked”) regression of accruals on cash flows.<sup>5</sup> Asymmetric loss recognition is incorporated into accounting rules as conditional conservatism. This principle requires that unrealized losses be recognized if they are related to events that cause contemporaneous losses.<sup>6</sup> Loss avoidance behavior will move the asymmetry in the opposite direction. The kink might even be reversed such that losses are not recognized in a *more* timely manner (as implied by conditional conservatism) but are postponed to periods in which they can be compensated by gains.

The asymmetric timeliness measure of Ball and Shivakumar (2005, 2006) is related to measures of income smoothing (e.g., Leuz et al., 2003; Burgstahler et al., 2006; Gassen et al., 2006) and estimates of the negative correlation of cash flows and accruals (e.g., Land and Lang, 2002; Leuz et al., 2003; Myers et al., 2007; Barth et al., 2008). These measures, however, are symmetrical for gains and losses, while the defining characteristic of the measure developed by Ball and Shivakumar (2005, 2006) is the loss recognition *asymmetry* that is crucial for our study.

Our intended contributions are twofold. First, we examine whether the ZE discontinuity declined in Europe in a similar way that it did in the US. Of course, Europe is not a homoge-

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<sup>5</sup>The measure of Basu (1997) for the timeliness of earnings with respect to stock returns is not suitable for our purpose because stock market valuation complicates the link to loss avoidance; see Dechow et al. (2010), Patatoukas and Thomas (2011) and Dutta and Patatoukas (2017).

<sup>6</sup>See Ball and Shivakumar (2005); Beaver and Ryan (2005); Mora and Walker (2015); Zhong and Li (2017). Unconditional conservatism can be defined as “an accounting bias toward reporting low book values of stockholder equity”, while conditional conservatism is “an equivalent bias *conditional on firms experiencing contemporaneous economic losses*” (Ball and Shivakumar, 2005, p. 89). Potential economic determinants of conservatism are contracting, litigation risk, taxation and accounting regulation, see Watts (2003b); Lara et al. (2009).

neous entity. There are, for example, firm- and country-level differences in IFRS compliance (Cascino and Gassen, 2015). In addition, as noted by Ball (2016, p. 551 f.), “despite substantially increased globalization over recent decades, the world still is in many ways more local than global.” However, “the European perspective on this issue is atypical. During the past five or six decades, the EU and its precursor bodies has converged member countries’ markets and governments to a substantially greater degree than has occurred elsewhere.” For this reason, it seems interesting to contrast the US with Europe on this aggregate level. Given the limited number of loss observations available, an in-depth country analysis and an in-depth analysis of the time dimension cannot be performed simultaneously. Our focus is on accurately reflecting the development of loss aversion over time (from 1988 to 2019). Therefore, in our main analyses, we avoid pooling data over several years, as is often found in prior literature.

As our second contribution, we examine whether similar results hold for an extended measure of loss avoidance that extends beyond the ZE threshold. In both analyses, we find pronounced differences between the US and EU samples. In the EU, both the ZE discontinuity and the extended loss avoidance measure suggest a pronounced and persistent level of earnings management. In contrast, the timeliness of loss recognition in the US increased in parallel with the disappearance of the ZE kink, which reinforces prior findings of a substantial decline in earnings management and an improvement in earnings quality.<sup>7</sup>

The remainder of the paper proceeds as follows. The next section describes our data. In Section 3, we present our method and empirical results for the ZE discontinuity. Section 4 extends this analysis to loss aversion in a broader sense. In Section 5, we compare matched

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<sup>7</sup>Our measures are among the proxies for earnings quality in the review of Dechow et al. (2010), see Sections 3.1.4 and 3.1.5.

industry samples to control for differences in the industry structures and size distributions of our samples. Section 6 concludes.

## 2. Data

We use Worldscope data from Refinitiv Datastream (formerly Thomson Reuters Datastream) for 1988 to 2019 for the US and the EU as well as for the United Kingdom (UK) and the EFTA states of Iceland, Liechtenstein, Norway and Switzerland. We exclude firms operating in regulated industries and financial institutions with SIC codes ranging from 4400 to 5000 and from 6000 to 7000.<sup>8</sup> Following previous research, we remove observations with a net income of exactly zero (58 firm-years in the European sample and 13 firm-years in the US sample).<sup>9</sup> We also remove firm-years with insubstantial sales, which we define as total sales of less than 2 million USD. Since these firms report losses by definition, they could distort our loss avoidance measures (see Chardonnnens et al., 2021).

We also apply a filter for firms with negligible market capitalization. In finance practice, stocks with a market capitalization value of less than 50 million USD are classified as “nano caps” or “penny stocks” (compared to micro caps, small caps, large caps and blue chips). These stocks are typically traded in OTC markets and are considered highly speculative investments not only in terms of return fluctuations but also in terms of potential market manipulations. Penny stocks are numerous in the Worldscope database because of their broad coverage of OTC markets, but they are not of interest to typical institutional or private investors. Therefore, we require a market capitalization level in 2019 of 50 million

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<sup>8</sup>See similarly, e.g., Beaver et al. (2007); Brown and Caylor (2005); Burgstahler and Dichev (1997); Chen et al. (2010b); Durtschi and Easton (2005); Durtschi and Easton (2009); Gilliam et al. (2015); Haga et al. (2019); Kerstein and Rai (2007); Roychowdhury (2006); Makarem et al. (2018).

<sup>9</sup>See Burgstahler and Dichev (1997); Gilliam et al. (2015); Dechow et al. (2003); Beaver et al. (2007); Burgstahler and Eames (2006); Lahr (2014).

USD and deflate this number by 3% per year such that the minimum requirement in 1988 is 20 million USD.<sup>10</sup> To ensure a minimum size regardless of market fluctuations, we apply the same threshold (20 million USD in 1988 to 50 million USD in 2019) to total assets. The remaining firms represent 99.2% of overall market capitalization (with minor variations across regions and years) and 69.3% (74.6%) of firm-years in the European (US) sample.

Our last filter concerns firms with extreme values of earnings or cash flows. We are interested in earnings management designed to avoid small losses of close to the ZE threshold and losses that extend well beyond this range but are not extreme. Extreme profits or losses are considered outliers that can affect our OLS regression results (see the discussion of Rees, 2009, on the relationship of earnings and stock returns). An assessment of earnings management in these cases would require detailed individual investigations. For this reason, we only include firm-years with absolute values of net income (scaled by total assets) and operating cash flow less depreciation and amortization (scaled by total assets) of less than 50%. This removes 6.9% of firm-years from the European sample and 3.5% of firm-years from the US sample. It is important to note that the filter applied is irrelevant for our analysis of the ZE discontinuity. It also does not affect the majority of our analysis of asymmetric timeliness because it is based on robust LOESS regressions. We show scatterplots of earnings versus cash flows to illustrate the range of earnings and cash flows covered. We also present robustness checks in Section 5.

In this paper, earnings and cash flows are always scaled by total assets at the beginning of the year. When analyzing the ZE discontinuity, we additionally consider the market value of equity as a scaling variable. Our final sample contains 65,052 firm-years for the US and

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<sup>10</sup>A value of 50 million USD in 2019 corresponds approximately to the 0.5th percentile of the market capitalization of NYSE stocks. Fama and French (2008) used the 20th NYSE percentile to define micro caps. This shows that we still include very small firms.



56,855 firm-years for Europe. Table 1 shows descriptive statistics. US firms tend to have a larger market capitalization (MCAP) than European firms. The difference is smaller for total assets, and the distributions of earnings and cash flows are similar in both samples. Appendix A reports more details on the country structure of the European sample. The three countries with the most firm-years are the UK, Germany and France, representing 56.7% of the European firm-years. We consider these countries separately in our analyses. Throughout the paper, we use a significance level of 5%.

Table 1: **Descriptive statistics for the US and European samples.** MCap: market capitalization. *NI*: net income; *CFO*: operating cash flow; *CF*: operating cash flow less depreciation and amortization; *TA*: total accruals before depreciation and amortization ( $NI - CF$ ). Earnings, cash flows and accruals are scaled by total assets at the beginning of the year. MCap and Total Assets in million USD.

Statistic	N	Mean	SD	Min	P25	Median	P75	Max
US								
MCap	65,052	4,171	22,041	20	141	473	1,818	1,304,756
Total Assets	65,052	3,182	16,924	20	143	427	1,615	797,800
NI	65,052	0.035	0.126	-0.500	-0.001	0.050	0.098	0.499
CFO	65,052	0.092	0.123	-0.496	0.039	0.095	0.155	1.249
CF	65,052	0.041	0.119	-0.499	-0.008	0.047	0.102	0.500
TA	65,052	-0.007	0.097	-0.926	-0.046	-0.006	0.031	0.899
Europe								
MCap	56,855	2,550	11,648	20	93	258	988	311,748
Total Assets	56,855	3,243	14,900	20	131	354	1,333	532,474
NI	56,855	0.049	0.091	-0.499	0.015	0.048	0.089	0.500
CFO	56,855	0.094	0.102	-0.475	0.042	0.088	0.142	1.074
CF	56,855	0.046	0.097	-0.498	0.001	0.044	0.091	0.499
TA	56,855	0.003	0.081	-0.690	-0.032	0.0004	0.034	0.938

### 3. Zero Earnings Discontinuity

#### 3.1. Method

The two most commonly used discontinuity measures are based on the frequency distribution of scaled earnings for a specific interval width.<sup>11</sup> Let  $i$  denote ordered intervals such that  $i = 1$  is the interval of the lowest profits,  $i = 2$  is the interval for the next range of profits,  $i = -1$  is the interval of the lowest losses and  $i = -2$  is the next loss interval. Additionally, let  $N_i$  denote the number of observations in interval  $i$ , let  $N$  denote the total number of observations in the sample and let  $p_i = N_i/N$  denote the proportion of observations falling in interval  $i$ . The first measure, the standardized differences test statistic, is then defined as the standardized difference between the actual number of observations in interval  $i$  and the expected number of observations assuming no discontinuity:<sup>12</sup>  $SD_i = [N_i - 0.5(N_{i-1} + N_{i+1})]/s_i$ , where  $s_i$  is the standard error of the difference.<sup>13</sup> The second measure, the profit-to-loss ratio, is defined as  $PL = N_1/N_{-1}$ .<sup>14</sup> In the presence of a ZE discontinuity,  $SD_{-1}$  will be negative,  $SD_1$  will be positive and  $PL$  will be larger than 1.

A disadvantage of the  $SD$  statistic is that it depends on the sample size. The profit-to-loss ratio, in turn, is disadvantageous in that it will be naturally larger than 1 when the center of gravity of the distribution is in the positive range. For these reasons, we modify the two measures based on a kernel density estimation inspired by Lahr (2014). We use a standard Gaussian estimator for scaled earnings of  $-0.15$  to  $0.15$ .<sup>15</sup> Figure 1 shows examples of frequency distributions and kernel densities (blue lines) for US (left column)

<sup>11</sup>The description provided in this subsection is in part identical to that in Chardonens et al. (2021).

<sup>12</sup>See Burgstahler and Dichev (1997).

<sup>13</sup>The standard error is computed as  $s_i = \sqrt{Np_i(1-p_i) + 0.25N(p_{i-1} + p_{i+1})(1-p_{i-1} - p_{i+1})}$ .

<sup>14</sup>See Dechow et al. (2003).

<sup>15</sup>The density is estimated at 512 equally spaced points. We implement the estimation in R ("density" function) with the bandwidth proposed by Scott (1992) (option `bw.nrd` in R).

and European firms (right column) for 1989, 1999, 2009 and 2019. Our measure “small loss deviation” is defined as  $SLD = (Actual_{-1} - Expected_{-1})/Expected_{-1}$  where  $Actual_{-1}$  is the actual number of observations in the first loss interval and  $Expected_{-1}$  is the expected number according to the kernel density estimation (integral over the first loss interval). The “small profit deviation” is analogously defined as  $SPD = (Actual_1 - Expected_1)/Expected_1$  where subscript 1 represents the first profit interval. We also compute both measures for an interval width of 0.015. In this case, the actual observations of the first three loss and profit intervals of width 0.005 are compared to the expected value according to the kernel density over the same range.

The expected profit-to-loss ratio without discontinuity ( $EPLR$ ) is defined as the integral of the kernel density over the first profit interval divided by the integral over the first loss interval, both with a width of 0.005. We then define our modified profit-to-loss ratio as  $MPL = \ln[N_1/N_{-1}] - \ln(EPLR_1)$ . To compute this ratio for a width of 0.015, we again sum the observations and integrals over three intervals of width 0.005.

### 3.2. Results

For illustrative purposes, Figure 1 shows selected frequency distributions and reports the corresponding small loss deviation ( $SLD$ ) and small profit deviation ( $SPD$ ). Figure 2 shows the yearly estimates of  $SLD$  (blue crosses) and  $SPD$  (black circles) for the sample of US (left panels) and European firms (right panels). The upper and lower panels are based on interval widths of 0.005 and 0.015, respectively. Appendices B and C report the exact values and further statistics that were defined in Section 3.1. In the US sample, the ZE discontinuity for an interval width of 0.005 (Panel A1 in Fig. 2) is very pronounced at the beginning of the sample period, but it diminishes in the following years. From 2004, the lines for  $SLD$  and

$SPD$  fluctuate around the same level. For the interval of 0.015, we observe the same decline until the kink disappears in approximately the year 2007.

The results are strikingly different in the European sample (Panels A2 and B2). The gap between the upper line for  $SPD$  and the lower line for  $SLD$  signifies a pronounced ZE discontinuity over the whole sample period. On average, 31% of the expected number of small losses (interval 0.015) is missing. The gap tends to be even more pronounced for the interval of 0.005 (Panel A1 compared to Panel B1), where on average, 38.6% of expected small losses are missing. Panel B2 illustrates that the kink in the European sample is remarkably stable over time (Panel B2). Appendix C confirms the statistical significance of this result: The standardized differences t-statistic  $SD_{-1}$  for interval 0.015 is significantly negative for every year and  $SD_1$  is significantly positive in most years.

Figure 3 focuses on the three countries with the largest number of firm-years within the European sample (the UK, Germany, France). To ensure a sufficient number of cases near the ZE threshold, we combine data from three years in a rolling window. The graphs are based on the broader interval of 0.015. In all three countries, consistent with the overall results, we observe a pronounced discontinuity. It is persistently smaller in the UK (mean  $SLD$  of  $-0.227$ ) than in Germany (mean  $SLD$  of  $-0.324$ ) and France (mean  $SLD$  of  $-0.373$ ). In all three cases, the difference from the US results shown in Panel B1 of Figure 2 is strikingly obvious: Small loss aversion is important over the whole sample period in European countries, while it has disappeared in the US. Our results remain confirmed when earnings are scaled by the market value of equity instead of by total assets. For this alternative scaling, we show analogous graphs in Appendices D and E.

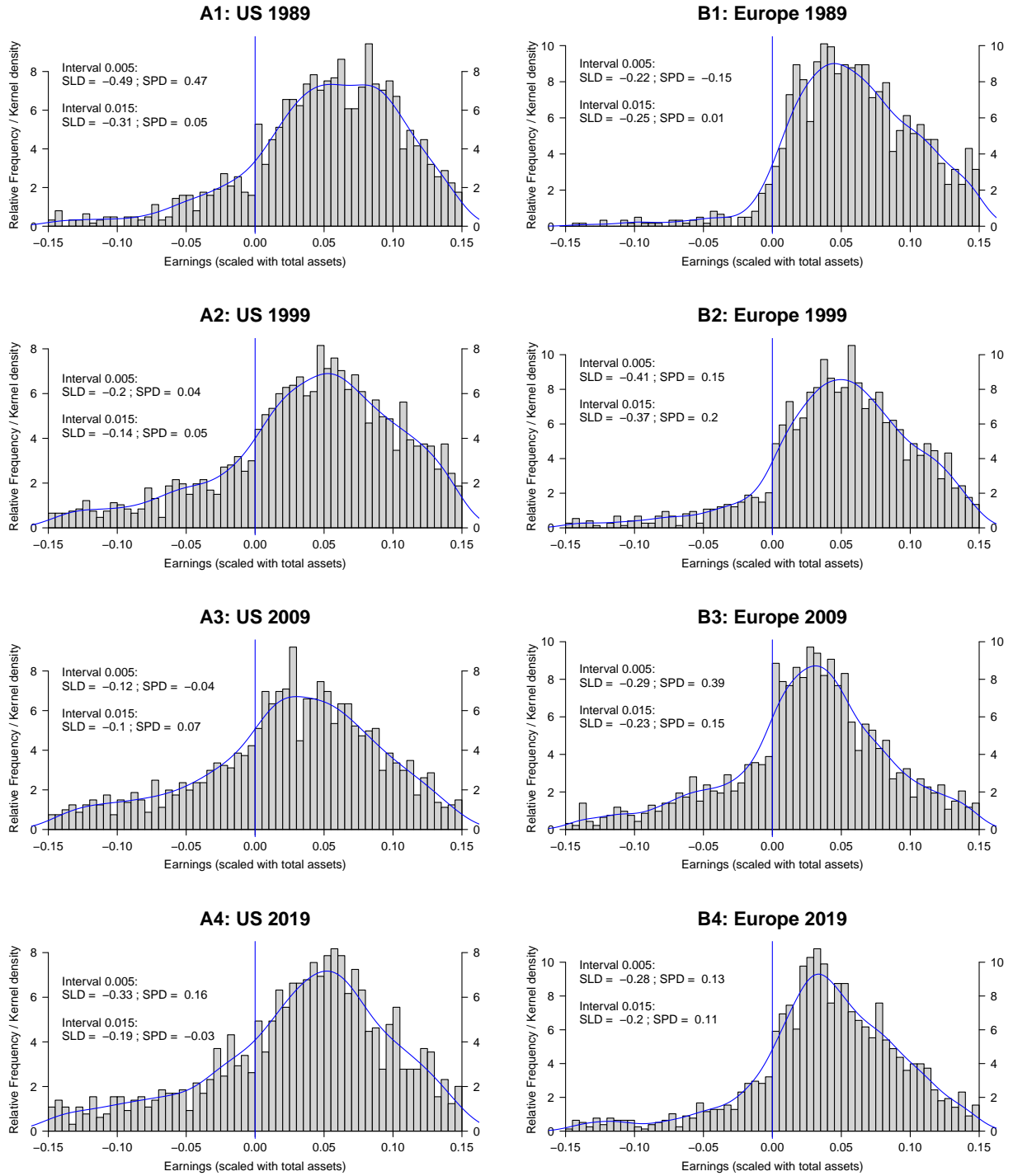


Figure 1: **Frequency distributions and kernel densities for scaling with total assets.** The distributions are shown for four years spread over the sample period. Left graphs: sample of US firms; right graphs: sample of European firms. Vertical line at zero scaled earnings. Earnings are scaled with total assets at the beginning of the year. One bar in the diagram represents a width of 0.005. *SLD*: small loss deviation; *SPD*: small profit deviation.

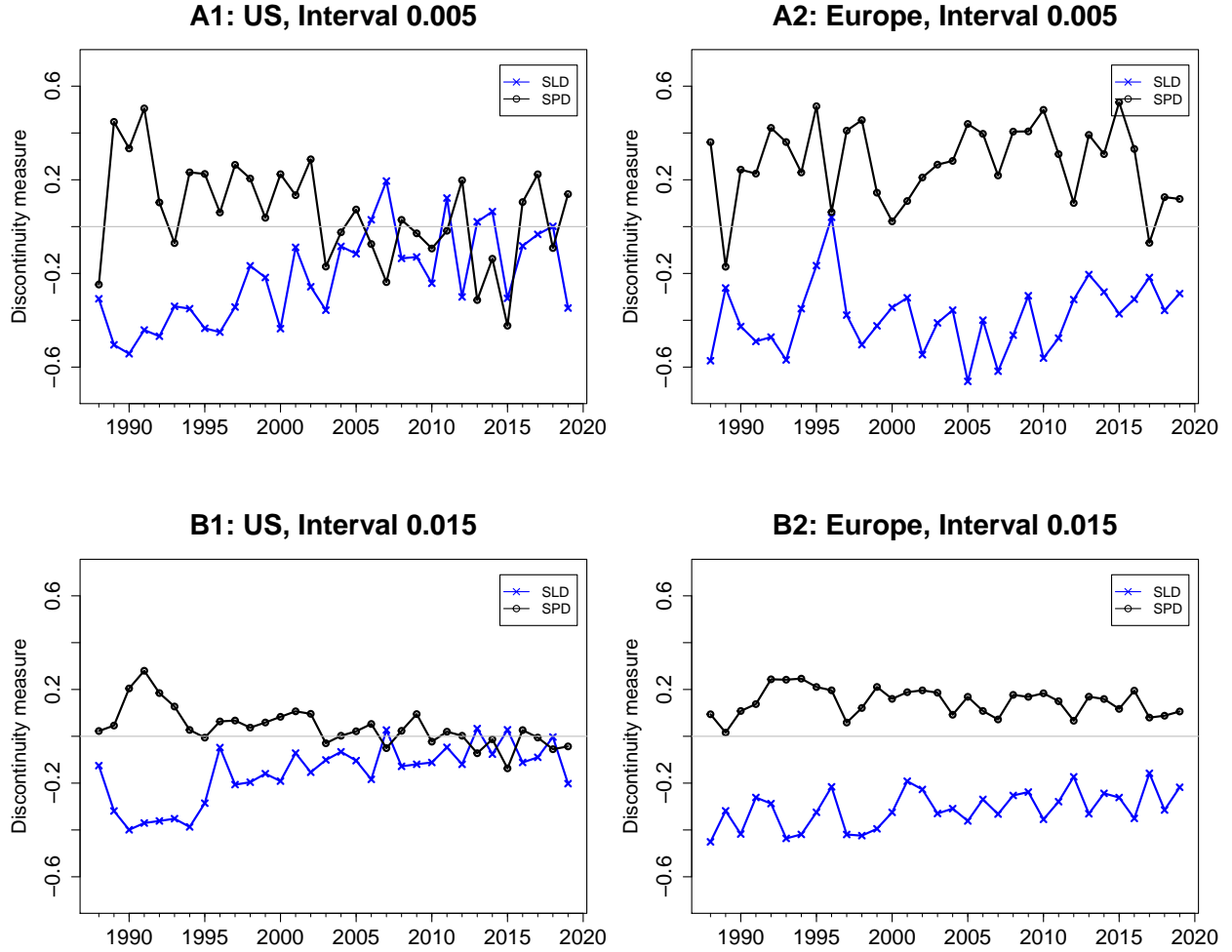


Figure 2: **Discontinuity measure for the US and Europe for scaling with total assets.** The discontinuity measure captures the share of excess observations (pos. sign) or missing observations (neg. sign) in the intervals of scaled earnings directly below and above the zero threshold. *SLD*: small loss deviation; *SPD*: small profit deviation. Earnings are scaled with total assets at the beginning of the year.

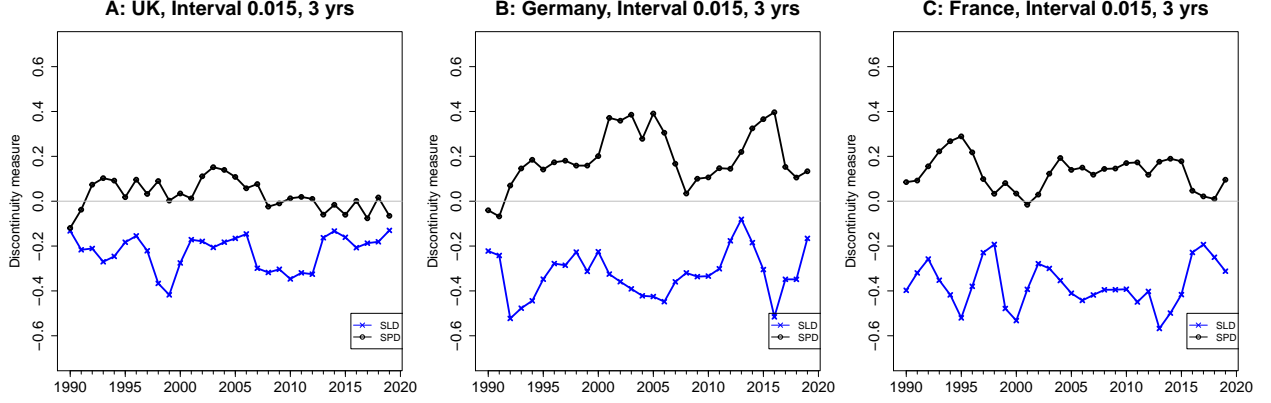


Figure 3: **Discontinuity measure for three European countries for pooled data of three years in a rolling window; scaling with total assets.** The discontinuity measure captures the share of excess observations (pos. sign) or missing observations (neg. sign) in the intervals of scaled earnings directly below and above the zero threshold. *SLD*: small loss deviation; *SPD*: small profit deviation. Earnings are scaled with total assets at the beginning of the year.

#### 4. Loss Avoidance Beyond the Zero Earnings Discontinuity

##### 4.1. Method

In this section, we examine the cross-sectional relation between net income and cash flow to draw conclusions on loss avoidance beyond the ZE discontinuity. We use the following piecewise linear regression model proposed by Ball and Shivakumar (2005) in a study comparing private and public US firms:<sup>16</sup>

$$\begin{aligned}
 NI_i = & \beta_0 + \beta_1 \cdot NEG_i + \beta_2 \cdot CF_i + \beta_3 \cdot NEG_i \cdot CF_i \\
 & + \beta_4 \cdot EU_i + \beta_5 \cdot EU_i \cdot NEG_i + \beta_6 \cdot EU_i \cdot CF_i + \beta_7 \cdot EU_i \cdot NEG_i \cdot CF_i + \varepsilon_i, \quad (1)
 \end{aligned}$$

where  $i$  is the firm index;  $NI$  is net income;  $CF$  is operating cash flow less depreciation and amortization;  $NEG$  is a dummy variable equal to one if  $CF < 0$  and zero otherwise;  $EU$  is

<sup>16</sup>Our dependent variable is net income instead of total accruals as applied in Ball and Shivakumar (2005). To convert Eq. (1) into the equivalent notation with total accruals, we have to subtract  $CF$  from both sides of the equation such that the coefficient of  $CF_i$  becomes  $(\beta_2 - 1)$ .

a dummy variable equal to one for European firms and zero for US firms;  $\varepsilon$  is an error term, and  $\beta_0, \dots, \beta_7$  are regression coefficients. We subtract depreciation and amortization from operating cash flow to make it comparable to net income. Otherwise, our earnings measure would be systematically smaller than the cash flow measure. The difference would be firm-specific such that the cross-sectional regression model would be misspecified. With our definitions,  $(NI - CF)$  represents total accruals before depreciation and amortization, which corresponds to working capital accruals also used in prior studies (e.g., Ball and Shivakumar, 2005; Givoly and Hayn, 2000). For European firms, cash flow statements have only been consistently available since 1995. Before 1995, we estimate accruals of European firms from balance sheet items as in Ball and Shivakumar (2005, p. 94).

Coefficient  $\beta_2$  (US firms) and sum  $\beta_2 + \beta_6$  (EU firms) in Eq. (1) will typically be less than one because total accruals are negatively related to cash flows. Dechow (1994) and Dechow et al. (1998) derive this result from the role of accruals to smooth random fluctuations in operating cash flows. Therefore, “a negative correlation between changes in accruals and operating cash flows [...] is a natural result of accrual accounting” (Leuz et al., 2003, p. 510). The arguments leading to this insight are symmetrical in the sense that they are valid for positive and negative cash flows.

Coefficients  $\beta_3$  (US) and  $\beta_3 + \beta_7$  (EU) capture asymmetric timeliness in the recognition of cash flows. Economic arguments suggest that operating cash flows are persistent to a certain extent such that current cash flows can be used as a proxy for unrealized gains and losses. Under conditional conservatism as embodied in international accounting standards, a part of unrealized losses is recognized in income, while unrealized gains may not be recognized, resulting in a positive  $\beta_3$  coefficient and a positive sum  $\beta_3 + \beta_7$ .

An opposing effect occurs when firms manage earnings with the aim of avoiding losses.



These firms will mitigate the effect of negative cash flows on earnings by releasing hidden reserves or understating expenses. The result will be a weaker association of cash flows and earnings when cash flows are negative. If loss avoidance is a common behavior, this effect might even overcompensate for the effect of conditional conservatism such that the asymmetric timeliness coefficient in the cross-sectional regression becomes negative. We hypothesize that the first effect (conditional conservatism) prevails in the US sample ( $\beta_3 > 0$ ), while the second effect (loss avoidance) prevails in the European sample ( $\beta_3 + \beta_7 < 0$ ).

In addition to OLS, we run a LOESS regression. One advantage of this nonparametric approach is that the position of a possible kink in the regression function is estimated from the data instead of being imposed as in the regression model (1) (at position  $CF = 0$ ). We also use LOESS regression to explore the association of  $NI$  and  $CF$  for relatively small losses to rule out the possibility that the OLS regression is strongly influenced by large losses. Specifically, in addition to graphical representations of the LOESS regressions, we evaluate the estimated LOESS function at cash flow levels of  $-10\%$ ,  $0$  and  $+10\%$  and compute average slopes within the cash flow ranges of  $-10\%$  to  $0$  and  $0$  to  $+10\%$ , which we then compare to the corresponding OLS slope coefficients. In the LOESS regressions, we apply the smoothing parameter that minimizes the Bayesian information criterion (BIC).

#### 4.2. Results

Figure 4 shows the relation of earnings and cash flows (with the estimated regression shown as a blue line and LOESS shown as a dashed red line) for 1989, 1999, 2009 and 2019. Table 2 reports the regression results, and Figure 5 compares the regression slope coefficients to the average slope of the LOESS regression for  $-10\%$  to  $0$  and for  $0$  to  $+10\%$ .

Three results stand out. First, the LOESS function often shows a kink near the zero

cash flow threshold similar to that of the OLS regression, which supports the specification of the regression model (1) and confirms that the OLS regression results are not driven by large gains and losses of close to  $\pm 50\%$ . Second, the coefficient of asymmetric timeliness ( $\beta_3$ ) for the US is significantly negative in the first half of the 1990s, which is consistent with prevailing loss avoidance. The coefficient turns positive in 1997, tends to further increase until 2007 and stays positive until the end of the sample period (except in financial crisis years 2008 and 2009).<sup>17</sup> Thus, the changes in asymmetric timeliness in the US run parallel to the disappearance of the ZE discontinuity. This result is consistent with our hypothesis that the two measures capture related aspects of loss avoidance behavior. Third, since 1993, the asymmetric timeliness coefficient in Europe has been lower than that in the US in all years except 2001, 2003 and 2009. The difference is large enough to turn the asymmetric timeliness coefficient in Europe ( $\beta_3 + \beta_7$ ) significantly negative for 19 of 32 years of the sample period. The value is only significantly positive in 2002 and 2003. The negative coefficient also prevails in the largest individual countries of the UK, Germany and France (see Figure 6). The value tends to be less pronounced in the UK than in Germany and France.

For positive cash flows, coefficient  $\beta_2$  in the US is not substantially different from  $\beta_2 + \beta_6$  in Europe (see Table 2 and the black lines in 5). In both samples, the value increases from approximately 0.6 to approximately 0.75 over the sample period.

## 5. Matched Industry Samples and Robustness

To address the possibility that our results are driven by different industry structures included in our US and European samples (e.g., Gaio, 2010), we follow Ball and Shivakumar

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<sup>17</sup>Based on the measure developed by Basu (1997), Lobo and Zhou (2006) report a more timely recognition of losses for the post-SOX period. According to our analysis, the main increase had already occurred before SOX application.

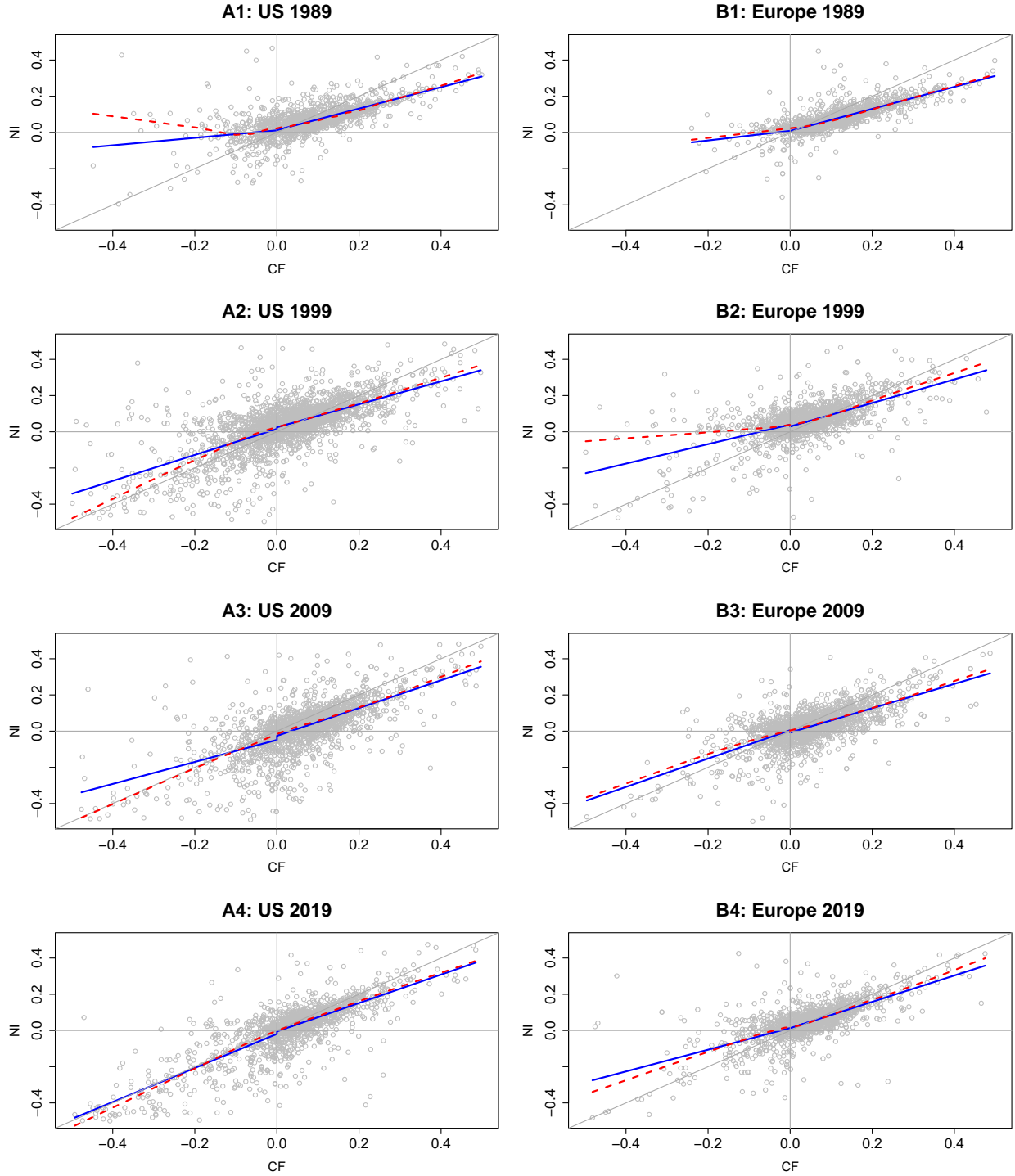


Figure 4: **Asymmetric timeliness: scatterplots.** Blue line: estimated regression of Eq. (1). Dashed red line: LOESS regression.  $NI$  is net income,  $CF$  operating cash flow less depreciation and amortization.  $NI$  and  $CF$  are scaled by total assets at the beginning of the year.

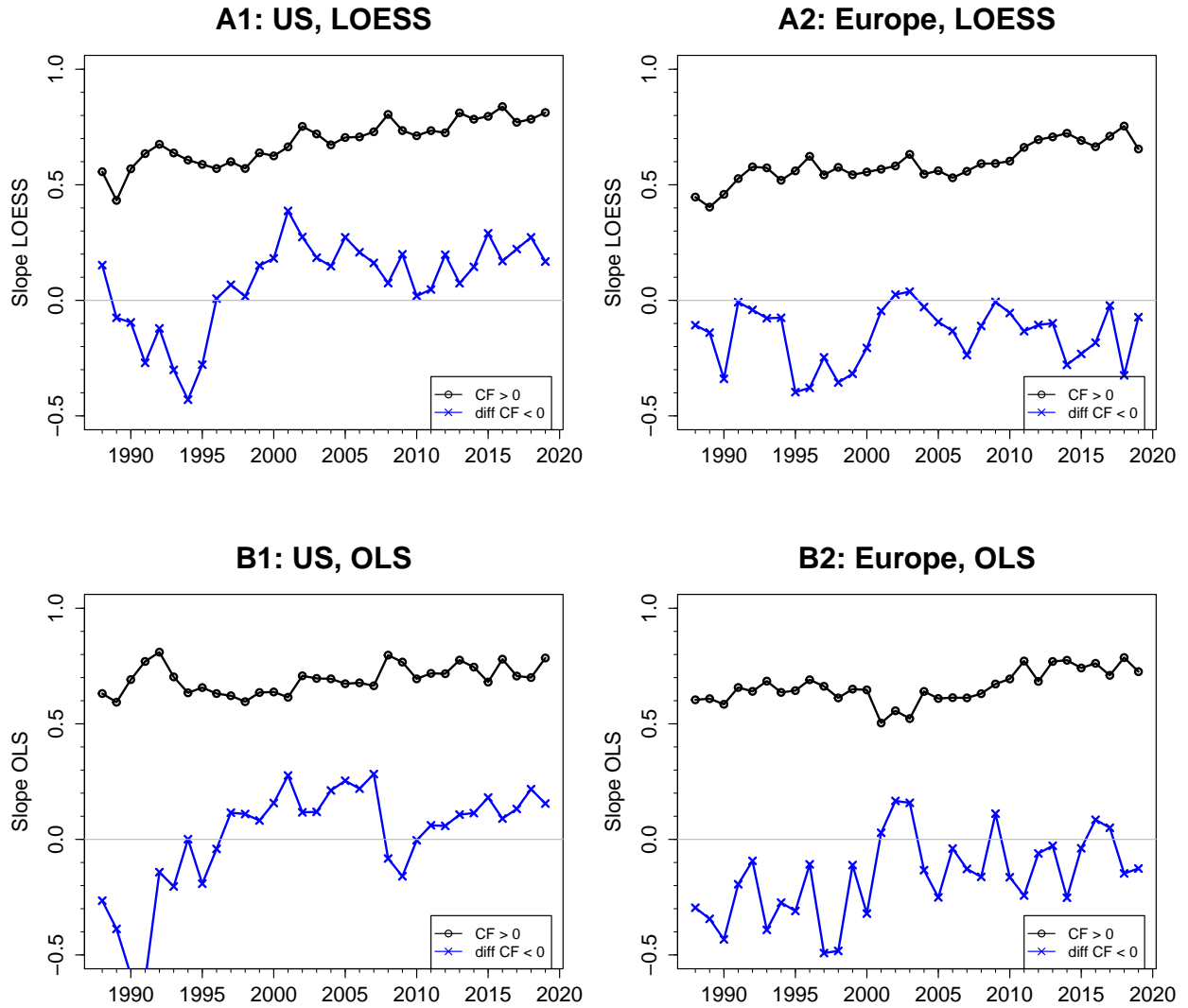


Figure 5: **Asymmetric timeliness: coefficients.** Panels A1 and A2: slope coefficients based on a LOESS regression with a smoothing parameter that minimizes the Bayesian Information Criterion (BIC). The LOESS function is evaluated at cash flow levels  $CF$  of  $-10\%$ ,  $0$  and  $+10\%$ . The black circles show the average slope in the cash flow range from  $0$  to  $+10\%$ . The blue crosses show by how much the average slope in the cash flow range from  $-10\%$  to  $0$  differs from this value. Panel B1 (US): regression coefficients  $\beta_2$  (black circles) and  $\beta_3$  (blue crosses) of regression model (1), where  $\beta_2$  is the slope coefficient for  $CF > 0$  and  $\beta_3$  indicates by how much the slope coefficient for  $CF < 0$  differs from  $\beta_2$ . Panel B2 (Europe): coefficients  $\beta_2 + \beta_6$  (black circles) and  $\beta_3 + \beta_7$  (blue crosses) of regression model (1).

Table 2: **Asymmetric timeliness: regression results.** Estimation results of yearly cross-sectional regressions according to regression model (1). The dependent variable is net income  $NI$ .  $\beta_2$  (US) and  $\beta_2 + \beta_6$  (Europe) are the slope coefficients for cash flows  $CF > 0$ ,  $\beta_3$  (US) and  $\beta_3 + \beta_7$  (Europe) are the asymmetric timeliness coefficients.  $NI$  and  $CF$  are scaled by total assets.

Year	US				Europe				$R^2$
	$\beta_2$	t-stat	$\beta_3$	t-stat	$\beta_2 + \beta_6$	t-stat	$\beta_3 + \beta_7$	t-stat	
1988	0.63	36.64	-0.27	-4.53	0.60	30.22	-0.30	-1.96	0.58
1989	0.59	30.24	-0.39	-8.05	0.61	32.89	-0.34	-3.38	0.50
1990	0.69	27.65	-0.59	-10.70	0.58	28.51	-0.43	-5.58	0.43
1991	0.77	31.60	-0.61	-11.39	0.66	28.10	-0.19	-2.32	0.47
1992	0.81	28.55	-0.14	-2.79	0.64	23.92	-0.09	-1.17	0.48
1993	0.70	24.59	-0.20	-4.30	0.68	24.81	-0.39	-5.80	0.43
1994	0.63	22.55	0.001	0.02	0.64	21.25	-0.27	-4.42	0.39
1995	0.66	24.65	-0.19	-4.71	0.64	16.61	-0.31	-3.24	0.35
1996	0.63	22.80	-0.04	-1.00	0.69	17.67	-0.11	-1.16	0.35
1997	0.62	23.47	0.12	2.94	0.66	18.87	-0.49	-7.05	0.40
1998	0.60	22.47	0.11	2.68	0.61	17.97	-0.48	-7.70	0.37
1999	0.64	24.24	0.08	2.08	0.65	18.22	-0.11	-1.96	0.45
2000	0.64	22.91	0.16	3.98	0.65	16.99	-0.32	-6.07	0.45
2001	0.61	20.53	0.28	6.64	0.50	12.07	0.03	0.49	0.51
2002	0.71	24.58	0.12	2.68	0.56	13.28	0.17	2.68	0.51
2003	0.70	27.67	0.12	3.03	0.52	14.99	0.16	2.67	0.53
2004	0.69	29.21	0.21	5.80	0.64	19.75	-0.13	-2.56	0.53
2005	0.67	28.48	0.25	6.56	0.61	20.23	-0.25	-4.74	0.50
2006	0.68	23.63	0.22	4.87	0.61	20.02	-0.04	-0.81	0.45
2007	0.66	24.68	0.28	6.65	0.61	22.82	-0.13	-2.76	0.47
2008	0.80	24.49	-0.08	-1.44	0.63	18.20	-0.16	-2.76	0.38
2009	0.77	28.41	-0.16	-3.20	0.67	21.87	0.11	1.83	0.45
2010	0.69	28.22	-0.004	-0.09	0.69	23.45	-0.16	-2.96	0.45
2011	0.72	27.28	0.06	1.35	0.77	24.76	-0.24	-4.39	0.48
2012	0.72	26.49	0.06	1.27	0.68	22.29	-0.06	-1.10	0.49
2013	0.78	28.21	0.11	2.38	0.77	25.54	-0.03	-0.50	0.54
2014	0.75	24.76	0.11	2.58	0.78	26.23	-0.25	-4.67	0.54
2015	0.68	21.28	0.18	3.74	0.74	23.28	-0.04	-0.67	0.53
2016	0.78	26.01	0.09	1.91	0.76	24.14	0.08	1.49	0.57
2017	0.71	23.29	0.13	2.91	0.71	23.06	0.05	0.89	0.53
2018	0.70	23.06	0.22	4.74	0.79	23.59	-0.15	-2.64	0.55
2019	0.78	26.46	0.16	3.62	0.73	23.09	-0.13	-2.37	0.60

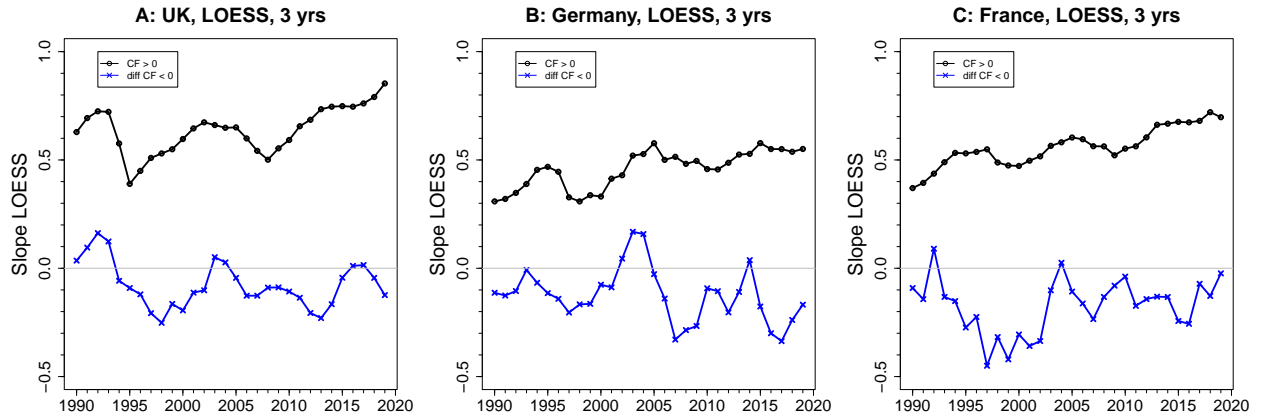


Figure 6: **Asymmetric timeliness: UK, Germany, France.** Black circles: coefficient  $\beta$  of regression model (1), i.e. slope coefficient for  $CF > 0$ . Blue crosses: coefficient  $\gamma$  of regression model (1), i.e. slope coefficients for  $CF < 0$  minus slope coefficient for  $CF > 0$ .

(2005) and construct a matched sample based on the first two digits of the SIC code and market capitalization.<sup>18</sup> For each year-industry combination, we first identify the subsample (the US or Europe) with the smaller number of observations. We match these observations with observations from the other subsample (without replacement) based on market capitalization using the nearest neighbor method. Over the whole sample period, 46,279 observations of both subsamples are matched, which means that 18,773 US firm-years and 10,576 European firm-years are discarded.

Panels A1 and A2 in Figure 7 show the discontinuity results for the matched sample (in the same way as Panels B1 and B2 in Fig. 2 for the full sample), and Panels B1 and B2 in Figure 7 replicate the asymmetric timeliness results (see Panels A1 and A2 in Fig. 5 for the full sample). The comparison shows that the results are very similar. In Europe, the ZE discontinuity is present over the whole sample period, while it has disappeared in the US. The asymmetric timeliness coefficient in Europe suggests that loss avoidance is a widespread phenomenon, while it is consistent with conditional conservatism in the US.

<sup>18</sup>Matched samples are commonly used in prior literature; see, e.g., Barth et al. (2008).

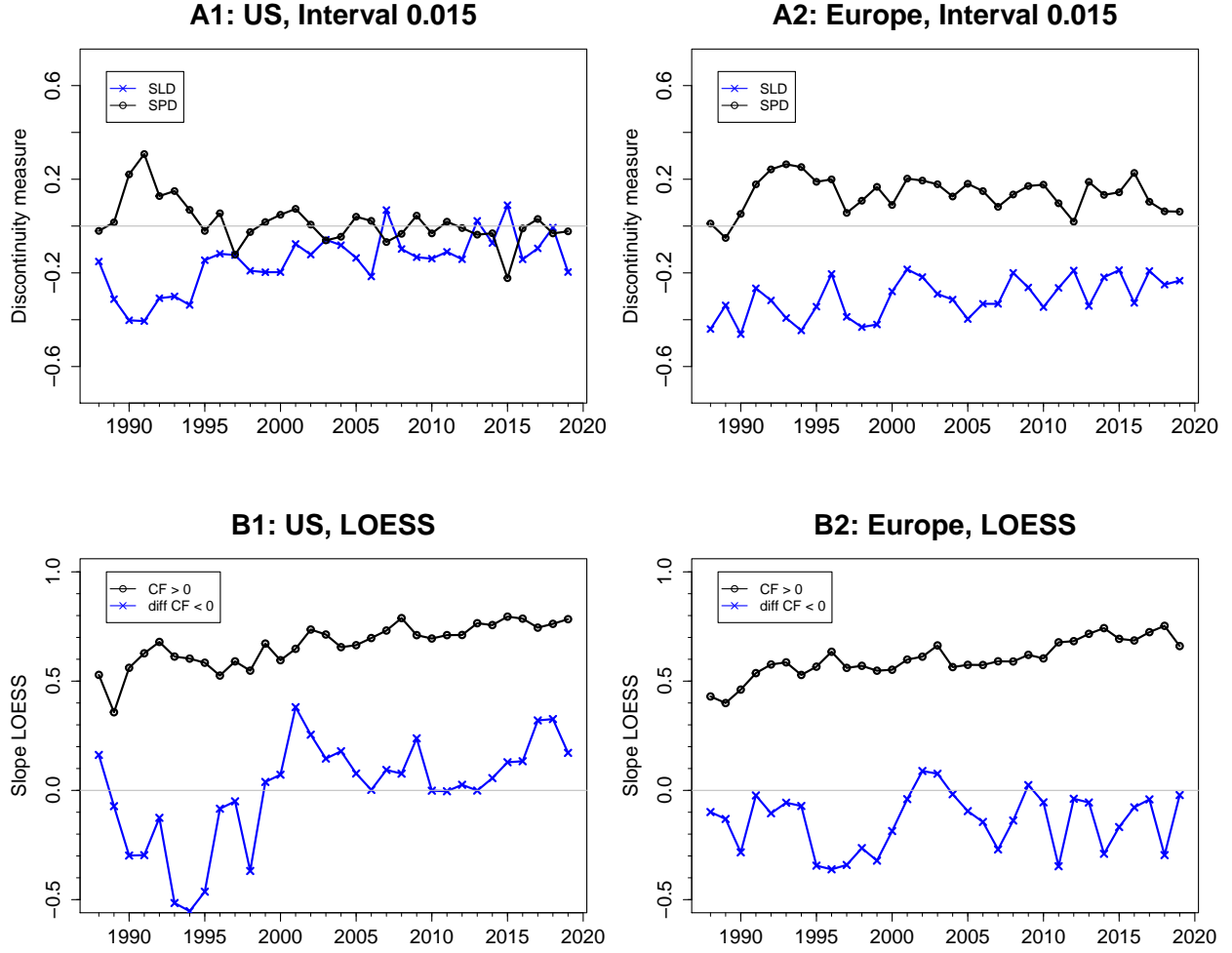


Figure 7: **Results for matched industry samples.** Panels A1 and A2: discontinuity measure analogous to Panels B1 and B2 in Fig. 2. *SLD*: small loss deviation; *SPD*: small profit deviation. Panels B1 and B2: asymmetric timeliness coefficients based on a LOESS regression analogous to Panels A1 and A2 in Fig. 5.

We conduct the following further robustness checks. To test whether our results are driven by stocks with very small market capitalization (“micro caps”), we double the minimum market capitalizations (20 to 50 million USD; see Section 2) and obtain similar results. The same result is found when using net income *before extraordinary items* as our earnings measure. The regression results also remain robust when the truncation limits for net income and cash flow are reduced to  $\pm 40\%$  or increased to  $\pm 60\%$ .

## 6. Conclusion

In this paper, we document two striking differences between the earnings distributions of European and US firms. On the one hand, the zero earnings (ZE) discontinuity is still pronounced in Europe, while it has disappeared in the US. On the other hand, asymmetry in the recognition of gains and losses in the US has increased along with the disappearance of the ZE discontinuity, which is consistent with a decline in loss avoidance in a broader sense. In Europe, in contrast, losses are recognized in a *less* timely manner than gains, which suggests widespread loss avoidance beyond the ZE discontinuity. The resulting impact seems to be substantial enough to overcompensate for the opposite effect of conditional conservatism.

One limitation of our study is that the coefficients of asymmetric timeliness are affected by factors unrelated to earnings management, such as differences between IFRS and US-GAAP in conditional conservatism and different business practices leading to particular cash flow patterns. However, we are not aware of specific differences that are systematic and large enough to explain our results. Currently, loss avoidance appears to be the most plausible and natural interpretation, but this could be questioned in future research. As a second limitation, we cannot specify the exact reasons why, unlike in the US, loss avoidance has remained stable in Europe. We can conclude, however, that the adoption of IFRS has not resulted in a decline in this type of earnings management.



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## Appendix

Appendix A: **Descriptive statistics: individual countries.**  $N$ : number of firm-years;  $NI$ : net income;  $CF$ : operating cash flow less depreciation and amortization;  $TA$ : total accruals before depreciation and amortization (equal to  $NI - CF$ ).  $NI$ ,  $CF$  and  $TA$  are scaled by total assets. SD denotes standard deviation.

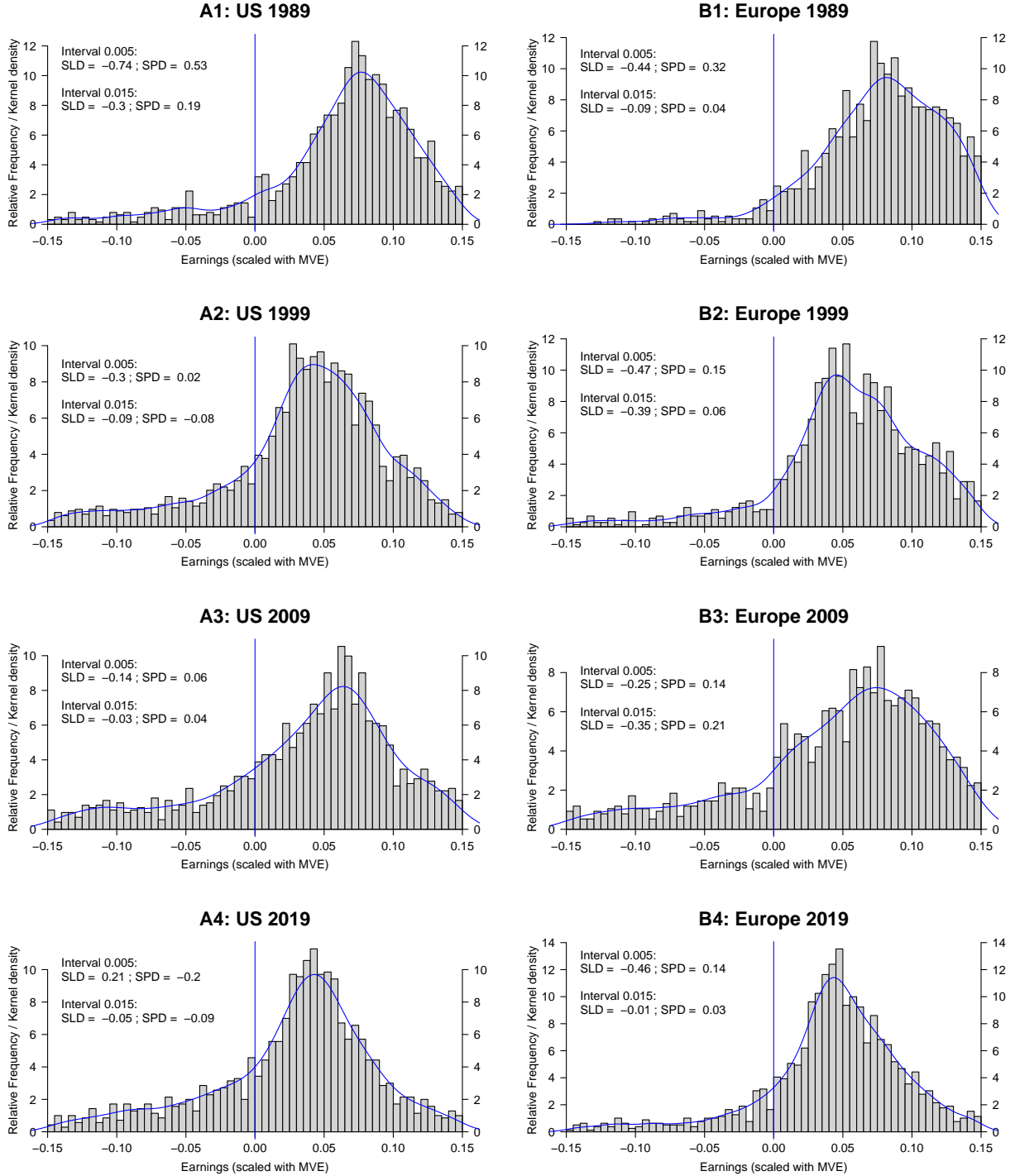
Country	$N$	$NI$		$CF$		$TA$	
		Mean	SD	Mean	SD	Mean	SD
US	65,052	0.035	0.126	0.041	0.119	-0.007	0.097
UK	16,980	0.062	0.101	0.067	0.102	-0.005	0.085
France	7,681	0.037	0.074	0.035	0.085	0.002	0.069
Germany	7,599	0.036	0.085	0.025	0.098	0.011	0.086
Sweden	3,274	0.064	0.096	0.055	0.098	0.009	0.076
Switzerland	2,946	0.053	0.086	0.050	0.087	0.003	0.065
Italy	2,877	0.022	0.073	0.023	0.082	-0.001	0.071
Netherlands	2,280	0.059	0.087	0.055	0.096	0.004	0.081
Norway	1,721	0.040	0.103	0.031	0.106	0.009	0.103
Finland	1,664	0.056	0.083	0.046	0.085	0.009	0.070
Denmark	1,527	0.054	0.101	0.047	0.105	0.007	0.078
Poland	1,463	0.062	0.082	0.035	0.095	0.027	0.101
Belgium	1,389	0.037	0.100	0.031	0.103	0.006	0.082
Spain	1,194	0.033	0.081	0.038	0.090	-0.004	0.072
Greece	1,160	0.042	0.075	0.024	0.100	0.018	0.086
Austria	680	0.038	0.059	0.032	0.075	0.007	0.068
Portugal	599	0.030	0.060	0.015	0.085	0.015	0.079
Ireland	572	0.056	0.099	0.059	0.098	-0.003	0.079
Bulgaria	166	0.045	0.081	0.012	0.116	0.033	0.121
Romania	143	0.056	0.101	0.034	0.115	0.023	0.110
Hungary	134	0.100	0.089	0.086	0.094	0.014	0.074
Luxembourg	126	0.053	0.113	0.046	0.104	0.008	0.100
Croatia	123	0.040	0.057	0.036	0.094	0.004	0.084
Czech Republic	115	0.059	0.090	0.053	0.106	0.006	0.087
Iceland	90	0.058	0.054	0.049	0.051	0.009	0.046
Lithuania	69	0.103	0.108	0.054	0.121	0.050	0.127
Cyprus	67	0.039	0.059	0.025	0.057	0.013	0.060
Estonia	67	0.086	0.104	0.068	0.101	0.019	0.089
Slovenia	62	0.034	0.062	0.021	0.059	0.013	0.056
Slovakia	32	0.039	0.064	0.029	0.059	0.010	0.062
Latvia	31	0.085	0.066	0.054	0.064	0.031	0.063
Malta	24	0.010	0.043	-0.001	0.082	0.010	0.091

Appendix B: **Discontinuity measures in the US sample.** Earnings are scaled by total assets.  $N$  is the number of observations;  $SD$  the standardized differences t-statistic;  $SLD$  the small loss deviation;  $SPD$  the small profit deviation and  $MPL$  the modified profit-to-loss ratio. The measures are defined in Section 3.1.

Year	$N$	Interval 0.005					Interval 0.015				
		$SD_{-1}$	$SD_1$	$SLD$	$SPD$	$MPL$	$SD_{-1}$	$SD_1$	$SLD$	$SPD$	$MPL$
1988	1,428	-0.79	-1.20	-0.29	-0.23	0.07	-1.36	0.37	-0.09	0.03	0.13
1989	1,455	-2.64	2.86	-0.49	0.47	1.07	-4.08	0.63	-0.31	0.05	0.42
1990	1,345	-2.55	1.32	-0.53	0.34	1.05	-5.72	3.21	-0.38	0.20	0.65
1991	1,423	-2.79	2.42	-0.44	0.49	0.98	-6.52	4.57	-0.36	0.26	0.68
1992	1,586	-2.19	0.14	-0.46	0.10	0.71	-6.15	3.17	-0.34	0.17	0.58
1993	1,732	-0.47	0.15	-0.31	-0.05	0.32	-6.14	2.46	-0.32	0.13	0.51
1994	1,818	-1.48	2.17	-0.32	0.26	0.62	-5.65	0.68	-0.36	0.03	0.47
1995	2,293	-2.79	2.11	-0.41	0.25	0.75	-3.89	-0.29	-0.25	-0.003	0.29
1996	2,570	-3.18	1.34	-0.44	0.07	0.65	-0.43	1.36	-0.03	0.07	0.10
1997	2,832	-2.89	2.54	-0.33	0.27	0.64	-3.10	1.19	-0.19	0.06	0.27
1998	2,780	-1.17	1.11	-0.16	0.22	0.36	-3.18	1.17	-0.18	0.04	0.24
1999	2,654	-0.71	0.49	-0.20	0.04	0.27	-2.48	0.98	-0.14	0.05	0.20
2000	2,363	-3.11	2.00	-0.43	0.23	0.76	-2.62	1.24	-0.17	0.08	0.26
2001	2,460	-0.75	0.56	-0.09	0.12	0.21	-1.50	1.57	-0.07	0.09	0.16
2002	2,320	-1.96	1.92	-0.24	0.29	0.53	-1.99	0.96	-0.13	0.08	0.21
2003	2,414	-1.78	-0.53	-0.34	-0.16	0.25	-1.15	-0.73	-0.08	-0.03	0.05
2004	2,436	-0.07	-0.63	-0.08	-0.02	0.06	-0.78	0.35	-0.06	0.003	0.06
2005	2,436	-0.59	0.53	-0.11	0.08	0.19	-1.45	0.83	-0.09	0.03	0.12
2006	2,390	1.27	-0.70	0.06	-0.06	-0.12	-3.19	1.38	-0.16	0.06	0.23
2007	2,280	1.50	-1.47	0.21	-0.23	-0.45	0.90	-1.06	0.04	-0.05	-0.09
2008	1,981	-0.33	0.15	-0.12	0.04	0.16	-1.30	0.41	-0.10	0.02	0.13
2009	2,000	-0.21	-0.51	-0.12	-0.04	0.09	-1.89	0.60	-0.10	0.07	0.18
2010	2,032	-0.89	0.22	-0.23	-0.08	0.17	-1.52	-0.34	-0.09	-0.02	0.08
2011	1,907	0.77	-0.15	0.13	-0.02	-0.14	-0.43	0.52	-0.03	0.02	0.05
2012	1,865	-1.99	1.91	-0.29	0.21	0.53	-1.51	0.15	-0.10	0.01	0.12
2013	1,840	0.46	-1.41	0.04	-0.30	-0.39	0.28	-0.99	0.05	-0.05	-0.10
2014	1,888	0.68	-0.68	0.09	-0.12	-0.22	-0.95	-0.10	-0.05	-0.005	0.04
2015	1,814	-1.28	-1.66	-0.29	-0.41	-0.18	0.99	-2.61	0.04	-0.12	-0.17
2016	1,748	-0.38	0.69	-0.07	0.11	0.17	-0.84	-0.14	-0.09	0.02	0.11
2017	1,694	-0.82	1.15	-0.03	0.23	0.23	-1.00	-0.20	-0.08	-0.0005	0.08
2018	1,633	0.08	-0.47	0.01	-0.09	-0.11	0.84	-1.18	0.02	-0.06	-0.08
2019	1,635	-1.83	1.87	-0.33	0.16	0.56	-2.61	-0.22	-0.19	-0.03	0.18

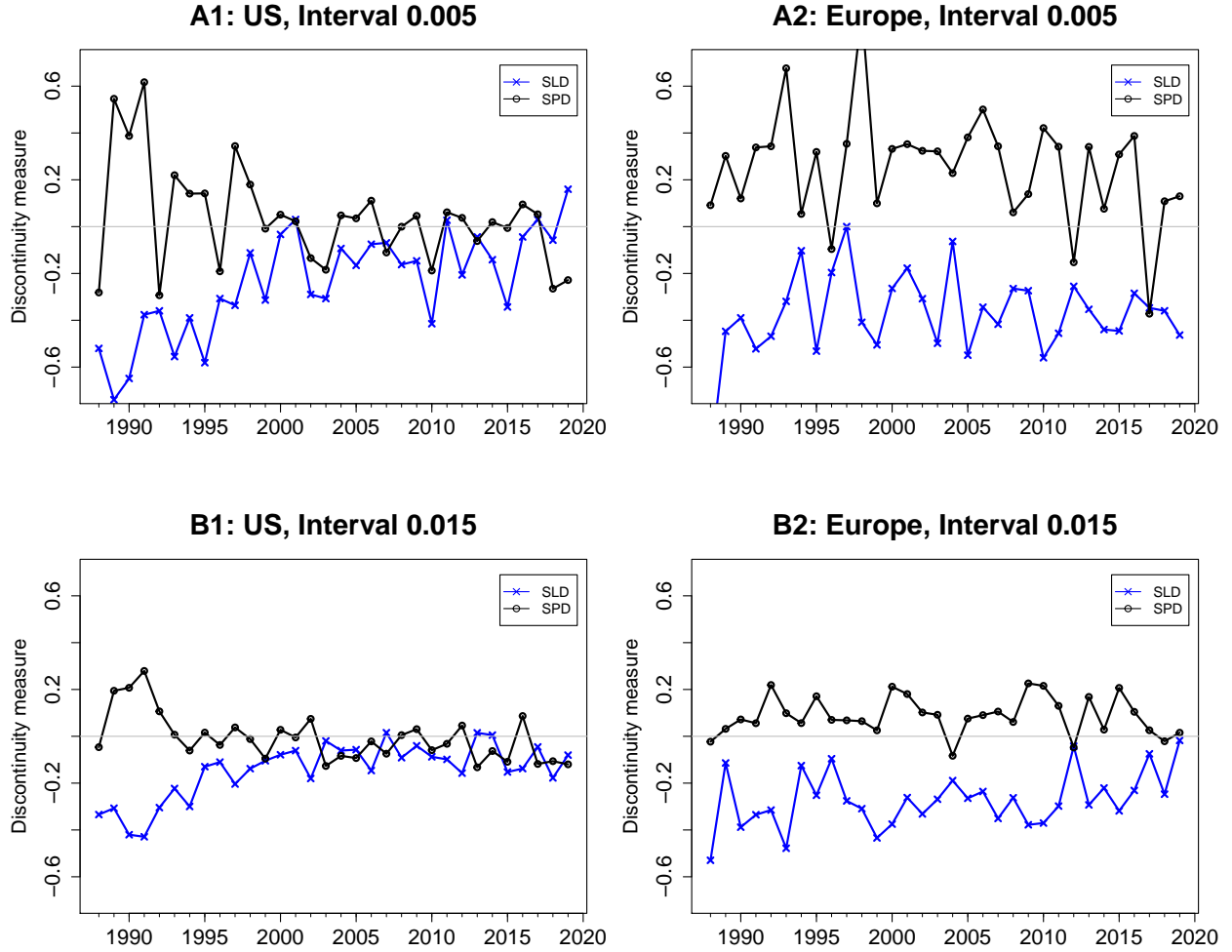
Appendix C: **Discontinuity measures in the European sample.** Earnings are scaled by total assets.  $N$  is the number of observations;  $SD$  the standardized differences t-statistic;  $SLD$  the small loss deviation;  $SPD$  the small profit deviation and  $MPL$  the modified profit-to-loss ratio. The measures are defined in Section 3.1.

Year	$N$	Interval 0.005					Interval 0.015				
		$SD_{-1}$	$SD_1$	$SLD$	$SPD$	$MPL$	$SD_{-1}$	$SD_1$	$SLD$	$SPD$	$MPL$
1988	963	-2.47	1.66	-0.56	0.37	1.13	-4.63	1.35	-0.41	0.08	0.61
1989	1,403	-0.32	0	-0.22	-0.15	0.08	-3.32	0.65	-0.25	0.01	0.30
1990	1,552	-2.46	1.85	-0.41	0.25	0.75	-7.72	2.16	-0.39	0.10	0.59
1991	1,608	-3.63	2.01	-0.49	0.22	0.87	-5.02	2.75	-0.25	0.13	0.40
1992	1,550	-3.78	3.24	-0.47	0.41	0.98	-6.37	5.00	-0.28	0.22	0.53
1993	1,671	-4.47	2.01	-0.56	0.35	1.13	-10.83	5.38	-0.42	0.22	0.75
1994	1,829	-1.85	1.52	-0.34	0.22	0.62	-10.49	5.56	-0.40	0.22	0.71
1995	1,330	-1.05	2.44	-0.16	0.51	0.59	-5.12	3.13	-0.31	0.20	0.55
1996	1,466	0.82	-0.77	0.05	0.05	0.01	-3.67	3.19	-0.20	0.18	0.38
1997	1,610	-2.31	2.35	-0.36	0.43	0.80	-6.74	1.48	-0.39	0.06	0.56
1998	1,695	-3.00	2.97	-0.49	0.47	1.06	-6.49	2.15	-0.40	0.12	0.62
1999	1,704	-1.66	0.92	-0.41	0.15	0.66	-7.29	3.69	-0.37	0.20	0.64
2000	1,794	-1.10	0	-0.32	0.03	0.41	-5.45	2.81	-0.28	0.15	0.46
2001	1,849	-1.57	0.48	-0.30	0.10	0.45	-3.77	3.76	-0.17	0.17	0.35
2002	1,699	-4.45	1.57	-0.55	0.20	0.97	-4.93	3.95	-0.22	0.18	0.41
2003	1,816	-2.58	2.10	-0.40	0.26	0.75	-8.09	4.28	-0.31	0.17	0.53
2004	1,899	-2.60	2.07	-0.35	0.28	0.68	-5.94	2.00	-0.29	0.09	0.43
2005	2,066	-5.07	3.23	-0.65	0.45	1.43	-6.68	3.47	-0.34	0.16	0.57
2006	2,292	-2.98	2.36	-0.39	0.40	0.83	-4.25	2.20	-0.24	0.10	0.37
2007	2,501	-4.24	2.26	-0.60	0.24	1.14	-5.78	1.22	-0.30	0.07	0.43
2008	2,106	-4.41	3.05	-0.46	0.40	0.95	-4.85	3.73	-0.24	0.16	0.42
2009	2,074	-2.66	2.69	-0.29	0.39	0.68	-5.00	3.73	-0.23	0.15	0.40
2010	2,045	-4.64	4.04	-0.55	0.50	1.21	-7.83	3.73	-0.34	0.17	0.57
2011	1,913	-3.18	2.47	-0.47	0.31	0.90	-5.42	2.56	-0.26	0.14	0.43
2012	1,879	-1.88	0.61	-0.30	0.11	0.46	-2.95	1.28	-0.16	0.07	0.24
2013	1,918	-1.18	1.63	-0.20	0.38	0.54	-6.88	3.90	-0.31	0.15	0.52
2014	1,821	-1.85	1.24	-0.28	0.30	0.59	-4.72	2.89	-0.23	0.15	0.40
2015	1,730	-2.99	3.53	-0.37	0.53	0.88	-4.64	2.20	-0.25	0.11	0.39
2016	1,705	-1.87	1.81	-0.30	0.32	0.63	-6.58	3.93	-0.32	0.18	0.55
2017	1,804	-0.33	-0.35	-0.20	-0.06	0.16	-2.97	1.20	-0.13	0.08	0.21
2018	1,801	-1.71	1.26	-0.34	0.14	0.54	-5.66	1.53	-0.29	0.08	0.42
2019	1,762	-1.41	0.81	-0.28	0.13	0.44	-4.15	1.79	-0.20	0.11	0.33



Appendix D: **Frequency distributions and kernel densities for scaling with the market value of equity.** The distributions are shown for the first and last year of the sample period and two years in-between. Left graphs: sample of US firms; right graphs: sample of European firms. Vertical line at zero scaled earnings. Earnings are scaled with the market value of equity at the beginning of the year. One bar in the diagram represents a width of 0.005. *SLD*: small loss deviation; *SPD*: small profit deviation.





Appendix E: **Discontinuity measure for the US and Europe for scaling with the market value of equity.** The discontinuity measure captures the share of excess observations (pos. sign) or missing observations (neg. sign) in the intervals of scaled earnings directly below and above the zero threshold. *SLD*: small loss deviation; *SPD*: small profit deviation. Earnings are scaled with the market value of equity at the beginning of the year.