Mandatory Financial Information Disclosure and Credit Ratings

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Abstract
When firms are forced to publicly disclose financial information, credit rating agencies are generally expected to improve their risk assessments. Theory predicts such an information quality effect but also suggests an adverse reputational concerns effect since credit analysts may become increasingly concerned about alleged rating failures. We empirically examine these predictions using a large-scale quasi-natural experiment in Germany, where a new compliance regime required firms to disclose annual financial statements publicly. Consistent with the reputational concerns hypothesis, we find an average increase in credit rating downgrades that is entirely driven by changes in the discretionary assessments of credit analysts rather than changes in firm fundamentals. Following public disclosure regulations, analysts tend to give positive private information less weight in their risk assessments while assigning greater weight to negative public information. A final set of results indicates that professional credit providers recognize that the resulting downgrades are not warranted.

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1. Introduction

Over the past few decades, policymakers have introduced several amendments to reporting regulations with the aim of enhancing corporate financial transparency. The requirement that firms publicly disclose standardized financial information is a key element of these regulatory measures. When effectively enforced, the regulations make it more difficult for companies to conceal or manipulate financially relevant information. This change is intended to improve the quality of risk assessments and allocation of capital (Seligman, 1983; Gigler, 1994; Rock, 2002). Consistent with these expectations, several empirical studies have documented various capital market benefits following the implementation of the more stringent reporting regulations introduced in recent decades (Leuz and Wysocki, 2016).

Studies focusing on credit ratings, however, have shown that credit rating agencies (CRAs) have become increasingly conservative and less accurate over this same period (Blume et al., 1998; Baghai et al., 2014). This decline in rating accuracy is puzzling given the concurrent increase in publicly disclosed financial information.[1]

In this paper, we provide an explanation for this conundrum by documenting how mandatory financial statement disclosure leads to both more conservative and less accurate credit ratings. Our results confirm economic theory suggesting that public disclosure of information can have adverse effects if it crowds out the effective usage of private information (Morris and Shin, 2002; Goldstein and Yang, 2017). The driving force behind this crowding out effect is that informed professionals care about their reputations with uninformed decision makers (Scharfstein and Stein, 1990; Morris, 2001; Ottaviani and Sørensen, 2006).

[1] For example, Dyer et al. (2017) documented a substantial increase in firms' information disclosure from 1996 to 2013. This increase was driven by various changes in standards and disclosure requirements. A broad literature has shown that these regulatory reforms yield numerous capital market benefits for firms (see Leuz and Wysocki, 2016, for an overview). Other scholars, however, have found significant increases in credit rating conservatism around these law changes. For example, Alp (2013) noted a significant increase in rating conservatism after 2002, when SOX was implemented. Similarly, Jorion et al. (2005) described an increase in rating downgrades and a decrease in rating upgrades after Regulation Fair Disclosure (p. 316).

In the context of CRAs, credit analysts are reluctant to use private information in their credit risk assessments, because rating failures based on private information are more likely to be attributed to misclassification than rating failures based on public information (e.g., Mariano, 2012). This idea is centered on the multilayered role of public disclosure: public information not only disseminates fundamental information, it also informs analysts about what other market participants know, thereby helping them to predict the actions of others (Morris and Shin, 2002). By following the same public information that others are following, analysts can diminish their own responsibility for potential rating mistakes that might occur.[2] Although this behavior is inefficient from a social standpoint, it can be rational from the perspective of analysts who are concerned with their reputations. The mechanism is very similar to herding in financial markets, where equity analysts have incentives to follow the mainstream opinion even if they are privately better informed (Trueman, 1994; Hong et al., 2000). Following this reasoning, we expect that the requirement that firms disclose information to the public will prompt credit analysts to strategically adjust their discretionary credit evaluations. More precisely, in their risk assessments, they will place more weight on information that becomes publicly available and less weight on information that remains private. This implies that credit rating accuracy will decline in response to public disclosure of financial information.

In addition to a decrease in rating accuracy due to the underutilization of private information, we expect that analysts will more likely issue overly conservative ratings. This kind of asymmetrical bias is likely to arise because credit analysts are penalized more heavily for overly optimistic ratings than for overly pessimistic ratings (Bolton et al., 2012; Xia, 2014; Dimitrov et al., 2015). The mechanism is twofold. First, the costs of rating failures to clients are more significant in the case of

[2] For example, when an analyst issues a rating that is primarily based on public information, users of credit ratings will likely arrive at similar conclusions about the firm's creditworthiness. As a result, the users will be less likely to blame the analyst if the rating turns out to be incorrect. In addition, relying primarily on public information enables analysts to ascribe rating failures more easily to unexpected events, incomplete or inaccurate information disclosed by the company to the public, an inadequate assessment by the auditors, or a collective misunderstanding by multiple CRAs.

missed defaults compared to other types of rating failures (Bolton et al., 2012; Xia, 2014). Second, the likelihood of a client detecting a credit rating failure is highest when a firm defaults. Intuitively, it is unlikely that a client will complain about a speculative grade assigned to a firm that remains solvent, while an optimistic grade assigned to a firm that subsequently defaults may expose the CRA to criticism. Given that reputational risks are highest for analysts when they fail to predict defaults accurately (Xia, 2014), we expect that analysts will be particularly hesitant to rely on positive private information that contradicts negative public information, leading to more conservative ratings on average.

Based on these considerations, the reputational concerns hypothesis yields the following empirical predictions: (1) increased public disclosure leads to more conservative credit ratings; (2) increased public disclosure leads to a decrease in credit rating accuracy; (3) the shift toward more conservative ratings and the decrease in rating accuracy are driven by changes in credit analysts' discretionary personal assessments, not by changes in firm fundamentals or the availability of information to analysts; (4) analysts strategically adjust ratings by giving more weight to negative information that becomes publicly available and less weight to positive information that remains private; and (5) these effects are more pronounced for analysts with heightened reputational concerns.

Importantly, the reputational concerns hypothesis does not necessarily imply a negative impact of disclosure regulation on capital markets or credit supply. It might well be the case that lenders take an unwarranted change in credit ratings into account when making lending decisions (Baghai et al., 2014). In such a scenario, the public availability of financial information might still lead to improvements in credit allocation. To shed light on the economic impact of disclosure-induced credit rating changes, we investigate whether credit providers change their reliance on credit ratings once firms publicly disclose financial information. Specifically, we test whether the sensitivity of debt to credit ratings declines. Additionally, we assess whether more sophisticated users of credit ratings (i.e.,

banks) are more likely to change their reliance on credit ratings than less sophisticated users (i.e., trade credit providers such as suppliers). The latter group may be more likely to act upon unwarranted credit rating changes due to their lack of in-house knowledge and resources to conduct additional independent checks of firms' creditworthiness.

Our empirical analysis exploits the introduction of a mandatory disclosure regime in Germany. Since 1987, Germany has required all private limited liability firms to publicly disclose financial statements. However, due to a lack of enforcement, only approximately 5% of private firms complied with these requirements prior to 2006 (Bernard, 2016; Breuer, 2021; Breuer et al., 2023). In 2007, a change in enforcement regulations compelled over a million firms to disclose their financial statements for the first time publicly. Using a difference-in-differences (DiD) design, we evaluate the impact of this regulatory reform on treated firms' credit ratings through comparison with three different control groups: (1) private unlimited liability firms operating in Germany that were not required to disclose financial statements before or after the reform, (2) private limited liability firms operating in Austria that had already been mandated to disclose financial statements since 1996, and (3) German private limited liability firms that voluntarily disclosed financial statements to the public prior to the enforcement change.

Our main data source is the Mannheim Enterprise Panel (MEP), which includes credit rating data from Creditreform, the largest CRA in Germany. This proprietary database covers the universe of firms operating in Germany. It includes all credit ratings issued by the CRA, along with the underlying information used to construct these ratings. It includes publicly and privately disclosed financial information as well as the discretionary personal assessments of credit analysts. The latter enable us to isolate changes in the subjective opinion of credit analysts from changes in firm fundamentals. In addition, because we have access to all elements considered by analysts to construct

credit ratings, we can control for differences in firm characteristics between treated and control firms that might impact their rating.

To further strengthen identification, we focus on firms that disclose all requested information to the CRA, irrespective of whether that information is publicly available. We thus specifically focus on firms whose financial statement information exogenously switches from being privately available to analysts to being publicly available. We compare these firms with a control group in which financial statement information is either always privately disclosed to the CRA or, alternatively, always publicly available. This approach rules out biases from changes in available firm-specific information to credit analysts (e.g., Breuer et al., 2022).

Based on a panel of approximately 260,000 private firms observed between 2002 and 2012, we find that firms, on average, receive more conservative ratings when they disclose their financial statements to the public. Specifically, we find that approximately one out of every four firms experiences a one-notch rating downgrade on the S&P rating scale after disclosure. Consistent with the reputational concerns hypothesis, we find that these changes in credit ratings are entirely driven by changes in the discretionary assessments of credit analysts and not by changes in fundamentals or the business environment. Moreover, if we control for changes in the discretionary assessment of credit analysts, the adjusted credit ratings would actually predict an improvement in the firms' creditworthiness. However, the observed improvements are not large enough to offset the negative effect driven by the analysts' increased concerns about alleged misclassifications. Consistently, we also find that rating accuracy declines following the provision of these more conservative ratings. Default warnings increase even though these firms are actually less likely to default and more likely to pay off their debt obligations. These results further support the idea that the observed increase in rating downgrades is unwarranted.

Detailed analyses of the determinants of credit ratings provide additional support for the idea that reputational concerns about alleged rating failures drive the decline in rating accuracy. First, we show that positive information that the CRA privately possesses is less likely to positively influence a credit analyst's opinion, while negative publicly available information is more likely to lead to a more conservative opinion. Second, we document that the effect is more pronounced for firms with a rating around the investment/speculative grade cutoff (i.e., firms with a rating of approximately BBB-). In contrast, firms with top-tier ratings and firms with the worst ratings did not experience a significant change in their ratings. These results are consistent with the idea that analysts are more likely to adjust ratings for firms when they anticipate possible complaints about alleged rating failures. Lastly, our findings indicate that analysts who have previously made inaccurate credit assessments are more prone to issuing overly conservative ratings. This behavior is likely driven by their desire to avoid additional rating errors in response to their heightened concerns about job security.

In our final set of tests, we examine the impact of this increase in conservatism on the sensitivity between credit ratings and debt provision. Besides confirming that debt provision strongly correlates with firms' credit ratings, we show that the sensitivity between ratings and bank debt provision decreases by about 29% for treated firms after disclosure regulation, while the sensitivity between ratings and trade credit provision decreases by only 6%. This supports the idea that sophisticated credit providers are more likely to understand that the disclosure-induced rating changes are unwarranted; consequently, these credit providers are less likely to rely on credit ratings. In contrast, unsophisticated credit providers do not seem to significantly change their reliance on credit ratings. Given that the sensitivity of trade credit to ratings remains largely unchanged, and that trade credit is one of the most important sources of external financing for firms (Berger and Udell, 1998; Bundesbank, 2012), disclosure regulation and its associated effect on credit ratings might adversely impact some firms' financing opportunities. It is important to note, though, that the average firm

experienced an increase in trade credit and bank debt provision following disclosure regulation. This finding is consistent with prior literature (Deno et al., 2020) and suggests that the unintended impact on credit ratings is neither the only nor dominant channel through which transparency influences the debt financing landscape.

Our study contributes to the broader debate on how public information disclosure changes the information environment and affects financial markets (e.g., Scharfstein and Stein, 1990; Goldstein and Yang, 2017; Breuer et al., 2018; Breuer et al., 2022). This literature has repeatedly challenged the conventional wisdom that public information disclosure unambiguously improves efficiency. One of the main arguments put forward is that public information may crowd out various types of private information. Our study extends this literature by investigating how mandatory financial statement disclosures influence corporate credit ratings and trigger reputational concerns among informed experts. We provide novel evidence that credit rating analysts are more likely to rely on public information and less on private information in their credit risk assessments when information becomes publicly available.

Our results also inform the growing theoretical and empirical credit rating literature (see Jeon and Lovo, 2013, for an overview). Several theoretical papers have studied biases in credit ratings, highlighting reputational concerns as a key driving force (e.g., Mariano, 2012; Bouvard and Levy, 2018). We offer evidence that supports the validity of those theories. Prior empirical studies have shown that credit ratings have generally become more conservative over time, and the market only partially eliminates the impact of conservatism on debt provision (e.g., Baghai et al., 2014). Factors contributing to rating conservatism include the unexpected collapse of WorldCom (Alp, 2013), increased regulatory scrutiny after the Dodd-Frank Act (Dimitrov et al., 2015), and increased competition from investor-paid CRAs (Xia, 2014). Our study contributes to this line of research by

showing how the requirement to disclose financial information contributes to the provision of overly conservative ratings.

2. Data and Identification Strategy

2.1. Data

To empirically assess how credit analysts strategically change their credit ratings when firms publicly disclose information, we utilize the Mannheim Enterprise Panel (MEP), hosted by the Leibniz Centre for European Economic Research (ZEW). The database contains credit ratings of all firms operating in Germany. Important for our study, it also includes the underlying data that credit analysts use to construct these credit ratings.

The data originally stems from Creditreform, the largest CRA in Germany. Creditreform regularly screens the official German company register, ensuring a complete coverage of the corporate landscape. From 2000 onward, the database contains firm-level data for approximately 3 million German firms on a yearly basis. It includes data on all public companies, as well as information on almost all limited liability and unlimited liability private companies operating in Germany (see Bersch et al., 2014, and the Online Appendix for more details about the MEP).

The core business of Creditreform is selling credit ratings to banks and suppliers that want to determine the amount of (trade) credit they should offer. For example, banks buy these credit ratings as an input to approve or reject loan applications, to determine the loan conditions, or to supplement their own creditworthiness assessments. Suppliers of firms buy ratings to help determine the amount of trade credit to offer their clients. Creditreform thus employs an investor-paid business model, similar to the business model of Credit Safe, Dun and Bradstreet, Equifax, and Experian, which operate in other parts of the world.

Creditreform has 130 business offices in Germany and over 4,000 employees. Each of the 130 offices has a local regional monopoly with the exclusive right to construct ratings for firms operating

in their respective regions. Creditreform has approximately 125,000 clients and sold more than 15 million reports in 2010 (Creditreform, 2010). Their market share, at around 70%, has remained stable over recent decades (Creditreform, 2007, 2010).

When one of the clients of Creditreform requests a credit rating for a company, an analyst collects the necessary information to construct a credit report. The most important element in the credit report is the credit rating, which reflects a given firm's likelihood of being in default within the following year. All ratings sold to clients are available in our database. The MEP also includes all the underlying data used to construct the ratings: (a) payment behavior, (b) order prospects, (c) general business development and growth, (d) financial statement information, (e) age, (f) sales, (g) employees, (h) productivity, (i) equity, (j) legal form, and (k) industry and regional information (Creditreform, 2020). This information is gathered from both public sources (e.g., corporate websites, publicly available financial statements, and court cases) and private sources (e.g., management reports or financial statements disclosed through private channels). Nonpublic information is obtained through interviews with managers and supplemented with data from clients and suppliers (e.g., data on the firm's payment behavior).

To determine the associated probability of default, Creditreform employs a credit risk model that incorporates all elements listed above, including indicators for missing information. In addition, analysts independently examine all available information to provide an individual assessment of a given firm's creditworthiness. All these elements are assigned weights and combined to determine the final credit rating. A company's payment behavior and the discretionary assessment of the credit analyst carry the most weight, with each accounting for approximately 25% (Creditreform, 2020). Each of the other risk factors is weighted at around 5%. The Online Appendix provides an example of a fictitious company. The model closely resembles the rating methodologies used by other CRAs, where analysts

have considerable influence over the final credit rating (e.g., Fracassi et al., 2016; Dun and Bradstreet, 2020; S&P, 2020).

2.2. Institutional Setting

To empirically examine the impact of financial statement disclosure on credit ratings, we use a quasi-natural experiment originating from the EU directive 2003/58/EC. This directive mandated that all EU member states establish an electronic company register by January 1, 2007, with the goal of making all corporate financial statements electronically available to the public.

Prior to 2007, the EU had already required private firms to disclose annual financial statements to the public. However, in Germany, this requirement was not enforced. Before 2007, only about 5% of German firms that were obliged to publish annual financial statements actually disclosed their financial statements to the public (Ballwieser and Häger, 1991; Bernard, 2016; Bundesanzeiger, 2011; Theile and Nitsche, 2006).

When Germany implemented the Electronic Registers for Commerce, Companies and Associations Bill (EHUG) to comply with EU directive 2003/58/EC, it also began enforcing the disclosure of financial statements. This led to a massive increase in available financial statements through a web-based platform. If a firm does not file its financial statements within one year after the end of the fiscal year, the Federal Office of Justice initiates an administrative procedure that results in fines ranging from €2,500 to €25,000. Firms continue to be subject to fines every six weeks until their financial statements are available in the electronic register. This robust change in enforcement practice proved to be highly effective. Publication rates increased from approximately 5% to over 90% two years after the law change (Bundesanzeiger, 2011). More than 1 million financial statements are now published annually and are readily accessible through the Bundesanzeiger website.

Importantly, the enforcement change did not significantly increase compliance costs for firms as accounting and tax reporting are strongly aligned in Germany. In addition, firms typically already

had financial statements readily available and disclosed them through private channels to stakeholders upon request, including to CRAs.[3] The main shift for credit analysts was that financial information became publicly available. An open question remains, however, as to whether the disclosure reform impacted the CRA business model and the demand for credit ratings. Descriptive evidence from old snapshots of Creditreform's website (accessed through archive.org) indicates that prices of credit reports remained relatively stable, ranging from €58 in 2005 to €64.90 in 2012. The price is the same for every company, regardless of whether or not it publicly discloses financial statements. Our database shows that the number of available credit ratings has remained relatively constant over time as well.[4] This suggests that credit reports are still considered valuable resources by many banks and companies today, even though more and easier-to-access public information is available.[5] However, the annual reports of Creditreform reveal a slight decline in its number of clients, from 128,000 in the period 2002–2006 to 125,000 in 2008–2012. This decline suggests that, at least for some clients, publicly available financial statements may serve as an adequate alternative for assessing a firm's creditworthiness. We discuss this topic in greater detail in section 3.5 Economic Relevance, where we empirically assess the relationship between credit ratings and debt provision.

2.3. Identification Strategy

To identify the causal impact of financial information disclosure on credit ratings, we employ a DiD research design. Our treated group comprises German limited liability firms with the legal forms GmbH and GmbH Co. KG. These firms did not disclose financial statements to the public before the law change but were required to – and effectively did so – from 2007 onwards (i.e., approximately

[3] For example, in our database, we observe that from 2002 to 2007, the CRA obtained financial information for approximately 1 million firms annually through private channels. See the Online Appendix for more information about the MEP.
[4] The number of firms for which a credit rating was requested by banks and suppliers steadily increased from 1.3 million firms in 2002 to 1.5 million firms in 2012, largely reflecting the growth in the number of companies during the same period.
[5] The credit reports contain detailed private information about the company, including payment behavior and order outlook. Such private information is not readily observable in the financial statements of private firms. Furthermore, the Basel II agreements mandate that banks use credit ratings when assessing credit risk. Banks either directly rely on ratings from external CRAs or purchase credit reports to include non-public information as an input for their own credit models.

95% of all limited liability firms operating in Germany). We compare this set of treated firms with three distinct control groups: (1) German unlimited liability firms; (2) Austrian limited liability firms, and (3) German limited liability firms that had already voluntarily disclosed their financial statements before the enforcement change.

Following prior research, our most preferred control group consists of unlimited liability firms (e.g., Breuer et al., 2022; Breuer et al., 2023). These firms serve as a natural control group because both before and after the regulatory change, they were not required to publicly disclose financial statements. We specifically focus on unlimited liability firms with the legal forms OHG and KG because they exhibit similar firm characteristics regarding sales, employees, and productivity, and they operate in the same industries and regions as their limited liability counterparts. In addition, firms in both groups regularly collaborate with various suppliers and banks, giving them similar incentives to provide information to business partners and CRAs. Despite differences in their legal status, owners of both unlimited liability and limited liability firms often need to provide personal collateral to obtain loans, thereby increasing the comparability between the two groups of firms (Cerqueiro and Penas, 2017).

In our empirical design, we compare limited and unlimited liability firms that operate in the same region and industry. As explained in the institutional setting section 2.2, each of the 130 credit rating offices of the CRA has the exclusive right to sell ratings for firms operating in its respective region and employs its own analysts. By incorporating county-year and industry-year fixed effects in our analyses, we essentially ensure that treated and control firms were rated by the same analyst.

To assess the robustness of our findings, we employ two alternative control groups. The first consists of Austrian limited liability firms that share the same legal forms as their German counterparts (GmbH and GmbH Co. KG). The law change affecting German firms did not change the requirements for firms operating in Austria. Austria has mandated public financial statement disclosure for limited liability firms since 1996 (Eierle, 2008). Furthermore, Creditreform is also the

market leader in Austria, and it uses the same methodology to construct its ratings for Austrian and German firms (Creditreform, 2007). Regional differences between Austria and Germany are arguably negligible since both countries are long-term EU members, allowing for the free movement of capital, labor, and goods between the member states. Together with Germany, Austria forms a common market, as evidenced by parallel trends in their GDP growth (see Online Appendix Figure A1).

The second alternative control group includes German limited liability firms that voluntarily disclosed their financial statements to the public before the enforcement change (~5% of all limited liability firms in Germany). Similar to the control group of Austrian firms, this group of firms also has limited liability and has disclosed financial statements to the public over the entire sampling period. These two alternative control groups allow us to assess the robustness of our results – for example, by verifying that our results using the main control group of unlimited liability firms are not merely driven by differences in legal form. We summarize the similarities and differences between treated and control firms in Table 1.

Table 1

OVERVIEW OF TREATED AND CONTROL GROUPS

	Treatment Effect	**Firm Characteristics**		
	Public Disclosure	**Credit analyst**	**Firm size**	**Legal form**
Treated group				
German Limited	No disclosure before 2007, disclosure after 2007	German regional offices	Small and large	Limited
Control groups				
German Unlimited	No disclosure before 2007, no disclosure after 2007	German regional offices	Small and large	Unlimited
Austrian Limited	Disclosure before 2007, disclosure after 2007	Austrian regional offices	Small and large	Limited
German Limited (voluntary disclosure)	Disclosure before 2007, disclosure after 2007	German regional offices	Mainly Large	Limited

Notes: This table summarizes the main similarities and differences between our treated and control groups.

Under the assumption that the treated and control groups are subject to the same macroeconomic influences and market-wide shocks (i.e., factors that are concurrent but unrelated to the regulatory change), we can identify the causal impact of mandatory financial statement disclosure

on credit ratings using DiD estimations. We examine the plausibility of these assumptions in section 3.2.3.

2.4. Sample Construction

We focus on credit ratings of firms released five years before and five years after the law change in 2007. This results in a panel dataset covering the period 2002 to 2012. The sample ends in 2012 because from 2013 onward, a large fraction of firms became eligible to disclose less information to the public. In section 3.2.4, we discuss this deregulation reform in greater detail and use it as an alternative identification strategy.

Our baseline sample comprises treated and control firms as outlined above. To mitigate potentially confounding selection effects, we restrict our sample to firms that are observable before and after the law change and that did not change their legal form over time.[6] In addition, we keep only observations with no missing information on all the variables that credit analysts use to construct ratings. Hence, we retain only firms that disclose all the requested information to the CRA (either through private or public channels). This approach allows us to rule out that changes in credit ratings are driven by changes in information provision (e.g., Breuer et al., 2022).[7] Hence, the variation that we exploit is that financial statement information exogenously switches from private availability to public availability in 2007 for the treated firms. For the firms in the control groups, the same set of information is either always available through private channels or, alternatively, always available through public channels.

[6] In our sample, we find that less than 0.3% of all firms switch legal forms. These firms do not significantly alter the results when they remain in the sample.

[7] In addition, this procedure rules out the possibility that our analyses are confounded by the GmbH Law reform that occurred in 2008 (MoMiG), which introduced a new legal form, Unternehmergesellschaft (UG), into the German corporate landscape (see Bracht et al., 2022). Unlike our treated firms, this new type of limited liability company has no minimum capital requirements. Given our focus on companies that we observe both before and after 2007, these newly founded firms do not appear in our sample.

To enhance comparability, we further exclude the largest 1% of firms from our sample.[8] Next, we omit German and Austrian limited liability firms that did not disclose to the public when they were required to do so. Similarly, we remove unlimited liability firms that voluntarily disclose financial statements to the public.[9] The final sample consists of 1,854,434 firm-year observations, comprising 205,947 treated firms and 55,104 control firms (including 4,152 unlimited liability firms, 8,672 Austrian limited liability firms, and 42,280 German limited liability firms). A detailed selection table is provided in Online Appendix Table A1, and a breakdown by year appears in Table A2.

3. Results

3.1. Descriptive Statistics

Table 2 presents descriptive statistics for treated and control firms. The size of treated firms and unlimited liability firms is comparable, with around 22 versus 24 employees on average. Austrian limited liability and German limited liability firms that voluntarily disclosed are about twice as large (42 and 43 employees, respectively). The average treated firm is 21 years old, which is about the same average age as Austrian limited liability firms and German limited liability firms that voluntarily disclosed to the public (22 and 24 years old, respectively) and about half the age of the average German unlimited liability firm (38 years old). The median labor productivity, measured by total sales per employee, is comparable across all samples. Similarly, treated and control firms show comparable payment behavior to suppliers, a similar number of orders from clients, and equivalent business development prospects.

[8] Specifically, we remove firms with over 5,000 employees and sales exceeding €130,000,000 from our sample. According to German Corporate Law, unlimited liability firms surpassing these thresholds are required to publicly disclose financial information. Our results remain consistent when including these larger firms in the sample.

[9] We identify these firms by comparing the availability of financial statement data in the MEP database with the historical records of the Orbis database. The Orbis database only includes financial information about firms that have publicly available financial statements.

Table 2

DESCRIPTIVE STATISTICS

	Treated Group					Control Groups														
	Limited (Germany) N: 1,438,019					Unlimited (Germany) N: 30,449					Limited (Austria) N: 46,547					Limited (Germany) Voluntary Disclosure N: 339,419				
Variables	Mean	SD	Min	Median	Max	Mean	SD	Min	Median	Max	Mean	SD	Min	Median	Max	Mean	SD	Min	Median	Max
Credit Rating Index	10.52	2.47	1	10	21	9.13	2.5	1	9	21	11.20	3.02	1	11	21	9.78	2.57	1	9	21
Credit Analyst Opinion	2.41	0.61	1	2	5	2.31	0.55	1	2	5	2.56	0.70	1	2	5	2.31	0.61	1	2	5
Employees	22.16	59.73	1	9	4,300	24.04	65.05	1	8	3,100	41.64	88.88	1	13	2,344	42.9	92.22	1	16	3,510
Age	21.19	24.58	0	14	901	38.07	38.94	0	24	372	22.85	29.21	0	16	812	24.18	25.81	0	16	681
Equity(x 100,000)	1.58	8.92	0.00	0.26	2,556	3.12	25.13	0.00	0.03	990	3.15	11.53	0.00	0.36	310	3.71	13.91	0.00	0.50	970
Productivity(x 100,000)	11.34	47.36	0.00	1.50	1,253	4.29	19.24	0.00	1.47	350	25.07	72.98	0.00	2.14	610	5.85	29.38	0.00	1.41	1,270
Sales(x 100,000)	50.64	110.85	0.00	15.75	1,300	50.21	119.26	0.00	12.40	1,300	119.94	181.84	0.01	38.00	1,291	75.59	134.63	0.00	26.00	1,300
Payment Behavior	2.05	0.48	1	2	5	2.02	0.52	1	2	5	2.29	0.59	1	2	5	2.03	0.54	1	2	5
Order Situation	2.40	1.22	0	3	6	2.55	1.10	0	3	5	1.72	1.60	0	2	6	2.49	1.09	0	3	6
Business Development	2.24	1.29	0	3	6	2.42	1.18	0	3	5	1.56	1.56	0	2	6	2.32	1.19	0	3	6

Notes: This table presents descriptive statistics for the subsamples of treated and control firms. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have three control groups: (1) German unlimited liability firms with the legal forms OHG or KG that not required either before or after 2007 to disclose financial statements; (2) limited liability firms operating in Austria that were required to disclose from 1996 onward; (3) German limited liability firms that voluntarily disclosed before 2007. The credit rating index ranges from 1 (AAA) to 21 (C). Variable definitions are provided in the Appendix.

In addition, credit analysts' opinions about the firms' creditworthiness are, on average, the same for the treated and control groups.[10] To compare credit ratings across groups, we follow prior literature and assign a numerical value to each rating on a notch basis as follows: AAA=1, AA+=2, AA=3, AA−=4, A+=5, A=6, A−=7, BBB+=8, BBB=9, BBB−=10, BB+=11, BB=12, BB−=13, B+=14, B=15, B−=16, CCC+=17, CCC=18, CCC−=19, CC=20, C=21. The credit rating index thus ranges from 1 to 21.[11]

Firms in our sample have, on average, an investment grade (i.e., BBB- or better). Unlimited liability firms and limited liability firms that have voluntarily disclosed have, on average, a one-notch better rating (BBB) compared to the treated firms (BBB-), while Austrian limited liability firms have a one-notch worse rating (BB+).

3.2. Impact of Disclosure Regulation on Credit Ratings

3.2.1. Impact on Credit Ratings

To systematically examine the impact of financial statement disclosure on credit ratings, we employ DiD regressions. Following Jiang et al. (2012), Baghai et al. (2014), and Xia (2014), we utilize an OLS regression model with the following specifications:[12]

$$Credit\ Rating\ Index_{\ it} = \beta_1 \cdot Treated_i \times Post_t + \beta_2 \cdot Treated_i + \beta_3 \cdot Post_t + \varepsilon_{it} \quad (1)$$

We estimate this model on three different samples. Each sample consists of the treated group along with one of the three control groups outlined in the section 2.3 Identification Strategy.

$Credit\ Rating\ Index_{it}$ is the credit rating of firm i in year t. It ranges from 1 to 21 (i.e., AAA to C ratings). $Treated_i$ is a dummy indicating whether the firm started to publicly disclose financial

[10] This categorical variable ranges from 1 (best classification) to 6 (worst classification), with distinct meanings for each category. For example, Category 2 of the payment behavior variable indicates that a company pays within the agreed timeframe. For detailed definitions, see the Online Appendix. The maximum value for payment behavior and credit analyst opinions is 5 as 6 is exclusively assigned to firms that have defaulted.

[11] The original ratings from Creditreform range from 100 (best credit score) to 500 (worst credit score), with a separate category of 600 for defaulted companies. The accompanying credit report converts ratings to the widely recognized S&P credit rating index, ranging from AAA (prime rating) to D (in default). We use the S&P index to enable comparison with prior literature.

[12] We employ Ordinary Least Squares (OLS) as the primary analytical method throughout this paper due to the extensive fixed effects we employ in our analyses.

statements after 2007; it is zero if the firm does not change its disclosure strategy. $Post_t$ is a dummy that equals one from 2008 onward, when the first financial statements became publicly available. Standard errors are clustered at the county level.

In an alternative specification, we also include firm fixed effects (f_i) in our model to control for (unobserved) time-invariant heterogeneity across firms (e.g., different legal forms), and we also include county-year fixed effects (α_{ct}) and industry-year fixed effects (δ_{st}) to control for macroeconomic differences across years, counties, and industries. This leads to the following specifications:

$$Credit\ Rating\ Index_{\ it} = \beta_1 \cdot Treated_i \times Post_t + f_i + \alpha_{ct} + \delta_{st} + \varepsilon_{it} \quad (2)$$

Under the assumption that treated and control firms follow similar trends absent disclosure regulation, β_1 captures the causal impact of financial statement disclosure on credit ratings in our models. We expect to find a positive β_1 coefficient, meaning that public disclosure of financial statements leads, on average, to lower ratings.

Table 3 displays the results. Across the different samples, we consistently find that firms receive, on average, more conservative ratings after disclosure regulation. Our results are also qualitatively similar when we include firm and year fixed effects. The average of the marginal effects suggests that approximately one in four firms experiences a one-notch downgrade after being mandated to publicly disclose financial statements.[13] This indicates an economically meaningful effect. For example, it is about three times the size of the competition effect identified by Xia (2014), who finds a one-notch rating downgrade in S&P ratings for approximately one out of twelve firms in response to new competition from an investor-paid CRA.

[13] (0.177+0.229+0.098+0.103+0.604+0.327)/6 ≈ 0.256 ≈ 1/4

Table 3

REPORTING REGULATION AND CREDIT RATINGS						
Outcome	Credit Rating Index					
Control Group	Unlimited (Germany)		Limited (Austria)		Limited (Germany)	
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	0.177***	0.229***	0.098*	0.103*	0.604***	0.327***
	(0.040)	(0.034)	(0.056)	(0.059)	(0.034)	(0.018)
Treated	1.312***		-0.716***		0.479***	
	(0.049)		(0.130)		(0.067)	
Post	0.169***		0.248***		-0.258***	
	(0.049)		(0.043)		(0.051)	
Firm FE	No	Yes	No	Yes	No	Yes
Year-Industry FE	No	Yes	No	Yes	No	Yes
Year-County FE	No	Yes	No	No	No	Yes
Observations	1,468,247	1,468,247	1,484,391	1,484,391	1,777,360	1,777,360
Clusters (County)	443	443	543	543	444	444
R-squared	0.011	0.696	0.007	0.677	0.018	0.694

Notes: This table presents OLS regressions on firms' credit ratings. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have three control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; (2) limited liability firms operating in Austria that were required to disclose from 1996 onward; and (3) German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating gets worse (better). Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

To further assess the economic significance, we conduct two additional tests. First, we examine the impact of disclosure regulation on the likelihood that a firm receives a speculative grade. We use the same specifications as in equations 1 and 2, but use $Speculative\ Grade_{it}$ as the outcome variable. $Speculative\ Grade_{it}$ is a dummy variable that equals one when firms receive a non-investment rating (i.e., a rating of BB+ or lower), and zero otherwise. The results in Online Appendix Table A3 show that the likelihood of securing an investment-grade rating decreases by approximately 4.2 percentage points following the disclosure regulation (i.e., a 9.35% higher likelihood of receiving a speculative grade (0.042/0.449)). This indicates that disclosure regulation has significant implications for a substantial set of firms since a shift from an investment grade to a speculative grade often entails significant changes in borrowing costs and access to capital.

As an alternative approach to assess the economic significance of our findings, we utilize data on the amount of trade credit recommended by the CRA. Within each credit report, the CRA suggests to suppliers and banks the maximum amount of credit that could be offered given a particular credit rating. Using this data, we find that the CRA recommends a 13% lower credit volume when the average firm in our sample receives a one-notch lower credit rating.[14]

Taken together, our results show that disclosure regulation leads to a substantial reduction in credit ratings. Firms, on average, are assigned worse credit ratings when they are required to disclose information to the public. Given that we find consistent results across the different control groups, both in the current and in subsequent analyses, we report tabular results only for our preferred control group (German Unlimited) in the following sections. Results using the alternative control groups are available in the Online Appendix.

3.2.2. Change in Assessment by Credit Analysts or Change in Fundamentals?

The previous results are consistent with the idea that credit analysts provide more conservative ratings after disclosure regulation due to reputational concerns. However, another potential explanation for the change in credit ratings is that disclosure regulation (or concurrent events around the law change) has real negative economic consequences for firms, leading in turn to real changes in firms' creditworthiness. If this is the case, we may err in attributing the estimated change in credit ratings to the reputational concerns of the credit analysts. For example, Breuer et al. (2023) demonstrate that disclosure regulation can negatively impact firms' incentives to innovate, potentially jeopardizing their future profits and thus indirectly contributing to lower credit ratings.[15] Lower ratings would then be

[14] The Credit Rating Index and the recommended amount of trade credit have a correlation of 0.706. Credit reports reveal that the average recommended amount of trade credit to a supplier is €28,356 for firms with an average rating of BBB and €24,586 for firms with a one-notch lower rating (BBB-), or a 13% reduction in the recommended amount of trade credit ((€24,586-€28,356)/€28,356). In Section 3.5 Economic Relevance, we will examine in more detail how creditors react to disclosure-induced changes in ratings.

[15] Similarly, Germany introduced a corporate tax code reform (UntStRefG) in 2008 that reduced limited liability and unlimited liability firms' tax rates. If tax rates for unlimited liability firms had been reduced more drastically, this might have served as an indirect explanation for the change in ratings. We note, however, that the reform favored limited liability companies more. Hence, if anything,

justified because of changes in firm fundamentals. The reputational concerns hypothesis, however, would predict that credit ratings would change regardless of changes in firm fundamentals. To determine whether our results are driven by changes in firm characteristics or are solely related to a more conservative assessment by the credit analyst, we estimate the following three specifications:

$$Credit\ Analyst\ Opinion_{it} = \beta_1 \cdot Treated_i \times Post_t + f_i + \alpha_{ct} + \delta_{st} + \varepsilon_{it} \quad (3)$$

$$Credit\ Rating\ Index_{it} = \beta_1 \cdot Treated_i \times Post_t + \beta_2 \cdot Credit\ Analyst\ Opinion_{it} + \beta_3 \cdot Credit\ Analyst\ Opinion_{it} \times Post_t + f_i + \alpha_{ct} + \delta_{st} + \varepsilon_{it} \quad (4)$$

$$Credit\ Rating\ Index_{it} = \beta_1 \cdot Treated_i \times Post_t + \beta_2 \cdot Other\ Rating\ inputs_{it} + \beta_3 \cdot Other\ Rating\ inputs_{it} \times Post_t + f_i + \alpha_{ct} + \delta_{st} + \varepsilon_{it} \quad (5)$$

Specification (3) examines the impact of disclosure regulation on the personal judgment of analysts about firms' creditworthiness ($Credit\ Analyst\ Opinion_{it}$). The personal judgment of analysts is one of the main elements that determines the final credit rating and is supposed to take into account all available private and public information. Similar to other CRAs, the personal judgment of the analysts explains approximately 25% of the variability in firms' credit ratings (Fracassi et al., 2016). If reputational concerns drive the credit rating downgrades, we expect to find that credit analysts provide more conservative opinions after disclosure regulation.

Specification (4) tests whether changes in credit analysts' opinions determine the change in the credit rating index. If the personal judgment of analysts drives our prior results, documented in Table 3, we expect to find that the increase in credit rating downgrades will be muted once we control for any changes that might occur in analysts' personal judgments.

Specification (5) tests whether any other element used in the credit rating model of Creditreform changes the impact we documented in Table 3. Hence, the last specification controls for all other available credit rating inputs that, according to Creditreform, are used: sales, employees, age, productivity, equity, payment behavior, order situation, and business development. Since we include

the more favorable tax rates for limited liability companies would work against our findings. This is also inconsistent with our findings that the main driver of the change in credit ratings is a shift in credit analysts' opinions rather than changes in firm fundamentals.

firm fixed effects in our regression, we also control for other aspects, such as legal form, industry, and regional differences that are time invariant. In addition, we interact all controls with the post-time dummy to take into account that our controls might have a differential impact on credit ratings after the regulatory reform. All continuous control variables are log(X+1) transformed. Dummy variables are added for each value of the categorical variables that the CRA uses (e.g., payment behavior).[16] If the reputational concerns hypothesis drives our main finding in Table 3, the inclusion of these additional variables in specification 5 should not downward bias the β_1 coefficient.

Table 4 summarizes the results. For brevity's sake, we report only the results for our main control group, unlimited liability firms. Results for the other control groups are in line with those in Table 4 and are available in the Online Appendix (Table A4).

Column 1 in Table 4 shows that credit analysts provide a worse credit opinion about firms in response to increased corporate financial transparency. In Column 2, we control for changes in analysts' opinions when estimating the impact of disclosure regulation on credit ratings. As the coefficient of our DiD estimator considerably declines, it seems that the change in the personal assessments of the credit analysts drives the less favorable credit ratings that we documented in Table 3. The sign of the coefficient even switches from positive to negative, suggesting that credit ratings would have improved due to disclosure regulation if analysts had not revised their personal opinions in the opposite direction. In Column 3 of Table 4, we do not control for the credit analysts' opinions but do control for all other information that Creditreform uses to construct the ratings. In this specification, we observe that the disclosure effect is comparable to our baseline results in Table 3. If anything, the coefficient of our DiD estimator becomes more positive once we consider changes in firm characteristics. Hence, the positive coefficient documented in Table 3 cannot be explained by changes in the other credit rating inputs. Taken together, these results suggest that the estimated rating

[16] Our results are unaltered if we also include all accounting items available in the financial statements as additional controls.

reduction is driven by changes in the credit analysts' personal assessments, and not by changes in firm fundamentals.

Table 4

REPORTING REGULATION AND CREDIT ANALYST OPINION			
Outcome	Credit Analyst Opinion	Credit Rating Index	Credit Rating Index
Column	(1)	(2)	(3)
Treated x Post	0.098***	-0.076***	0.382***
	(0.011)	(0.018)	(0.041)
Log (Sales +1)			-0.374***
			(0.031)
Log (Age)			-0.540***
			(0.022)
Log (Equity +1)			-0.142***
			(0.007)
Log (Productivity +1)			0.414***
			(0.032)
Log(Employees +1)			0.286***
			(0.036)
Firm FE	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes
Credit Analyst Opinion FE	No	Yes	No
Payment Behavior FE	No	No	Yes
Order Situation FE	No	No	Yes
Business Development FE	No	No	Yes
Covariates x Post	No	No	Yes
Observations	1,468,247	1,468,247	1,468,247
Clusters (County)	443	443	443
R-squared	0.620	0.908	0.838

Notes: This table presents OLS regressions on credit analysts' opinions and firms' credit ratings. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. The control group consists of German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit analyst opinions range from 1 (best possible opinion) to 5 (worst opinion). The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating/opinion gets worse (better). Results using the two alternative control groups are reported in Online Appendix Table A4. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

3.2.3. Matched Sample, Effects over Time, and Parallel Trends Assumption.

To further increase confidence in the identification, we test our models based on a matched sample of treated firms that are comparable to the control group firms across all control variables, including industry and regional differences. This exercise addresses concerns that treated firms might be clustered in regions or industries where disclosure regulation had particularly pronounced effects.

Specifically, we employ Mahalanobis nearest-neighbor matching, where we only consider treated firms that are most comparable to a given control group firm. Re-estimating our baseline models on the matched sample reveals consistent results (see Table A5 in the Online Appendix).

If changes in reputational concerns among analysts were driving our results, we would also expect the effect to remain constant over time. We empirically examine the impact over time by re-estimating our DiD model with coefficients β_t separately added for each year before and after the regulatory change.

Figures 1 through 4 illustrate the results, showing that after the reform, the estimated impact stays relatively constant over time.[17] In all models, we also find economically insignificant differences between the treated and non-treated firms before 2007, supporting the parallel trends assumption. We do note, however, a minor uptick in Figures 2 and 4 for the year 2007. Although this could be interpreted as a breach of parallel trends, it more likely indicates early voluntary compliance by a subset of treated firms (Bernard et al., 2021). This interpretation is in line with the German practitioner literature, which reports that despite the typical one-year delay between the fiscal year-end and the filing of financial statements by German firms, a portion of German private firms had already proactively filed their financial statements in the latter half of 2007 (Henselmann and Kaya, 2009).

[17] Online Appendix Figures A2 to A7 present similar graphs using the matched sample and for our two alternative control groups.

Figure 1: Average Difference in Credit Ratings between Treated and Control Group Over Time

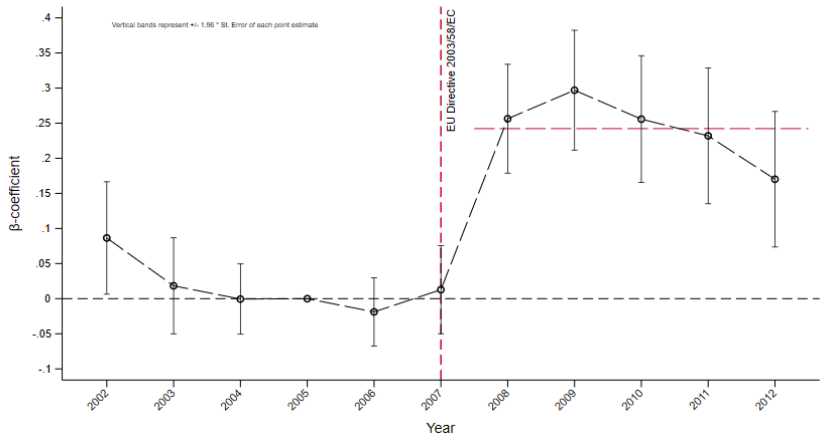


Figure 2: Average Difference in Analyst Opinion between Treated and Control Group Over Time

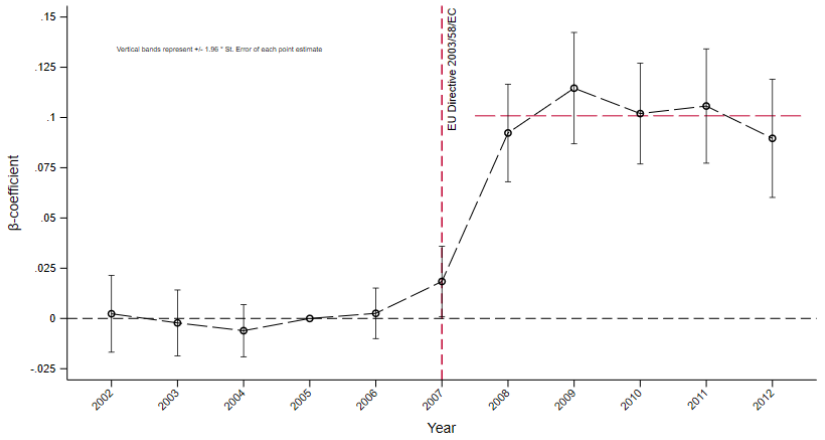


Figure 3: Average Difference in Credit Ratings between Treated and Control Group Over Time Controling for Credit Analyst Opinion

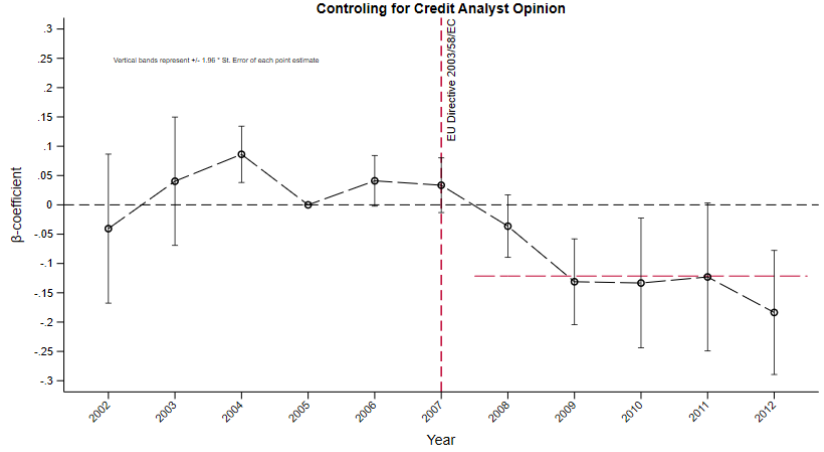
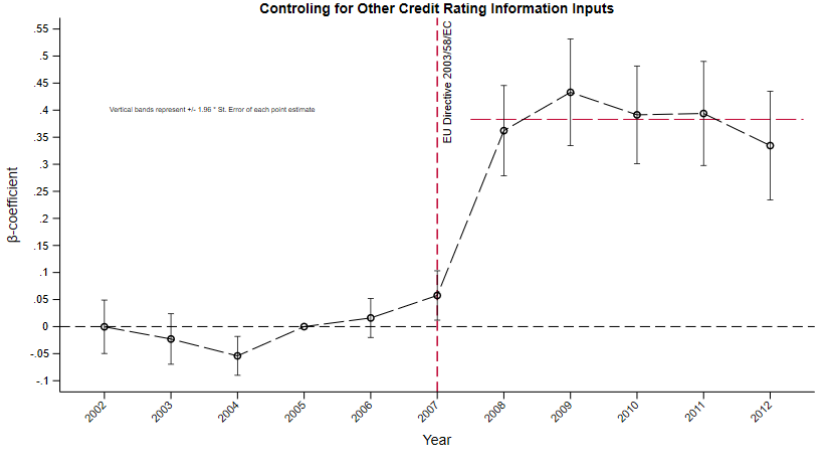


Figure 4: Average Difference in Credit Ratings between Treated and Control Group Over Time Controling for Other Credit Rating Information Inputs



Our main findings can thus be summarized as follows: Firms receive a significantly worse credit rating once they start to disclose to the public (Figure 1). A similar effect is observed when we examine the impact on credit analysts' opinions, which is one of the main inputs influencing the final credit rating (Figure 2). Once we control for changes in credit analysts' opinions, our model suggests that credit ratings would actually have improved (Figure 3). In other words, firms receive, on average, more conservative ratings after public disclosure regulation, and this effect is entirely driven by changes in analysts' personal assessments of firms' creditworthiness. Figure 4 further confirms our main findings. If we control for all other information used to construct the final rating, this does not explain the change in credit rating conservatism illustrated by Figure 1. Taken together, these results suggest that the change in credit ratings is not driven by changes in firm fundamentals but by changes in the subjective opinions of the analysts.

3.2.4. Alternative Quasi-Natural Experiment: MicroBilg

To address remaining concerns regarding the specific timing of the EU disclosure directive, we rerun our analyses using an alternative quasi-natural experiment. As discussed in the institutional setting section 2.2, Germany enacted another change in its disclosure regulation for a large share of firms at the end of 2012. The Small Capital Companies Accounting Law Amendment Act (MicroBilg) allowed the smallest firms within the economy to disclose less information to the public (e.g., fewer notes and less detailed balance sheet information). This change significantly impacted the number of publicly available financial statements (see Gassen and Muhn, 2023, for more details). In this setting, we would thus expect findings that were the opposite of what our results showed. Following disclosure deregulation, we expect that firms would receive more favorable opinions from analysts.

Table A6 in the Online Appendix reports our results. In summary, we find that firms that are eligible to reduce public disclosure experience an upgrade in credit ratings and receive more favorable opinions from analysts compared to firms that remained subject to more stringent reporting

requirements. Importantly, we observe that the effect of deregulation on credit ratings becomes less pronounced once we control for the credit analysts' opinions in our analyses. Overall, we find consistent evidence across different settings and when using multiple control groups, all of which support the idea that analysts issue more conservative credit ratings when firms are mandated to disclose information to the public.

3.3. Accuracy of Credit Ratings

As discussed earlier, an additional consequence of the reputational concerns hypothesis is that the accuracy of ratings declines. Evidence of reduced accuracy would further rule out the notion that changes in analysts' opinions and the observed rating downgrades are justified.

To empirically examine changes in rating accuracy following disclosure regulation, we adopt the approach of Baghai et al. (2014). Specifically, we examine the impact of disclosure regulation on defaults and on firms' payment behavior toward suppliers. Should we observe a decrease in defaults and improvement in payment behavior, it would further support the argument that credit analysts provide overly conservative ratings that are not justified relative to firms' objective default risk. In contrast, an increase in defaults would suggest that the lower ratings might be justified by correctly updated beliefs about the actual creditworthiness of the firm.

As an alternative test, we follow Cheng and Neamtiu (2009) and Dimitrov et al. (2015) and examine how the likelihood of type I and type II errors changes after financial statements become publicly available. If the disclosures lead to an improvement of credit analysts' creditworthiness assessments, we expect both error types to decline. Following prior literature, we define type II errors as when a firm receives a speculative rating (i.e., a credit rating of BB+ or worse) but the firm does not default in the next year. Type I errors occur when an analyst provides an investment rating (i.e., a credit rating of BBB- or better) but the firm defaults in the next year. If the reputational concerns hypothesis holds, we expect that type II errors will increase.

Table 5

REPORTING REGULATION AND CREDIT RATING ACCURACY							
Control Group	Unlimited (Germany)						
Outcome	Default		Payment Behavior		Type II Error		
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treated x Post	-0.026***	-0.007**	-0.004	-0.015*	0.0427***	0.0496***	-0.0107**
	(0.003)	(0.003)	(0.007)	(0.008)	(0.008)	(0.011)	(0.005)
Log (Sales +1)		0.008*		-0.030***		-0.0394***	-0.0234**
		(0.004)		(0.009)		(0.012)	(0.009)
Log (Age)		0.158***		-0.040***		-0.3010***	-0.2785***
		(0.004)		(0.005)		(0.006)	(0.006)
Log (Equity +1)		0.001		0.003		-0.0136***	-0.0227***
		(0.001)		(0.002)		(0.002)	(0.001)
Log (Productivity +1)		-0.011**		0.028***		0.0509***	0.0340***
		(0.004)		(0.009)		(0.012)	(0.010)
Log (Employees +1)		-0.019***		0.006		0.0327**	0.0308***
		(0.005)		(0.010)		(0.014)	(0.011)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Analyst Opinion FE	No	No	No	No	No	No	Yes
Payment Behavior FE	No	Yes	No	No	No	Yes	Yes
Order Situation FE	No	Yes	No	Yes	No	Yes	Yes
Business Development FE	No	Yes	No	Yes	No	Yes	Yes
Additional Controls x Post	No	Yes	No	Yes	No	Yes	Yes
Observations	1,767,631	1,767,631	1,767,631	1,767,631	1,767,631	1,767,631	1,767,631
Clusters (County)	444	444	0.589	0.598	444	444	444
R-squared	0.342	0.376	443	443	0.575	0.633	0.692

Notes: This table presents OLS regressions on defaults and type II errors. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. The control group consists of German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. Default is equal to 1 if the firm defaults in the next year and 0 otherwise. Payment behavior ranges from 1 (lowest credit risk) to 6 (highest credit risk). Type II Error equals 1 when an analyst provides a speculative rating (i.e., credit rating of BB+ or worse) but the firm does not default in the next year; it equals 0 otherwise. Results using the two alternative control groups are reported in Online Appendix Table A7. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table 5 supports the idea that the disclosure-induced credit rating downgrades are unwarranted. Firms that disclose financial statements are less likely to default (Columns 1 and 2) despite documented declines in their ratings (see Table 3 above). If anything, the payment behavior of firms also seems to improve (Columns 3 and 4). These findings reinforce the notion that credit analysts provide overly conservative ratings after disclosure regulation.

Our findings are further supported by an increase in type II errors. Columns 5 and 6 show that type II errors are 9% more likely to occur for treated firms after the law change (an average

absolute marginal change of 4.27 percentage points).[18] Column 7 reveals that once we control for the analysts' opinions in our analyses, the direction of the disclosure effect reverses. These results confirm that credit analysts' more conservative opinions drive the increase in type II errors. In Online Appendix Table A7, we report the impact of financial statement disclosure on type I errors. The evidence of the effects on type I errors is mixed and depends on the specification (see Table A7 Panels E and F). Results using the alternative control groups and alternative outcome variables (e.g., a more stringent definition of type I and type II errors or a firm's order outlook) are reported in Online Appendix Table A7. These results largely corroborate our main results.[19]

Taken together, our accuracy tests support the notion that the estimated rating downgrades are not justified by changes in firms' creditworthiness. Indeed, our findings indicate that firms' creditworthiness improves due to disclosure regulation (e.g., improvement in payment behavior and lower default rates). This is consistent with prior literature documenting various capital market benefits of improved disclosure regulation (Leuz and Wysocki, 2016). These benefits, however, do not seem to manifest themselves in better ratings because the negative impact of reputational concerns outweighs the positive effects.

3.4. Underlying Mechanisms

3.4.1. Crowding Out Private Information

Next, we examine the underlying mechanism behind the finding that analysts tend to err on the side of being overly conservative in their ratings. As previously highlighted, theoretical models predict that public disclosure of information can have adverse effects because it crowds out the effective usage of

[18] The average type II error in our sample is 0.4522. The likelihood thus increases by 0.0427/0.4522 ≈ 9%.

[19] Across all control groups and in nearly all specifications used to measure credit rating accuracy, we consistently find the same sign for the coefficients of interest as reported in Table 5. One exception exists when comparing treated firms with German limited liability firms that voluntarily disclosed information before the reform. In this specific case, we observe an increased likelihood of default that diverges from the overarching trends in the data. However, it is important to note that other key metrics, such as type II errors or alternative measures (e.g., a firm's order outlook), remain consistent with our general findings. We suspect that the rarity of default occurrences in this particular control group may be driving this inconsistency in default likelihood.

private information. This occurs because informed professionals care about their reputations with uninformed decision makers (Scharfstein and Stein, 1990; Morris, 2001; Ottaviani and Sørensen, 2006). Credit analysts may be reluctant to use their private information because rating failures based on private information are more likely to be attributed to alleged misclassifications than rating failures based on public information (Mariano, 2012). Given that credit analysts are penalized more heavily for overly optimistic ratings than for overly pessimistic ratings (Bolton et al., 2012; Xia, 2014; Dimitrov et al., 2015), we expect that analysts will be less likely to use private information that positively deviates from public information in their assessments.

To test this prediction, we draw on information that analysts receive through private or public channels and examine how positive and negative information from these sources affects their credit opinions. We construct two indicators. The first is equal to one if analysts provide a positive opinion when they receive a positive private signal; it equals zero otherwise. We define a positive private signal as information received from suppliers or banks upon a firm's timely repayment of its debt. Second, we construct a variable to measure how negative public information influences analysts' credit opinions. Hence, we create an indicator variable that is equal to one if an analyst provides a negative opinion upon receiving a negative public signal and zero otherwise. A negative public signal is measured by a dichotomous variable that equals one when revenue decreases compared to the prior year and zero otherwise. In alternative tests, we measure negative public signals by negative employment and productivity growth rates. Our results are robust to these alternative specifications (see Online Appendix A8).

Table 6 shows the results using our baseline DiD design. We find that analysts are, on average, 13.14% less likely to provide a positive opinion about a company when they observe a positive private signal (in Column 2, a decrease of 0.082 from the sample average of 0.624) and 31.53% more likely to provide a negative opinion when they observe a negative public signal (in Column 4, an increase of

0.070 from the sample average of 0.222). These results are consistent with the idea that analysts are less likely to use private information that positively deviates from public information in their risk assessments because they are concerned about receiving complaints should a rating failure occur. These findings align with the predictions of herding models and more recent theoretical models suggesting that public information may crowd out the effective usage of private information (e.g., Morris and Shin, 2002; Goldstein and Yang, 2017).

Table 6

THE USE OF POSITIVE PRIVATE INFORMATION AND NEGATIVE PUBLIC INFORMATION BY CREDIT ANALYSTS

Control Group	Unlimited (Germany)			
Outcome	Positive Credit Opinion when Positive Private Information is Received		Negative Credit Opinion when Negative Public Information is Received	
Column	(1)	(2)	(3)	(4)
Treated x Post	-0.068***	-0.082***	0.054***	0.070***
	(0.010)	(0.014)	(0.007)	(0.008)
Log (Sales +1)		0.037***		-0.069***
		(0.009)		(0.014)
Log (Age)		0.040***		0.146***
		(0.007)		(0.009)
Log (Equity +1)		-0.012***		0.008***
		(0.002)		(0.001)
Log (Productivity +1)		-0.038***		0.011
		(0.010)		(0.014)
Log(Employees +1)		-0.016		0.003
		(0.011)		(0.016)
Firm FE	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes
Payment Behavior FE	No	Yes	No	Yes
Order Situation FE	No	Yes	No	Yes
Business Development FE	No	Yes	No	Yes
Additional Controls x Post	No	Yes	No	Yes
Observations	1,468,247	1,468,247	1,468,247	1,468,247
Clusters (County)	443	443	443	443
R-squared	0.638	0.654	0.445	0.470

Notes: This table presents OLS regressions on the use of information by credit analysts. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. The control group consists of German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. "Positive Credit Opinion when Positive Private Information is Received" is a dummy variable equal to 1 when analysts provide a positive opinion upon receiving a positive private signal; it equals 0 otherwise. "Negative Credit Opinion when Negative Public Information is Received" is a dummy variable equal to 1 when an analyst provides a negative opinion upon receiving a negative public signal; it equals 0 otherwise. Results using the two alternative control groups are reported in Online Appendix Table A8. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

3.4.2. Reputational Concerns

In Tables 3 and 4, we show that on average, analysts err on the side of giving overly conservative ratings. We would expect a more pronounced effect where reputational damage is more likely to occur. As explained earlier, analysts are particularly concerned about missing a default (Bolton et al., 2012; Xia, 2014). Reputational concerns are thus particularly likely to manifest when there is a realistic possibility that a default will occur. Therefore, it is likely that the effects documented earlier will be weaker or even muted for AAA-rated companies because these companies are highly unlikely to default within a year. Similarly, if a company already received a highly speculative rating (e.g., CCC rated or worse), this would likely already serve as sufficient protection for the analyst's reputation. In such cases, analysts may not feel pressured to further downgrade a rating. Hence, we expect to find a more pronounced effect for firms that have a rating around the investment/speculative grade cutoff, while firms in the tails of the rating distribution are likely to be unaffected.

To evaluate whether we observe varying effects across the credit rating distribution, we estimate quantile regressions based on the methods of Meyer and Visculi (1995) and Parente and Silva (2016). Table 7 reports quantile regressions for quantiles 20, 40, 50, 60, and 80 using our main control group. We find an insignificant effect for firms with superior credit ratings (Column 1, firms with approximately A ratings). The effect gradually increases as we move down the rating scale and seems to be most pronounced for firms around quantile 60 (i.e., firms with approximately BBB- ratings). When we go even further down the rating scale, the impact of public disclosure on credit rating conservatism becomes less pronounced again (Column 5, firms with approximately BB- ratings). Online Appendix Table A9 reports the results for our alternative control groups and reveals similar patterns across the credit rating distribution. The effect even becomes insignificant in quantile 80 when using Austria Limited Companies as an alternative control group. Due to the rarity of AAA and CCC ratings (see Baghai et al., 2014), we cannot compute the impact for these specific quantiles.

Overall, our empirical results strongly support the notion that analysts strategically provide more conservative ratings to firms for which they are most likely to expect complaints about rating failures.

Table 7

QUANTILE REGRESSIONS					
Outcome	Credit Rating Index				
Quantile	Quantile 20	Quantile 40	Quantile 50	Quantile 60	Quantile 80
Column	(1)	(2)	(3)	(4)	(5)
Treated x Post	-0.090	0.132***	0.425***	0.605***	0.249***
	(0.096)	(0.039)	(0.041)	(0.068)	(0.063)
Treated	3.109***	1.148***	1.074***	1.171***	1.378***
	(0.140)	(0.037)	(0.054)	(0.072)	(0.061)
Log (Sales +1)	-1.214***	-1.229***	-1.444***	-1.384***	-1.111***
	(0.035)	(0.079)	(0.108)	(0.142)	(0.127)
Log (Age)	-0.301***	-0.364***	-0.408***	-0.452***	-0.413***
	(0.008)	(0.013)	(0.019)	(0.017)	(0.012)
Log (Equity +1)	-0.198***	-0.141***	-0.121***	-0.119***	-0.164***
	(0.005)	(0.007)	(0.006)	(0.007)	(0.006)
Log (Productivity +1)	1.163***	1.157***	1.308***	1.223***	1.036***
	(0.034)	(0.079)	(0.100)	(0.139)	(0.113)
Log(Employees +1)	1.087***	1.029***	1.184***	1.064***	0.831***
	(0.042)	(0.089)	(0.105)	(0.166)	(0.139)
Constant	4.290***	6.338***	6.694***	7.033***	6.979***
	(0.174)	(0.199)	(0.425)	(0.239)	(0.183)
Year FE	Yes	Yes	Yes	Yes	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes
Observations	1,468,247	1,468,247	1,468,247	1,468,247	1,468,247
Clusters (County)	443	443	443	443	443
R-squared	0.540	0.556	0.556	0.553	0.559

Notes: This table presents quantile regressions of credit ratings. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. The control group consists of German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating gets worse (better). Results using the two alternative control groups are reported in Online Appendix Table A9. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

3.4.3. Career Concerns

Next, we examine whether credit analysts who have provided inaccurate credit ratings in the past are more inclined to issue more conservative opinions after the disclosure mandate. We expect that this particular group of analysts faces pressure to provide more conservative ratings as they might fear losing their jobs if any additional clients complain about their inaccurate ratings.

Our database lacks credit analysts' identifiers, but we can estimate prior analysts' errors at the industry-office level. Creditreform has 130 local offices in Germany, each with a regional monopoly and specialized analysts. We proxy for analyst errors by counting mistakes within each office-industry cluster (i.e., errors within county-NACE4). Given the small number of specialized analysts per office, this should approximate individual analyst mistakes. In our DiD model, we interact this measure with our Treated and Post variables, resulting in the following specifications:

$$\begin{aligned} Credit\ Analyst\ Opinion_{it} = {} & \beta_1 \cdot Treated_i \times Post_t \times \text{Past Errors}_i \\ & + \beta_2 \cdot Treated_i \times Post_t + \beta_3 \cdot Past_t \times \text{Past Errors}_i \\ & + f_i + \alpha_{ct} + \delta_{st} + \varepsilon_{it} \end{aligned} \quad (6)$$

In equation 6, Past Errors is calculated as the sum of all the errors made prior to 2007 within an office-industry cluster, scaled by all ratings provided within that office-industry cluster in that period.[20]

Table 8 presents results that, like our main results in Table 3, show that credit analysts give more conservative opinions after disclosure regulation. However, the effect is significantly more substantial for analysts who have made prior rating mistakes. It is consistent with the idea that this group of analysts will be particularly motivated to avoid blame for future rating failures due to increased job security concerns. Overall, the results in Tables 6, 7, and 8 support our hypothesis that disclosure regulation triggers reputational concerns, which lead to more conservative ratings.

[20] Specifically, we define an error as when a company received an investment grade (i.e., a BBB- or better) but defaulted within the following year. Given that this variable is time invariant, the main effect and its interaction with treated firms are omitted from the model because we include firm and year fixed effects.

Table 8

REPORTING REGULATION AND CAREER CONCERNS				
Outcome				
Control Group	Credit Expert Opinion		Credit Rating Index	
Column	(1)	(2)	(3)	(4)
Treated x Post x Past Errors	3.554***	3.624***	9.999***	9.990***
	(0.601)	(0.618)	(2.470)	(2.114)
Treated x Post	0.081***	0.098***	0.180***	0.335***
	(0.011)	(0.014)	(0.035)	(0.041)
Post x Past Errors	-3.008***	-3.149***	-8.472***	-8.962***
	(0.578)	(0.604)	(2.395)	(2.096)
Log (Sales +1)		-0.051***		-0.374***
		(0.010)		(0.031)
Log (Age)		-0.035***		-0.540***
		(0.007)		(0.022)
Log (Equity +1)		0.013***		-0.142***
		(0.003)		(0.007)
Log (Productivity +1)		0.054***		0.414***
		(0.011)		(0.032)
Log(Employees +1)		0.031***		0.286***
		(0.012)		(0.036)
Firm FE	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes
Payment Behavior FE	No	Yes	No	Yes
Order Situation FE	No	Yes	No	Yes
Business Development FE	No	Yes	No	Yes
Additional Controls x Post	No	Yes	No	Yes
Observations	1,468,247	1,468,247	1,468,247	1,468,247
Clusters (County)	443	443	443	443
R-squared	0.620	0.669	0.696	0.838

Notes: This table presents OLS regressions on credit analysts' opinions. Treated firms are limited firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. The control group consists of German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit analyst opinions range from 1 (best possible opinion) to 5 (worst opinion). The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating/opinion gets worse (better). Results using the two alternative control groups are reported in Online Appendix Table A10. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

3.5. Economic Relevance

3.5.1. Credit Ratings and Their Impact on Firms' Access to Debt: An Examination of Sensitivity over Time

Lower credit ratings typically decrease firms' ability to attract external capital (e.g., Hand et al., 1992; Kliger and Sarig, 2000). However, prior studies also suggest that debt yields are shaped by factors other than ratings (e.g., Campbell and Taksler, 2003), and market participants view rating conservatism

as an additional factor to consider when pricing debt (Baghai et al., 2014). If credit providers realize that the increase in downgrades is unwarranted, they might change their reliance on credit ratings once firms are mandated to disclose financial information. As a consequence, debt providers might become more reluctant to rely exclusively on credit ratings when making lending decisions, thereby (partially) mitigating the impact of more conservative ratings on firms' access to credit. We shed light on this issue by examining the sensitivity of firms' debt to credit ratings. Since banks and suppliers buy credit reports to determine the amount of (trade) credit they provide, we expect that (a) credit ratings will be highly correlated with firms' access to debt, (b) the sensitivity will decrease over time if credit providers recognize that credit analysts provide less accurate ratings, and (c) the sensitivity of bank debt to credit ratings will decrease more strongly compared to the sensitivity of trade credit to credit ratings. This is because trade credit providers – generally small private firms – often lack the financial expertise and the resources to verify the accuracy of credit ratings. As a result, they are less likely to recognize that credit analysts are providing overly conservative ratings, and thus are inclined to authorize credit in accordance with these conservative ratings.

To assess the sensitivity between debt and credit ratings, we make use of balance sheet data that is available for German firms.[21] We estimate the following DiD model:

$$\begin{aligned} Log(Debt)_{it} = {} & \beta_1 \cdot Treated_i \times Post_t \times \text{Log(Credit Rating Index)}_{it} \\ & + \beta_2 \cdot Treated_i \times Post_t + \beta_3 \cdot Past_t \times \text{Log(Credit Rating Index)}_{it} \\ & + \beta_4 \cdot Treated_i \times \text{Log(Credit Rating Index)}_{it} + \beta_5 \cdot Treated_i \\ & + \beta_6 \cdot Post_i + \varepsilon_{it} \end{aligned} \tag{7}$$

where the dependent variable, $Log(Debt)_{it}$, represents either the total bank debt or the total trade credit observed on a firm *i*'s balance sheet in year *t*. We take the log of the Credit Rating Index so that the coefficients can be interpreted as elasticities. We also demean the log of the Credit Rating

[21] In this test, we focus on firms that disclose detailed non-missing and non-zero debt data in their balance sheets. Online Appendix Table A13 shows that our prior results hold for this subsample of firms. We note that we cannot use Austrian firms as a control group for this specification. The vast majority of Austrian firms do not publicly disclose detailed debt data. In our database, and in other databases such as Orbis, such information is only available for less than 1% of Austrian firms.

Index to ease interpretation. The model allows us to assess how the sensitivity between debt and credit ratings changes across the treated and control groups over time. In this specification, we do not include credit rating inputs as control variables as they would essentially capture the sensitivity between debt and credit ratings that we are interested in.

In a follow-up test, we do include all control variables as well as firm and year fixed effects. This specification alters the interpretation of our main variable of interest. Specifically, it allows us to assess how changes in credit ratings affect changes in debt, conditional on keeping all credit rating inputs constant. In other words, we assess how firms access to debt changes through rating changes that cannot be explained by changes in credit rating inputs or firm fundamentals.

To ease the interpretation of our results, we use the coefficients from the regression output of equation 7 (available in Online Appendix Table A11) and calculate the sensitivity between debt and credit ratings for the treated and control groups in both the pre- and post-treatment period. Table 9 Panel A and B show that the sensitivity between credit ratings and debt is negative in all cases. Hence, worse credit ratings consistently lead to lower debt volumes for treated and control firms in both the pre- and post-period. More importantly, the sensitivity between ratings and bank debt decreases on average by 29% for treated firms (Table 9 Panel A; i.e., an increase of 0.727 from the sample average of -2.478), while the trade credit volume to credit rating sensitivity declines at a magnitude of only 6% for treated firms (Table 9 Panel B; i.e., an increase of 0.119 from the sample average of -2.110). In comparison, we do not observe any significant changes in sensitivity for our control group. Similarly, when comparing the DiD change in sensitivity between trade credit and bank debt, we observe a significantly larger decrease in sensitivity for bank debt compared to trade credit (approximately three times larger).

Table 9

CHANGE IN SENSITIVITY – AVERAGE MARGINAL EFFECTS ACROSS GROUPS				
Panel A: Sensitivity between Bank Debt and Credit Ratings (No Controls)				
				Difference Pre- and Post-Period
Control Pre:	-1.818***	Control Post:	-2.141***	-0.323
	(0.241)		(0.250)	(0.249)
Treated Pre:	-2.478***	Treated post:	-1.752***	0.727***
	(0.087)		(0.055)	(0.087)
		Difference-in-Differences in Sensitivity:		1.045***
				(0.266)
Panel B: Sensitivity between Trade Credit and Credit Rating Index (No Controls)				
				Difference Pre- and Post-Period
Control Pre:	-1.578***	Control Post:	-1.830***	-0.252
	(0.189)		(0.185)	(0.223)
Treated Pre:	-2.110***	Treated post:	-1.991***	0.119***
	(0.056)		(0.048)	(0.068)
		Difference-in-Differences in Sensitivity:		0.371
				(0.241)
Panel C: Sensitivity between Bank Debt and Credit Rating Index (With Controls)				
				Difference Pre- and Post-Period
Control Pre:	-0.524***	Control Post:	-0.639***	-0.115
	(0.108)		(0.119)	(0.120)
Treated Pre:	-0.491***	Treated post:	-0.140**	0.351***
	(0.062)		(0.067)	(0.040)
		Difference-in-Differences in Sensitivity:		0.467***
				(0.132)
Panel D: Sensitivity between Trade Credit and Credit Rating Index (With Controls)				
				Difference Pre- and Post-Period
Control Pre:	-0.316***	Control Post:	-0.451***	-0.135
	(0.080)		(0.094)	(0.097)
Treated Pre:	-0.348***	Treated post:	-0.206***	0.143***
	(0.052)		(0.053)	(0.030)
		Difference-in-Differences in Sensitivity:		0.278***
				(0.101)

Notes: This table presents sensitivity statistics between credit ratings and debt. Sensitivities across groups and time periods are calculated using the coefficients reported in Online Appendix Table A11. Panels A and B show the results using OLS models without incorporating credit rating information inputs as controls; Panels C and D include these inputs as controls. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. The control group consists of German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

In Panels C and D, we present the results where we control for all credit rating inputs in our model (regression output available in Online Appendix Table A11). Conditional on all inputs, we again find that the sensitivity between credit rating and bank debt decreases more strongly as compared to the sensitivity between credit rating and trade credit. These results imply that, even if no changes occurred in firm fundamentals, firms would still receive less debt when they received an unwarranted

rating downgrade. When firms are required to disclose information to the public, however, these unwarranted changes in ratings have a lower effect on access to debt (i.e., a decrease of 71% in bank debt sensitivity compared to a decrease of 41% in trade credit sensitivity for treated firms). Results using the alternative control group with available debt data are consistent with this finding (see Online Appendix Table A12).

Hence, our results reveal that the sensitivity between bank debt and credit ratings decreases significantly when firms are required to disclose financial statements. The persistently strong sensitivity of trade credit volume to credit ratings suggests that a change to more conservative ratings could lead to a decrease in the average amount of trade credit volume for these firms. However, it is important to note that our results report a slight, albeit notable, decrease in sensitivity between trade credit and ratings. This indicates that some trade credit providers do adjust their reliance on credit ratings following disclosure regulation. In addition, when examining the direct impact of disclosure regulation on trade credit and bank debt, we find that firms experience, on average, a 13% increase in trade credit and a 16% increase in bank debt after disclosure regulation (see coefficients of the variable "Treated x Post" in Online Appendix Table A11, Columns 3 and 4). Hence, consistent with prior literature, the *average* net effect of transparency on debt attraction seems to be positive (see, e.g., Deno et al., 2020). However, the relatively stronger increase in bank debt compared to trade credit suggests that bank debt financing becomes a relatively more important source of external financing for firms. This shift from trade credit to bank debt aligns with the notion that banks and trade creditors differ in their ability to accurately interpret and utilize more conservative credit ratings.

Taken together, our findings indicate that the intertwined change of public transparency and increased credit rating conservatism can lead to the deterioration of credit conditions for some firms (e.g., as a consequence of more conservative ratings) while simultaneously improving debt accessibility for others (e.g., due to transparency benefits; see Leuz and Wysocki, 2016). Those most likely to be

adversely affected are firms that predominantly rely on smaller trade credit providers who are more likely to use credit ratings to determine trade credit volumes.

4. Summary and Conclusion

This study demonstrated how the introduction of a mandatory disclosure regime in Germany influenced firms' credit ratings. Consistent with the idea that credit analysts become increasingly concerned about alleged rating failures following disclosure regulation, we find that analysts issue more conservative ratings. The change in ratings appears to be entirely driven by changes in the discretionary assessment of the credit analysts and not by changes in firm fundamentals. Analysts reduce the likelihood of being accused of rating failures by giving less weight to positive private information and more weight to negative public information in their risk assessments. Since these changes are not justified by changes in fundamentals (e.g., firms' payment behavior), rating accuracy declines, as evidenced by an increase in erroneous default warnings.

Professional credit providers seem to understand that the analyst-induced downgrades are not warranted. The sensitivity between credit ratings and bank debt provision declines, while unsophisticated lenders do not appear to change their reliance on credit ratings to the same extent. These results indicate that some firms might less likely receive credit in response to the analyst-induced rating downgrades, underscoring the tangible influence of disclosure regulation on financing dynamics. However, it is noteworthy that, on average, firms experience an uptick in both trade credit and bank debt following disclosure regulation. This observation suggests that the unintended impact on credit ratings is neither the only nor dominant channel through which transparency influences debt financing opportunities.

Our results call for a cautionary review of the conventional wisdom that additional disclosure of financial information unambiguously improves the information environment. It seems essential to

carefully consider not only the benefits of increased corporate financial transparency but also its unintended side effects (e.g., impacts on credit ratings and unsophisticated lenders).

Given that our analysis is specific to the German institutional environment and one single CRA, more research is needed to assess the generalizability of our findings. However, since other CRAs (e.g., D&B, Experian, Credit Safe) follow a similar business model, it seems reasonable to expect similar mechanisms to apply. Future research could further explore the boundary conditions of our findings by examining the interplay among credit rating business models, levels of financial transparency, and their impact on different types of capital providers.

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Variable Appendix

VARIABLE DESCRIPTION	
Treatment:	**Description**
Treated	Treated is equal to 1 for German limited-liability firms that start to disclose financial statements from 2007 onwards, 0 for firms in the control group. The control group consists of either (1) German unlimited-liability firms that were never required to disclose financial statements information to the public , (2) Austrian limited-liability companies that were already enforced to disclose financial statements from 1996 onwards, or (3) German limited-liability firms that always disclosed financial statement to the public voluntarily.
Post	Post is equal to one after 2007, 0 otherwise.
Main Outcome:	
Credit Rating Index	Credit Rating index is the credit rating of Creditreform. The original rating ranges from 100 to 500. A rating of 600 is given to firms that defaulted. We translate the rating of Creditreform to the S&P index using the correspondence table of Creditreform. Following the prior literature, a numerical value is assigned to each rating on a notch basis as follows: AAA=1, AA+=2, AA=3, AA−=4, A+=5, A=6, A−=7, BBB+=8, BBB=9, BBB−=10, BB+=11, BB=12, BB−=13, B+=14, B=15, B−=16, CCC+=17, CCC=18, CCC−=19, CC=20, C=21. The credit rating index ranges from 1 to 21. Defaulting firms are equal to 22.
Credit Rating Inputs:	
Log (Sales + 1)	The log of sales of the firm within a year, plus 1.
Log (Age)	The log of the age of the company.
Log (Equity + 1)	The log of the total equity of the firm within a year, plus 1.
Log (Productivity + 1)	The log of the productivity of the firm within a year (measured as sales divided by employees), plus 1.
Log(Employees + 1)	The log of the number of employees within a year, plus 1.
Payment Behavior	Information from suppliers about firm's payment behavior. The payment behavior information is classified in 6 main categories. Ranging from 1, the most positive rating, to 6 which is given to firms in default. Specifically, Category 1 means that firms pay on time and utilize cash discounts; Category 2 means that firms payback within the agreed targets; Category 3 means that firms mostly pays within agreed targets, occasionally exceeding the target; Category 4 means that firms exceeded payment targets for up to 30 days; Category 5 means that firms have significant overruns of at least more than 30 days; Category 6 means that firms are in bankruptcy proceedings.
Credit Analyst Opinion	The opinion of the analysts about the creditworthiness of the firm. An analyst can classify firms in 6 main categories. Ranging from 1, the most positive rating, to 6 which is given to firms in default. Specifically, Category 1 means that business relationships and credit provision are highly recommended; Category 2 means that business relationship and credit provision are permitted; Category 3 means that Business relationship are acceptable, and credit provisions are allowed, but with limits; Category 4 means that a business relationship is acceptable, but any form of credit requires collateral; Category 5 means that any form of business relationships and credit are not advised. Category 6 means that the firm is in default, any form of business relationship and loans are rejected.
Order Situation	Information about customer orders. Firms' order situation is classified in 6 main categories. Ranging from 1, the most positive rating, to 6 the worst rating. Specifically, Category 1 means that the firm has a very good order book (growing); Category 2 means that the firm has a good order book (growing); 3 means that the situation is satisfactory (stable); 4 means that the orders are declining; 5 means that the orders are

	declining sharply; Category 6 is giving to firms with the worst order situation (e.g., no orders incoming, close to bankruptcy). A Category 0, exist in case the information is missing.
Business Development	Information about the general business development of the company. The business development of the company is classified in 6 main categories. Ranging from 1, the most positive rating, to 6 the worst rating. Specifically, Category 1 means that the business is expanding (growing); Category 2 means that there is a positive business development (growing); Category 3 means that the business development of the company is stable; Category 4 means that the business development of the company is stagnating; Category 5 means that the business development in is decline; Category 6 means that there is a sharp decline in the business development of the company. A Category 0, exist in case the information is missing.
Industry	The industry of the company that the firm is operating in. Certain industries have a higher risk of default compared to others, and thus receive a higher rating. In our setting, this is captured by our firm-fixed effects and year-industry fixed effects.
County	The county of the company that the firm is operating in (i.e., Kreis-level). Certain counties have a higher risk of default compared to others, and thus receive a higher rating. In our setting, this is captured by our firm-fixed effects and year-county fixed effects
Additional Variables:	
Speculative Grade	Speculative grade is equal to 1, if a firm receives a speculative grade (i.e., credit rating of BB+ or worse), 0 otherwise.
Type-Two Error	Type-Two Error is equal to 1 if the company received a speculative grade (a credit rating BB+ or worse), but do not default within the next year, 0 otherwise.
$Default_{t+1}$	Default (t+1) is equal to 1 if the company defaults the next year, 0 otherwise.
Log (Trade Credit)	The variable Log(Trade Credit) is the log of trade credit of a company. Retrieved from firms' financial statements.
Log (Bank Debt)	The variable Log(Bank Debt) is the log of bank debt of a company. Retrieved from firms' financial statements.
Past errors	The variable past errors is the number of Type-One Errors made in the period 2002 to 2006 within each 'industry - credit rating office' cluster, weighted by the number of credit ratings constructed within each 'industry - credit rating office' cluster.
Positive Credit Analyst Opinion	Positive credit analyst opinion is equal to 1 for an opinion which permits credit provisions (i.e., a score of 1 or 2 on the Credit Analyst opinion variable), 0 otherwise.
Positive Payment Behavior	Positive payment behavior is equal to 1 for all firms that pay within targets (i.e., a score of 1, 2 or 3 on the payment behavior variable), 0 otherwise.
Negative Financial statement information	Negative financial information is equal to 1 if firms experience a drop in turnover from t to t-1, 0 otherwise.

Online Appendix

(For online publication only)

Table of Contents

Credit Rating Model

The following description is provided in the information brochure of Creditreform:

> The Creditreform Solvency Index is the central pillar of Creditreform's Commercial Report and other information formats for evaluating a business's solvency. Its accurate forecasts of the probability of default (PD) provide for quick and direct assessment of a customer's solvency – and consequently also the customer's credit worthiness.
>
> The Solvency Index's excellent forecasting accuracy is also attributed to Creditreform's extensive database which has increased significantly over the past few years – not only in terms of 10 million accounts now published, but also regarding industry KPIs and in the payment-experience field. The Debitorenregister Deutschland debtors' register, alone, for example, gives Creditreform access to over 100 million payment experiences.
>
> The calculation of the Creditreform Solvency Index involves a wide range of information relevant to a company's solvency. The individual KPIs in the Commercial Report are collated into an overall score value represented as a three-digit figure.
>
> The following attributes are used in calculating the creditreform Credit Rating Index: Credit opinion, payment behaviour, financial report data, industry risk, company development, turnover, legal form, company's age, regional risk, order-book situation, capital, management experience, number of employees, sales per employee, relationship of capital:sales
>
> Due to their relevance for calculating solvency scores, a wide range of exclusive Creditreform information sources is tapped for this. These sources include, in particular: External payment experiences, Financial statement data, and Industry risk.

Creditreform's model to determine a Credit Rating

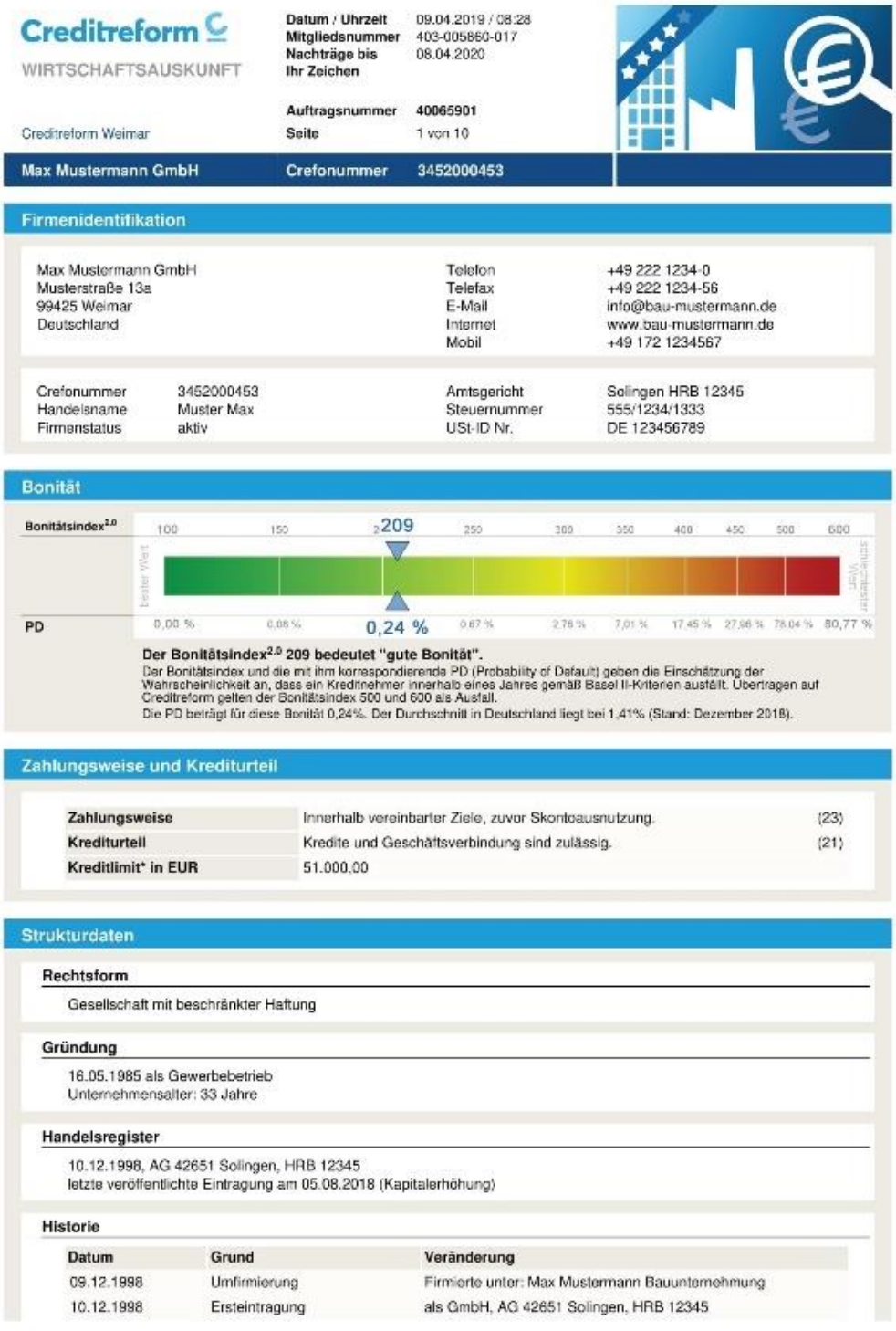
			Classification					
Example Company	Risk factors	Weight %	1	2	3	4	5	6
Legal form: GmbH (limited company) **Industry:** Electronics – Wholesale **Age:** 12 years **Business development:** Constant (class 3) **Order situation:** Satisfactory (class 3) **Payment behavior:** Within agreed goals (class 2) **Credit Analyst Opinion:** Credit provision and business relationships are permitted (class 2)	Payment behavior	25		50				
	Credit Analyst Opinion	25		50				
	Business development	5			15			
	Order situation	5			15			
	Legal form	4		8				
	Industry	6		12				
	Age	4		8				
	Sales	5			15			
	Employees	4			12			
	Productivity	2		4				
	Equity	5		10				
	Financial statement Rating	10		20				
	Total	**100**		**162**	**57**			
	Credit Rating	**219**						

Statistical valuation models returning accurately calculated forecasts, plus rigorously implemented quality controls, guarantee the meaningfulness of these checks. In this way, the Creditreform Solvency Index allows prospective forecasts to be made for reliably distinguishing between good and profitable, and bad, loss-making, business.

The Creditreform Solvency Index can assume a value ranging from 100 to 500 or 600 – corresponding to a spectrum from excellent solvency to suspension of payment). A solvency index is not calculated for newly formed companies or in the event of uncertain circumstances.

Retrieved from:
https://www.creditreform.at/fileadmin/user_upload/Oesterreich/Downloads/Wirtschaftsinformation/Broschuere_Bonitaetsindex_2.pdf
and
https://www.creditreform.co.uk/wp-content/uploads/2016/12/Solvency_Index.pdf

Example of a Credit Rating Report of Creditreform (fictitious example)



Creditreform
WIRTSCHAFTSAUSKUNFT

Creditreform Weimar

Datum / Uhrzeit 09.04.2019 / 08:28
Mitgliedsnummer 403-005860-017
Nachträge bis 08.04.2020
Ihr Zeichen

Auftragsnummer 40065901
Seite 1 von 10

Max Mustermann GmbH | **Crefonummer** 3452000453

Firmenidentifikation

Max Mustermann GmbH
Musterstraße 13a
99425 Weimar
Deutschland

Telefon +49 222 1234-0
Telefax +49 222 1234-56
E-Mail info@bau-mustermann.de
Internet www.bau-mustermann.de
Mobil +49 172 1234567

Crefonummer	3452000453	Amtsgericht	Solingen HRB 12345
Handelsname	Muster Max	Steuernummer	555/1234/1333
Firmenstatus	aktiv	USt-ID Nr.	DE 123456789

Bonität

Bonitätsindex[2.0]: 100 | 150 | 209 | 250 | 300 | 350 | 400 | 450 | 500 | 600
(bester Wert … schlechtester Wert)

PD: 0,00 % | 0,06 % | 0,24 % | 0,67 % | 2,78 % | 7,01 % | 17,45 % | 27,96 % | 78,04 % | 80,77 %

Der Bonitätsindex[2.0] 209 bedeutet "gute Bonität".
Der Bonitätsindex und die mit ihm korrespondierende PD (Probability of Default) geben die Einschätzung der Wahrscheinlichkeit an, dass ein Kreditnehmer innerhalb eines Jahres gemäß Basel II-Kriterien ausfällt. Übertragen auf Creditreform gelten der Bonitätsindex 500 und 600 als Ausfall.
Die PD beträgt für diese Bonität 0,24%. Der Durchschnitt in Deutschland liegt bei 1,41% (Stand: Dezember 2018).

Zahlungsweise und Krediturteil

Zahlungsweise	Innerhalb vereinbarter Ziele, zuvor Skontoausnutzung.	(23)
Krediturteil	Kredite und Geschäftsverbindung sind zulässig.	(21)
Kreditlimit* in EUR	51.000,00	

Strukturdaten

Rechtsform
Gesellschaft mit beschränkter Haftung

Gründung
16.05.1985 als Gewerbebetrieb
Unternehmensalter: 33 Jahre

Handelsregister
10.12.1998, AG 42651 Solingen, HRB 12345
letzte veröffentlichte Eintragung am 05.08.2018 (Kapitalerhöhung)

Historie

Datum	Grund	Veränderung
09.12.1998	Umfirmierung	Firmierte unter: Max Mustermann Bauunternehmung
10.12.1998	Ersteintragung	als GmbH, AG 42651 Solingen, HRB 12345

Diese Auskunft ist nur für den Empfänger bestimmt. Für den Inhalt wird jede Haftung für einfache Fahrlässigkeit abgelehnt. Dies gilt auch für Erfüllungsgehilfen. Wer die Auskunft zur Kenntnis nimmt, unterwirft sich diesen Bedingungen. Der Empfänger darf die übermittelten Daten nur für den Zweck verarbeiten oder nutzen, zu dessen Erfüllung sie ihm übermittelt worden sind. Eine Nutzung für andere Zwecke ist nur unter der Voraussetzung Art. 6 Abs. 1 f) i.V.m. Abs. 4 EU-DSGVO zulässig.

* Das Kreditlimit beruht auf der Einschätzung von Creditreform und bezeichnet den von uns empfohlenen Vorschlagswert für die Einrichtung einer Kreditlinie zum angefragten Debitor.

Max Mustermann GmbH | **Crefonummer** 3452000453

10.12.1998	Rechtsformänderung	Umwandlung in: GmbH, AG 42651 Solingen, HRB 12345
19.05.2010	Gewinnabführungsvertrag	Gewinn- und Verlustübernahmevertrag bekannte Vertragspartner: 3452000487 Musterkonzern Fantasien 99425 Weimar, Musterstraße 1235
24.03.2012	Verschmelzung	Verschmelzung als übernehmende Gesellschaft bekannte Vertragspartner: 3452000720 Muster verschmolzene GmbH 41460 Neuss, Hellersbergstr. 12
05.08.2018	Kapitalerhöhung	

Gesellschafter und Kapitalangaben

Crefonummer	Name / Adresse / Status	beteiligt seit	Anteil
Gesellschafter			
3452000598	Max Mustermann, geb. 30.05.1975, Diplom-Kaufmann 58097 Hagen, Musterweg 55	01.08.2018	80.000 EUR
3452000597	Moritz Mustermann, geb. 15.12.1965 99425 Weimar, Musterstrasse 101b	10.12.1995	35.000 EUR
Stammkapital			**115.000 EUR**
5332000122	*Georg Gründer* *58097 Hagen, Saarstr. 1*	*10.12.1995* *ausgeschieden am 31.07.2018*	*70.000 EUR*

Geschäftsführung und Vertretungsbefugnisse

Crefonummer	Name / Adresse / Status	beteiligt seit	Vertretungsbefugnis
Geschäftsführer			
3452000598	**Hauptgeschäftsführer** Max Mustermann, geb. 30.05.1975, Diplom-Kaufmann 58097 Hagen, Musterweg 55	01.08.2018	alleinvertretungsberechtigt
5332000122	***Hauptgeschäftsführer*** *Georg Gründer* *58097 Hagen, Saarstr. 1*	*10.12.1995* *ausgeschieden am 31.07.2018*	*gemeinsam vertretungsberechtigt*
Prokurist			
3452000526	**Aufgabenschwerpunkt: Technik** Erwin Erfinder, geb. 24.12.1970, Erfinder 23451 Neustadt, Neue Strasse 356	06.12.2012	Einzelprokura

Standorte

Adressbereich	Anschrift	Telefon
Niederlassung		
	12346 Musterhausen, Musterstraße 12a	
Betriebsstätte		
	45678 Musterhausen, Musterallee 12a	

Beteiligungsverhältnisse

Eine grafisch aufbereitete Auskunft über die Verflechtungen des Unternehmens und der Beteiligten können Sie als Verflechtungsinfo abrufen.

Beteiligungen des Unternehmens

Crefonummer	Name / Adresse / Status	beteiligt seit	Gesamtkapital Anteil
Komplementärin			
4032005093	Musterbau GmbH & Co KG 12345 Musterstadt, Musterstr. 51	29.07.2009	

Konzernzugehörigkeit

Crefonummer	Firmierung und Anschrift
3452000487	Musterkonzern Fantasien 99425 Weimar, Musterstraße 1235

Beteiligungen und Funktionen von: Max Mustermann, 3452000598

Crefonummer	Name / Adresse / Status Beteiligteneigenschaft	beteiligt seit	Anteil
4112005285	Muster Company Ltd. 12345 Mustertown, Musterstrasse 246 * in Liquidation *		
	Gesellschafter	15.09.2009	5.000 EUR
4032005902	Max Mustermann GmbH 46399 Bocholt, Musterstraße 1234		
	Gesellschafter	15.09.1995	70.000 EUR
	Geschäftsführer	15.12.1995	

Beteiligungen und Funktionen von: Moritz Mustermann, 3452000597

Crefonummer	Name / Adresse / Status Beteiligteneigenschaft	beteiligt seit	Anteil
5332000120	Max Mustermann Bauunternehmung GmbH 12345 Musterstadt, Musterstraße 123		
	Gesellschafter	01.08.2014	30.000 EUR

Geschäftstätigkeit

Eingetragener Gegenstand

Durchführung von Hoch- und Tiefbauarbeiten, Erstellung von schlüsselfertigen Wohn-, Gewerbe- und Industriebauten als Generalunternehmer sowie Handel mit Baustoffen.

Tatsächliche Tätigkeit

Generalunternehmer für Industriebauten und Handel mit Baufahrzeugen.

Klassifikation der Wirtschaftszweige, Ausgabe 2008

WZ 2008	Beschreibung	Gewichtung	PD
41.20.1	Bau von Gebäuden (ohne Fertigteilbau)	50 %	1,40 %
46.73.4	Großhandel mit Baustoffen und Bauelementen aus mineralischen Stoffen	30 %	0,93 %

* Das Kreditlimit beruht auf der Einschätzung von Creditreform und bezeichnet den von uns empfohlenen Vorschlagswert für die Einrichtung einer Kreditlinie zum angefragten Debitor.

42.99	Sonstiger Tiefbau a. n. g.	20 %	2,04 %

Die PD (Probability of Default / Ausfallwahrscheinlichkeit) von 1,40 % beschreibt ein geringes Ausfallrisiko von Firmen dieser Branche.
Bis 1,50 % bezeichnen wir das Risiko als gering, ab 3,00 % wird es als hoch bewertet.
Der Durchschnitt über alle Branchen in Deutschland liegt bei 1,41 %. (Stand: Dezember 2018)

Sofern Sie weitere Informationen zur Branche mit der höchsten Gewichtung des Unternehmens benötigen, stellen wir Ihnen diese gerne im Rahmen einer Branchenanalyse zur Verfügung.

Produkte

Muster-Produkt-Eins, Muster-Produkt-Zwei

Marken

Muster-Prima, Muster-Super, Muster-Marke

Vertriebswege

Freiberufliche Vertriebsmitarbeiter, Online-Versandhandel

Zertifizierungen

ISO 9001

Geschäftszahlen

Mitarbeiter und Umsatz

	Geschäftsjahr				
Mitarbeiter	**2018**	**2017**	**2016**	**2015**	**2014**
Gewerbliche Mitarbeiter	19	20	18	20	19
Angestellte	7	7	7	7	7
Auszubildende	2	1	2	1	2
Teilzeitkräfte	4	5	4	4	4
Gesamt	**32**	**33**	**31**	**32**	**32**

	Geschäftsjahr				
Umsatzart	**2018**	**2017**	**2016**	**2015**	**2014**
Umsatz	3.800.000 EUR (erwartet)	3.697.770 EUR	3.334.874 EUR	3.214.452 EUR	3.334.874 EUR

Mitarbeiter und Umsatz (Konzern: Musterkonzern Fantasien, 3452000487)

	Geschäftsjahr				
Mitarbeiter	**2017**	**2016**	**2015**	**2014**	**2013**
Gesamt	3.145	3.160	3.152	2.939	3.035

	Geschäftsjahr				
Umsatzart	**2017**	**2016**	**2015**	**2014**	**2013**
Umsatz	217.580.805 EUR	204.123.956 EUR	192.751.872 EUR	185.697.145 EUR	190.254.146 EUR

* Das Kreditlimit beruht auf der Einschätzung von Creditreform und bezeichnet den von uns empfohlenen Vorschlagswert für die Einrichtung einer Kreditlinie zum angefragten Debitor.

Max Mustermann GmbH | **Crefonummer** 3452000453

Import / Export

	Import	Export
Quote	30 %	5 %
Länder	Frankreich, Österreich	China, Indien

Immobilien

Immobilienart	Anschrift	Verkehrswert	Belastung
Betriebsanwesen			
	12345 Musterstadt, Musterstr. 123	180.000 EUR	
Unbebautes Grundstück			
	23456 Musterdorf, Musterweg 20	200.000 EUR	

Eine Überprüfung der Angaben zum Immobilieneigentum durch Grundbucheinsicht ist uns leider nicht möglich.

Unternehmensbilanz

Hinweis

Bitte beachten Sie, dass die dargestellte Bilanz von der veröffentlichten Bilanz abweicht, da diese zu Bewertungszwecken in eine Strukturbilanz (Analysebilanz) überführt wurde. Hintergrund dafür ist, dass die vom Gesetz eingeräumten Wahlrechte bzw. die vom Unternehmen genutzten, gesetzeskonformen, bilanzpolitischen Gestaltungsmaßnahmen aus analytischer Sicht nicht den tatsächlichen Erfolg der Periode im betriebswirtschaftlichen Sinne wiedergeben und somit nicht ausreichend genau das tatsächliche Bild der Vermögens-, Finanz- und Ertragslage des Unternehmens abbilden. Aus diesem Grund werden einzelne Bilanzpositionen aufgespaltet, umgegliedert oder umgruppiert.

Bilanz

Bilanzkategorie	**mittel**	**mittel**
Rechnungslegung	**HGB**	**HGB**
Berichtszeitraum	**01.01.2017 - 31.12.2017**	**01.01.2016 - 31.12.2016**
strukturierte Aktiva	**in EUR**	**in EUR**
bereinigte Bilanzsumme Aktiva	***12.727.978,16***	***12.657.634,86***
Summe Anlagevermögen	**12.293.889,76**	**11.617.592,18**
bereinigtes immaterielles Vermögen	*8.756,78*	*4.719,91*
Konzessionen, Schutzrechte, Lizenzen	8.756,78	4.719,91
Sachanlagevermögen	*12.285.132,98*	*11.612.872,27*
Grundstücke, Bauten	12.213.777,45	11.469.402,76
Betriebs- und Geschäftsausstattung, Anlagen	59.859,95	67.069,54
Anzahlungen und Anlagen im Bau	11.495,58	76.399,97
Summe Umlaufvermögen	**434.088,40**	**1.040.042,68**
monetäres (kurzfristiges) Umlaufvermögen	*419.786,48*	*1.019.624,78*
Forderungen aus Lieferungen und Leistungen RLZ bis 1 Jahr	17.317,90	11.847,09
flüssige Mittel	402.468,58	1.007.777,69
mittelfristiges Umlaufvermögen	*14.301,92*	*20.417,90*
sonstige Forderungen und Vermögensgegenstände RLZ über 1 Jahr	14.301,92	20.417,90
strukturierte Passiva	**in EUR**	**in EUR**
bereinigte Bilanzsumme Passiva	***12.727.978,16***	***12.657.634,86***

bereinigtes Eigenkapital	**4.715.420,95**	**4.072.111,02**
Nennkapital, Kapitalkonto I	*1.614.176,97*	*1.398.826,46*
+ Gewinnrücklagen / Rücklagen bei Personengesellschaften	*3.038.565,48*	*2.696.733,89*
+ Bilanzgewinn / Bilanzverlust	*62.678,50*	*-23.449,33*
Summe Fremdkapital	**8.012.557,21**	**8.585.523,84**
mittelfristiges Fremdkapital	*6.376.585,84*	*7.037.737,30*
Verbindlichkeiten gegenüber Kreditinstituten RLZ 1 bis 5 Jahre	6.376.585,84	7.037.737,30
kurzfristiges Fremdkapital	*1.635.971,37*	*1.547.786,54*
Steuerrückstellungen und sonstige Rückstellungen	19.090,00	18.600,00
erhaltene Anzahlungen RLZ bis 1 Jahr	162.184,24	110.746,62
Verbindlichkeiten aus Lieferungen und Leistungen RLZ bis 1 Jahr	125.392,57	291.629,12
sonstige Verbindlichkeiten inkl. Steuerverbindlichkeiten RLZ bis 1 Jahr	1.329.304,56	1.126.810,80
Bilanzgewinn-/Verlust aus Bilanz	***62.678,50***	***-23.449,33***

Gewinn- und Verlustrechnung

Berechnungsart: Gesamtkostenverfahren

Rechnungslegung	**HGB**	**HGB**
Berichtszeitraum	**01.01.2017 - 31.12.2017**	**01.01.2016 - 31.12.2016**
	in EUR	**in EUR**
Umsatzerlöse	**3.697.769,96**	**3.334.874,17**
Gesamtleistung	***3.697.769,96***	***3.334.874,17***
Aufwand für Roh-, Hilfs- und Betriebsstoffe	2.075.657,53	1.796.202,41
Rohertrag	***1.622.112,43***	***1.538.671,76***
sonstige betriebliche Erträge	93.462,19	55.698,75
Löhne und Gehälter	592.047,89	521.018,10
Abschreibungen inkl. Firmenabschreibung	550.800,65	630.043,87
sonstige betriebliche Aufwendungen	113.944,17	94.217,43
Betriebsergebnis	***458.781,91***	***349.091,11***
sonstige Zinsen und ähnliche Erträge	8.631,64	10.347,99
Zinsen und ähnliche Aufwendungen	***301.811,01***	***296.644,26***
Finanzergebnis	***-293.179,37***	***-286.296,27***
Ergebnis der gewöhnlichen Geschäftstätigkeit	165.602,54	62.794,84
Gesamtergebnis	***165.602,54***	***62.794,84***
sonstige Steuern	102.924,04	86.244,17
Jahresüberschuss / -fehlbetrag	***62.678,50***	***-23.449,33***
Jahresüberschuss / -fehlbetrag nach Gewinn- / Verlustabführung	***62.678,50***	***-23.449,33***

Jahresabschlusskennzahlen

Berichtszeitraum	**01.01.2017 - 31.12.2017**	**01.01.2016 - 31.12.2016**
Vermögensstruktur		
Anlagenintensität (%)	**96,58**	**91,78**

Kapitalumschlag	0,29	0,26
Quote der flüssigen Mittel (%)	3,16	7,96
Kapitalstruktur		
Eigenkapitalquote (%)	37,04	32,17
Verschuldungsgrad	1,69	2,10
Lieferantenziel (Tage)	22,05	59,26
Kurzfristige Kapitalbindung (%)	39,33	42,53
Rentabilität		
Gesamtkapitalrentabilität (%)	2,86	2,15
Umsatzrentabilität (%)	4,24	1,57
Erfolgsquote (%)	0,49	-0,18
Liquidität		
Liquidität I. Grades (%) erweitert	5,02	11,73

Konzernbilanz

Hinweis

Bitte beachten Sie, dass die dargestellte Bilanz von der veröffentlichten Bilanz abweicht, da diese zu Bewertungszwecken in eine Strukturbilanz (Analysebilanz) überführt wurde. Hintergrund dafür ist, dass die vom Gesetz eingeräumten Wahlrechte bzw. die vom Unternehmen genutzten, gesetzeskonformen, bilanzpolitischen Gestaltungsmaßnahmen aus analytischer Sicht nicht den tatsächlichen Erfolg der Periode im betriebswirtschaftlichen Sinne wiedergeben und somit nicht ausreichend genau das tatsächliche Bild der Vermögens-, Finanz- und Ertragslage des Unternehmens abbilden. Aus diesem Grund werden einzelne Bilanzpositionen aufgespaltet, umgegliedert oder umgruppiert.

Bilanz (Konzern: Musterkonzern Fantasien, 3452000487)

Bilanzkategorie	**groß**	**groß**
Rechnungslegung	**HGB**	**HGB**
Berichtszeitraum	**01.01.2017 - 31.12.2017**	**01.01.2016 - 31.12.2016**
strukturierte Aktiva	**in EUR**	**in EUR**
bereinigte Bilanzsumme Aktiva	***128.223.823,39***	***114.593.814,62***
Summe Anlagevermögen	**51.359.844,66**	**51.699.490,65**
bereinigtes immaterielles Vermögen	*7.422.251,71*	*9.741.001,40*
Konzessionen, Schutzrechte, Lizenzen	765.229,28	877.993,13
Anzahlungen auf immaterielles Vermögen	41.947,43	3.452.393,87
sonstige immaterielle Vermögensgegenstände	6.615.075,00	5.410.614,40
Sachanlagevermögen	*43.937.592,95*	*41.958.489,25*
Grundstücke, Bauten	30.154.458,86	27.542.745,40
Maschinen, technische Anlagen	7.445.789,31	6.878.709,60
Betriebs- und Geschäftsausstattung, Anlagen	5.799.681,94	5.776.745,89
Anzahlungen und Anlagen im Bau	537.662,84	1.760.288,36
Summe Umlaufvermögen	**76.863.978,73**	**62.894.323,97**
Vorräte	*50.249.587,28*	*42.839.542,07*
Roh-, Hilfs- und Betriebsstoffe	27.054.711,36	24.225.913,86
fertige und unfertige Erzeugnisse und Handelswaren	23.194.875,92	18.613.628,21
monetäres (kurzfristiges) Umlaufvermögen	*26.614.391,45*	*20.054.781,90*

Forderungen aus Lieferungen und Leistungen RLZ bis 1 Jahr	18.546.317,98	16.032.047,23
flüssige Mittel	6.409.520,16	2.970.694,23
aktive Rechnungsabgrenzung (ohne Disagio)	1.658.553,31	1.052.040,44
strukturierte Passiva	**in EUR**	**in EUR**
bereinigte Bilanzsumme Passiva	***128.223.823,39***	***114.593.814,62***
bereinigtes Eigenkapital	**53.748.388,32**	**45.081.116,62**
Nennkapital, Kapitalkonto I	*15.000.000,00*	*15.000.000,00*
+ Kapitalrücklage	*5.963.985,00*	*5.963.985,00*
+ Gewinnrücklagen / Rücklagen bei Personengesellschaften	*998.090,88*	*1.083.620,35*
- aktivierter Geschäfts- oder Firmenwert	*7.907.681,48*	*8.915.688,60*
+ 1/2 Sonderposten mit Rücklagenanteil	*772.894,09*	*864.717,50*
+ Gewinnvortrag / Verlustvortrag	*31.084.482,37*	*24.876.119,64*
+ Jahresüberschuss / Jahresfehlbetrag	*7.836.617,46*	*6.208.362,73*
Summe Fremdkapital	**74.475.435,07**	**69.512.698,00**
langfristiges Fremdkapital	*910.043,08*	*907.399,38*
Pensionsrückstellungen und ähnliche längerfristige Rückstellungen	910.043,08	907.399,38
mittelfristiges Fremdkapital	*772.894,09*	*864.717,50*
1/2 Sonderposten mit Rücklagenanteil	772.894,09	864.717,50
kurzfristiges Fremdkapital	*72.792.497,90*	*67.740.581,12*
Steuerrückstellungen und sonstige Rückstellungen	4.796.712,36	7.343.877,58
Verbindlichkeiten gegen Gesellschafter RLZ bis 1 Jahr	250.000,00	250.000,00
Verbindlichkeiten gegenüber Kreditinstituten RLZ bis 1 Jahr	40.857.194,43	33.381.303,36
Verbindlichkeiten aus Lieferungen und Leistungen RLZ bis 1 Jahr	14.402.469,00	16.158.569,80
sonstige Verbindlichkeiten inkl. Steuerverbindlichkeiten RLZ bis 1 Jahr	11.822.570,04	9.865.684,45
passive Rechnungsabgrenzung	663.552,07	741.145,93
Bilanzgewinn-/Verlust aus Bilanz	***38.921.099,83***	***31.084.482,37***

Zusatzinformationen

Banken

Bankname Ort	BLZ SWIFT
Deutsche Bank AG 42651 Solingen	34270094 DEUTDEDW342
Commerzbank AG 42651 Solingen	34240050 COBADEFFXXX

* Das Kreditlimit beruht auf der Einschätzung von Creditreform und bezeichnet den von uns empfohlenen Vorschlagswert für die Einrichtung einer Kreditlinie zum angefragten Debitor.

Max Mustermann GmbH | **Crefonummer** 3452000453

Zahlungsinformationen und Beurteilung der Geschäftsverbindungen

Zahlungsweise und Krediturteil

Zahlungsweise	Innerhalb vereinbarter Ziele, zuvor Skontoausnutzung.	(23)
Krediturteil	Kredite und Geschäftsverbindung sind zulässig.	(21)
Kreditlimit* in EUR	51.000,00	

Anfragezähler

Anzahl der Auskünfte in den letzten		
4 Wochen	13.03.2019 - 09.04.2019	4
8 Wochen	13.02.2019 - 09.04.2019	9
12 Monaten	10.04.2018 - 09.04.2019	24

Der Anfragezähler zählt sämtliche erteilten Auskünfte über das beauskunftete Unternehmen in den aufgezeigten Zeiträumen. Eine hohe Anzahl von Anfragen ist ein Indikator für eine hohe Geschäftsaktivität. Bei einem sprunghaften Anstieg der Anfragen innerhalb der letzten vier Wochen empfehlen wir eine zusätzliche Prüfung. Weitergehende Fragen beantworten wir Ihnen unter anfragezaehler@verband.creditreform.de

Wirtschaftliche Entwicklung

Unternehmensentwicklung	positive Geschäftsentwicklung
Auftragslage	zufriedenstellender Geschäftsgang

Negativmerkmale

Es liegen keine öffentlichen Negativmerkmale vor.

Zuordnung Creditreform-Bonitätsindex$^{2.0}$ in die Bewertungsklassen der Finanzdienstleister

	Risikoklasse PD-Bereich					
Unternehmen	**I** 0 % - 0,3 %	**II** 0,3 % - 0,7 %	**III** 0,7 % - 1,5 %	**IV** 1,5 % - 3,0 %	**V** 3,0 % - 8,0 %	**VI** 8,0 % - 100 %
Creditreform Bonitätsindex$^{2.0}$	100 - 218	219 - 251	252 - 283	284 - 302	303 - 356	357 - 600
Creditreform Rating AG	AAA - BBB	BBB - BB+	BB+ - BB	BB - B+	B+ - B-	>= B-
Commerzbank	1,0 - 2,4	2,4 - 3,0	3,0 - 3,4	3,4 - 4,0	4,0 - 4,8	>= 4,8
Deutsche Bank	iAAA - iBBB	iBBB - iBB+	iBB+ - iBB-	iBB- - iB+	iB+ - iB-	>= iB-
HypoVereinsbank - UniCredit	1+ - 2	2 - 3	3 - 4	4 - 5	5 - 6	>= 6-
KFW Bankengruppe	BK1 - BK2	BK2 - BK3	BK3 - BK4	BK4 - BK6	BK6 - BK7	BK7
CredaRate Solutions GmbH	1 - 5	5 - 7	7 - 9	9 - 11	11 - 13	13 - 15
Sparkassen Finanzgruppe	1 - 4	4 - 6	6 - 8	8 - 10	10 - 12	>= 12
Postbank	pAAA - pBBB+	pBBB+ - pBBB-	pBBB- - pBB	pBB - pB+	pB+ - pB	>= pB-
Volksbanken Raiffeisenbanken	0+ - 1d	1e - 2a	2b - 2c	2d - 2e	3a - 3b	>= 3c
Standard & Poor's	AAA - BBB	BBB - BB+	BB+ - BB	BB - B+	B+ - B-	>= B-
Verband deutscher Bürgschaftsbanken	1 - 2	3	4	5 - 6	7 - 8	9 - 10

* Das Kreditlimit beruht auf der Einschätzung von Creditreform und bezeichnet den von uns empfohlenen Vorschlagswert für die Einrichtung einer Kreditlinie zum angefragten Debitor.

Creditreform

WIRTSCHAFTSAUSKUNFT

Creditreform Weimar

Datum / Uhrzeit	09.04.2019 / 08:28
Mitgliedsnummer	403-005860-017
Nachträge bis	08.04.2020
Ihr Zeichen	
Auftragsnummer	40065901
Seite	10 von 10

Max Mustermann GmbH	Crefonummer	3452000453

Weitere Informationen zu den Risikoklassen finden Sie unter www.creditreform.de/ratingmap

Die PD (Probability of Default) gibt die Wahrscheinlichkeit an, dass ein Kreditnehmer innerhalb eines Jahres gemäß Basel II-Kriterien ausfällt. Übertragen auf Creditreform gelten der Bonitätsindex 500 und 600 als Ausfall. Angabe des PD-Bereichs von (inkl.) bis (exkl.)

Die Bewertung des angefragten Unternehmens liegt im blau unterlegten Bereich.

* Das Kreditlimit beruht auf der Einschätzung von Creditreform und bezeichnet den von uns empfohlenen Verschlagswert für die Einrichtung einer Kreditlinie zum angefragten Debitor.

Retrieved from:
https://www.creditreform.de/fileadmin/user_upload/central_files/docs/produkte/muster/Muster-Creditreform-Wirtschaftsauskunft.pdf

Database – Mannheim Enterprise Panel

The following description is based on information retrieved from the corporate website of ZEW-Leibniz Centre for European Economic research (ZEW), and from Bersch et al. (2014).

The Mannheim Enterprise Panel (MEP) is a proprietary panel dataset available at ZEW in Germany. The MEP is a joint project between ZEW and Creditreform, the largest Credit Rating Agency (CRA) operating in Germany. The database is a collection of all firm-level data collected by Creditreform. Every six months, ZEW receives an update of all the data collected by Creditreform. ZEW processes the data to structure it into a panel format.

The first wave of available data was received in 1992 and contains data about the entire population of Eastern Germany, as well as all start-ups in Western Germany. From 2000 onwards, ZEW received data that covers the full population of German companies. The MEP also contains data from firms operating in 26 other countries.

Creditreform registers new businesses in its database through three channels: (1) They make use of records from official registers such as the Handelsregister, (2) reports on firms in various media, and (3) research by the credit analysts of Creditreform in response to requests of clients. Through this procedure, the MEP covers all firms with a significant economic activity. Firms with minor economic activities – such as freelancers, unlimited-liability microenterprises, businesses in the agricultural sector – are underrepresented in the MEP. Comparison with aggregated statistics from the German Statistical Business Register of the Federal Statistical Office shows that the MEP contains data about 91% of all firms in 2012.

Comparison to Orbis Database

The MEP dataset is the most comprehensive dataset on the German economy that can be used for research. When we compare the Orbis, Amadeus and Dafne databases to the MEP, we observe that the products of Bureau van Dijk (BvD) only contain data for about 28% of German firms that are available in the MEP. It is important to note that the data available about German companies in the products of BvD originate from Creditreform. However, Creditreform only sells data to BvD which has been retrieved from publicly available data sources. Hence, the vast majority of data that is available in Orbis comes from sources such as the Bundesanzeiger website (the official publication platform in Germany). Firms that are not required to disclose such information on this platform are thus not observable in the datasets of BvD (e.g., unlimited liability firms).

Hence, the MEP contains the same data as is available in the products of BvD, but in addition it contains financial information for a large fraction of firms that voluntarily disclose financial statements to Creditreform. This information is not sold to BvD. For example, in the period 2002 to 2005, when firms were not yet enforced to disclose financial statement information to the public, we observe voluntarily disclosed financial information for approximately one million firms on a yearly basis in the MEP. In Orbis, we only observe data for approximately fifty thousand companies in that period.

The MEP does not have the typical biases that exist in Orbis and Amadeus. For example, ZEW does not remove any information about companies in their database. Unlike the Orbis and Amadeus databases, firms are thus not removed when they go bankrupt or stop disclosing information for 5 years in a row. For more information, see the webpage of ZEW about the Mannheim Enterprise Panel (2020), and the paper of Bersch et al (2014) for more technical details.

Credit Ratings and Private Information

In addition to accounting data, the MEP also includes data about firms' credit ratings, as well as all other underlying data that is used to construct these ratings (e.g., information on payment behavior received from suppliers).

Credit ratings are available for about half of all firm-year observations in the database. More specifically, we observe credit ratings in 74% of firm-year observations for limited-liability firms, and in 61% of observations for unlimited-liability firms with the legal form OHG and KG. For all other unlimited-liability firms that are not used in our study (e.g., one-man companies, BGB-Gesellschaft), we observe ratings in 42% of the cases.

We also explored whether there are potential changes in the availability of private information over time (i.e., data which is not available for many small private firms in their financial statements). In Online Appendix Table MEP.1, we show the percentage of non-missing observations for sales, employees, and payment behavior data. The descriptive statistics show that there is only a minor change in available private information for analysts for treated and control firms. Most noteworthy is a decrease in the availability of sales data for limited liability firms, however, this appears to decrease in a similar fashion for unlimited liability firms. Data on firm's payment behavior of debt, received from suppliers and banks, appear to increase. Employee data appears to remain relatively constant over time. Overall, these descriptive statistics suggest that there is some change in the availability of private information for some firms, however, for the vast majority of firms, the information is still available.

Online Appendix Table – MEP.1

DESCRIPTIVE STATISTICS – PRIVATE INFORMATION AVAILABILITY OVER TIME

Panel A: All firms (including firms with missing credit ratings)

Period	Limited Liability Firms (Legal Form: GmbH / GmbH Co. KG)				Unlimited Liability Firms (Legal Form: OHG /KG)			
Non-missing:	Credit Rating	Employees	Sales	Payment Behavior	Credit Rating	Employees	Sales	Payment Behavior
2002-2006	70.45%	58.38%	60.16%	78.29%	61.49%	50.83%	53.07%	68.54%
2008-2012	77.21%	58.36%	54.69%	87.19%	62.09%	49.75%	47.66%	68.52%

Panel B: Firms with credit ratings

Period	Limited Liability Firms (Legal Form: GmbH / GmbH Co. KG)			Unlimited Liability Firms (Legal Form: OHG /KG)		
Non-missing:	Employees	Sales	Payment Behavior	Employees	Sales	Payment Behavior
2002-2006	80.16%	76.45%	99.76%	79.44%	75.50%	99.82%
2008-2012	71.70%	64.25%	99.99%	77.25%	68.95%	99.90%

Notes: This Table presents descriptive statistics regarding availability of private information data collected by the CRA.

In our analyses, we keep only firm-year observations that have non-missing information on the variables used by the CRA to construct a rating. Hence, we keep only firms that disclose all the requested information to the CRA (either through private or public channels). This approach allows us to rule out that changes in credit ratings are driven by changes in information provision (see e.g. Breuer, Hombach, and Muller, 2022).

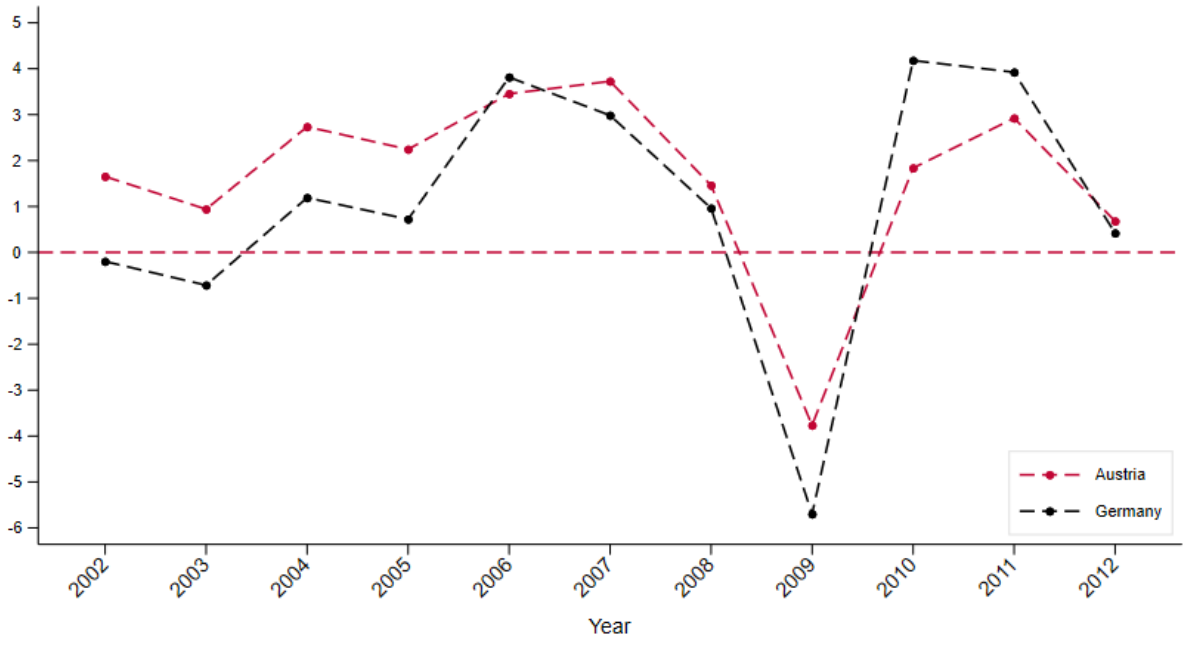
References:

ZEW. (2020) The Mannheim Enterprise Panel. ZEW Webpage (2020). Retrieved from: https://www.zew.de/PJ92-1

Bersch, J., Gottschalk, S., Müller, B., & Niefert, M. (2014). The Mannheim Enterprise Panel (MUP) and Firm Statistics for Germany. *ZEW-Centre for European Economic Research Discussion Paper*, (14-104).

Online Appendix Figures

Figure A1: GDP Growth over Time between Germany and Austria



This figure shows the GDP Growth rate (Annual %) of Austria and Germany. Data is retrieved from the World Bank.

FIGURES A2 – A7: DYNAMIC DIFFERENCE-IN-DIFFERENCE

Matched Sample of Treated and Unlimited (Germany)

Figure A.2: Average Difference in Credit Ratings between Treated and Control Group Over Time
Control Group: German Unlimited Liability Firms

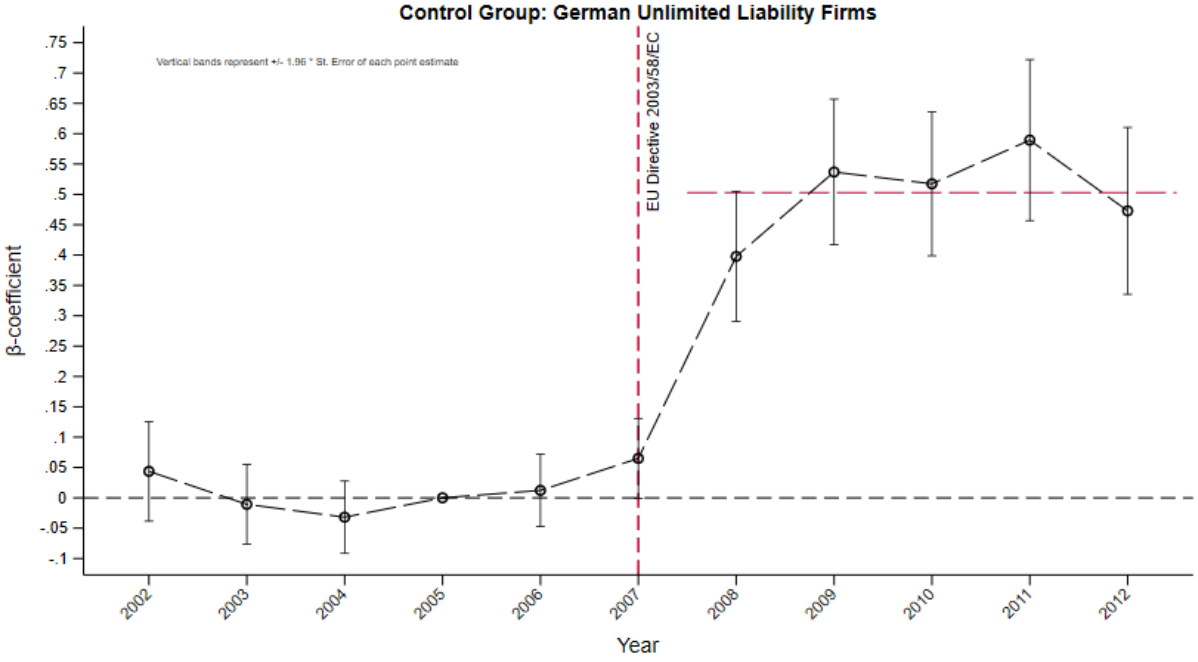


Figure A.3: Average Difference in Analyst Opinion between Treated and Control Group Over Time
Control Group: German Unlimited Liability Firms

Matched Sample of Treated and Limited (Austria)

Figure A.4: Average Difference in Credit Ratings between Treated and Control Group Over Time
Control Group: Austrian Limited Liability Firms

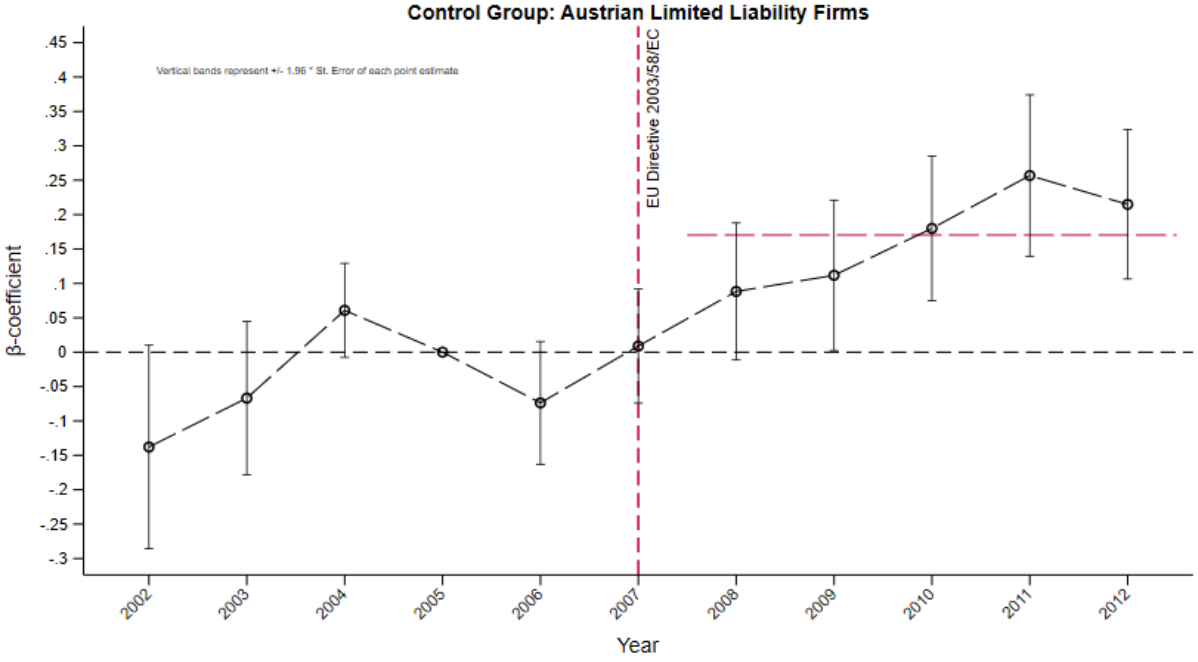


Figure A.5: Average Difference in Analyst Opinion between Treated and Control Group Over Time
Control Group: Austrian Limited Liability Firms

Matched Sample of Treated and Limited (German)

Figure A.6: Average Difference in Credit Ratings between Treated and Control Group Over Time
Control Group: German Voluntary Disclosing Limited Liability Firms

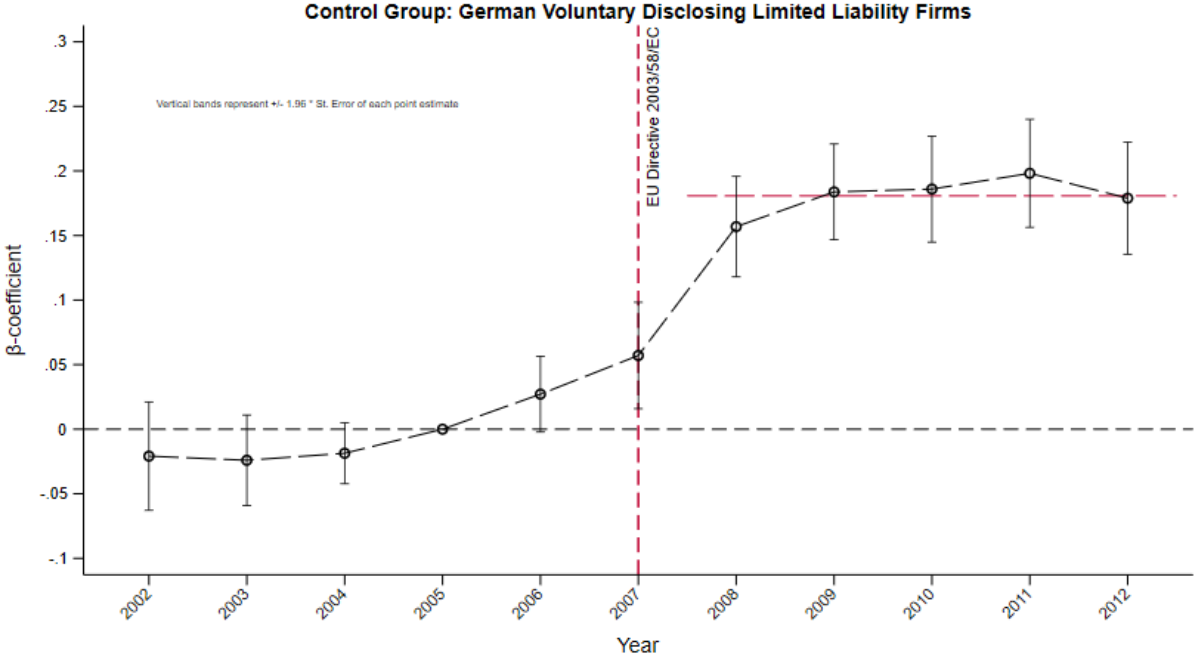


Figure A.7: Average Difference in Analyst Opinion between Treated and Control Group Over Time
Control Group: German Voluntary Disclosing Limited Liability Firms

Online Appendix Tables

Table A1

SAMPLE SELECTION				
	Treated Group	Control Groups		
Sample selection criteria:	Limited (Germany)	Unlimited (Germany)	Limited (Austria)	Limited (Germany) Voluntary Disclosure
Firm-year observations in MEP in period 2002-2012	8,597,690	398,557	1,150,308	676,136
Remove observations with missing credit ratings	-2,412,649	-160,498	-534,219	-82,949
Remove observations with missing information on credit information (e.g., payment behavior, employees, sales, etc.)	-2,270,884	-87,809	-330,962	-142,909
Remove observations with characteristics above the thresholds that require *unlimited* companies to disclose	-72,000	-3,021	-11,143	-30,251
Remove firms that we only observe before or after the mandate	-1,244,448	-52,110	-115,710	-80,608
Remove OHG/KG that voluntary disclosed before or after the mandate (according to Orbis Database)	0	-4,407	0	0
Remove limited-liability firms that did not disclose to the public after the mandate (according to Orbis Database)	-689,558	0	0	0
Remove Austrian GMBH that did not disclose in the pre and post period (according to Orbis Database)	0	0	-111,727	0
Remove firms where the CRA does not observe (voluntary disclosed) financial statements before and/or after the mandate.	-470,132	-60,263	0	0
Final Samples	1,438,019	30,449	46,547	339,419

Notes: We start with the full MEP database (wave 56), which contains 81 million firm-year observation across 23 European countries. We retain all limited-liability (GmbH and GmbH Co.KG) and unlimited-liability firms (OHG and KG) in the MEP database for Germany, and all limited-liability firms (GmbH and GmbH Co.KG) for Austria that do no switch legal forms over our sample period (36,236 firm year observations drop out due to removing switching firms, approximately 0.3% of the sample). From this sample we keep all firm-year observations where the CRA provides a credit rating. Next, we keep all observations where the CRA has all credit information available that is used in their credit rating model. The largest group that drops out is due to missing observations on either sales or employee data. Information is rarely missing on other variables such as payment behavior. Next, we remove firm-year observations in our sample that have more than €65 million in total assets, €130 million in sales or more than 5,000 employees. We remove these firms from our sample because unlimited-liability firms in Germany that score above these thresholds are required to disclose financial statement information to the public. Next, we remove firms that we do not observe before or after the law change to keep the sample balanced over the two periods. We thereby also remove firms that default in our sample period, because we need to observe firms in both periods. As a last step, we remove unlimited-liability firms that voluntarily disclosed before and/or after the mandate and limited-liability firms that did not disclose to the public when they are required to do so. To identify these firms, we make use of historical records of the Orbis database, which include only data of publicly available financial statements. By comparing if firms have financial statement data available in the Orbis database or not, we can verify if they disclose or not to the public. Finally, we also remove firms where the CRA did not receive a full set of financial statement information (through private channels) for our treated and control firms. This leaves us with a final sample of 1,854,434 firm-year observations across four distinct groups. Note that minor differences in the number of observations exist when one would compare these totals with the total number of observations in our main analyses. This is because we removed singletons due to the inclusion of year-industry, and year-region fixed effects. Specifically, 217 treated and 4 control firm-year observations drop out in the Limited-liability (Germany) vs Unlimited-liability (Germany) sample, 169 treated and 6 control firm-year observations drop out in the Limited-liability (Germany) vs Limited-liability (Austria) sample, and 54 treated and 24 control drop out in the limited-liability (Germany) vs Limited-liability (Germany) sample.

Table A2

SAMPLE BREAKDOWN BY YEAR				
	Treated Group	Control Groups		
Year	Limited (Germany)	Unlimited (Germany)	Limited (Austria)	Limited (Germany) Voluntary Disclosure
2002	117,360	2,508	3,839	30,064
2003	119,179	2,588	4,192	31,423
2004	131,644	2,734	4,380	33,071
2005	144,058	2,955	4,077	33,178
2006	149,189	3,045	5,027	32,641
2007	132,691	2,802	3,797	30,740
2008	133,349	2,944	4,585	30,678
2009	127,579	2,717	4,475	28,871
2010	127,710	2,772	4,414	29,355
2011	127,557	2,736	3,841	29,525
2012	127,703	2,648	3,920	29,873
Final Samples	1,438,019	30,449	46,547	339,419

Notes: This table presents the sample breakdown by year across treated and control groups. The final sample comprises 1,854,434 firm-year observations across four distinct groups. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have three control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; (2) limited liability firms operating in Austria that were required to disclose from 1996 onward; and (3) German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. Note that minor differences in the number of observations exist when one would compare the totals with the number of observations in our main analyses. Singletons were removed due to the inclusion of year-industry, and year-region fixed effects. Specifically, 217 treated and 4 control firm-year observations drop out in the Limited-liability (Germany) vs Unlimited-liability (Germany) comparison, 169 treated and 6 control firm-year observations drop out in the Limited-liability (Germany) vs Limited-liability (Austria) comparison, and 54 treated and 24 control drop out in the limited-liability (Germany) vs Limited-liability (Germany) comparison.

Table A3

REPORTING REGULATION AND SPECULATIVE GRADE						
Outcome	Speculative Grade					
Control Group	Unlimited (Germany)		Limited (Austria)		Limited (Germany)	
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	0.024**	0.041***	0.034***	0.033**	0.084***	0.034***
	(0.010)	(0.009)	(0.013)	(0.013)	(0.007)	(0.005)
Treated	0.194***		-0.091***		0.065***	
	(0.011)		(0.026)		(0.015)	
Post	0.026***		0.015*		-0.035***	
	(0.009)		(0.009)		(0.011)	
Firm FE	No	Yes	No	Yes	No	Yes
Year-Industry FE	No	Yes	No	Yes	No	Yes
Year-County FE	No	Yes	No	No	No	Yes
Observations	1,468,247	1,468,247	1,484,391	1,484,391	1,777,360	1,777,360
Clusters (County)	443	443	543	543	444	444
R-squared	0.006	0.616	0.003	0.585	0.009	0.609

Notes: This table presents OLS regressions on firms' credit ratings. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have three control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; (2) limited liability firms operating in Austria that were required to disclose from 1996 onward; and (3) German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. Speculative grade is equal to 1 for all firms with a non-investment grade (i.e., BB+ or worse). Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A4

REPORTING REGULATION AND CREDIT ANALYST OPINION
ALTERNATIVE CONTROL GROUPS

Panel A: Control Group: Limited (Austria)			
Outcome	Credit Analyst Opinion	Credit Rating Index	Credit Rating Index
Column	(1)	(2)	(3)
Treated x Post	0.079***	-0.148***	0.314***
	(0.015)	(0.027)	(0.051)
Log (Sales +1)			-0.432***
			(0.036)
Log (Age)			-0.487***
			(0.023)
Log (Equity +1)			-0.134***
			(0.008)
Log (Productivity +1)			0.467***
			(0.039)
Log(Employees +1)			0.347***
			(0.042)
Firm FE	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes
Year-County FE	No	No	No
Credit Analyst Opinion FE	No	Yes	No
Payment Behavior FE	No	No	Yes
Order Situation FE	No	No	Yes
Business Development FE	No	No	Yes
Additional Controls x Post	No	No	Yes
Observations	1,484,391	1,484,391	1,484,391
Clusters (County)	543	543	543
R-squared	0.590	0.905	0.826
Panel B: Control Group: Limited (Germany)			
Outcome	Credit Analyst Opinion	Credit Rating Index	Credit Rating Index
Column	(1)	(2)	(3)
Treated x Post	0.101***	0.025***	0.206***
	(0.006)	(0.009)	(0.014)
Log (Sales +1)			-0.320***
			(0.029)
Log (Age)			-0.546***
			(0.021)
Log (Equity +1)			-0.150***
			(0.007)
Log (Productivity +1)			0.352***
			(0.031)
Log(Employees +1)			0.214***
			(0.033)
Firm FE	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes
Credit Analyst Opinion FE	No	Yes	No
Payment Behavior FE	No	No	Yes
Order Situation FE	No	No	Yes
Business Development FE	No	No	Yes
Additional Controls x Post	No	No	Yes
Observations	1,777,360	1,777,360	1,777,360
Clusters (County)	444	444	444
R-squared	0.614	0.908	0.839

Notes: This table presents OLS regressions on credit analysts' opinions and firms' credit ratings. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. In Panel A, the control group consist out of limited liability firms operating in Austria that were required to disclose from 1996 onward. In Panel B, the control group consist out of German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit analyst opinions range from 1 (best possible opinion) to 5 (worst opinion). The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating/opinion gets worse (better). Results using the two alternative control groups are reported in Online Appendix Table A4. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A5

REPORTING REGULATION AND CREDIT RATINGS
(MATCHED SAMPLE)

Outcome	Credit Analyst Opinion			Credit Rating Index		
Control Group	Unlimited (Germany)	Limited (Austria)	Limited (Germany)	Unlimited (Germany)	Limited (Austria)	Limited (Germany)
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	0.121***	0.065***	0.056***	0.486***	0.201***	0.177***
	(0.016)	(0.016)	(0.005)	(0.048)	(0.042)	(0.015)
Log (Sales +1)	0.046	-0.083**	-0.008	-0.187	-0.208	-0.255***
	(0.034)	(0.039)	(0.012)	(0.117)	(0.134)	(0.040)
Log (Age)	-0.058***	0.001	-0.029***	-0.646***	-0.282***	-0.613***
	(0.014)	(0.012)	(0.009)	(0.040)	(0.042)	(0.025)
Log (Equity +1)	-0.000	0.010	0.009***	-0.112***	-0.125***	-0.189***
	(0.007)	(0.007)	(0.003)	(0.024)	(0.024)	(0.009)
Log (Productivity +1)	-0.042	0.078*	0.005	0.235*	0.249*	0.262***
	(0.036)	(0.040)	(0.013)	(0.124)	(0.134)	(0.042)
Log(Employees +1)	-0.080*	0.064	-0.021	0.085	0.065	0.123***
	(0.043)	(0.047)	(0.014)	(0.146)	(0.158)	(0.047)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	No	Yes	Yes	No	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls x Post	Yes	Yes	Yes	Yes	Yes	Yes
Observations	58,727	94,672	668,106	58,727	94,672	668,106
Clusters (County)	427	539	443	427	539	443
R-squared	0.762	0.711	0.649	0.890	0.871	0.842

Notes: This table presents OLS regressions on firms' credit ratings and credit analysts' opinions. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have three control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; (2) limited liability firms operating in Austria that were required to disclose from 1996 onward; and (3) German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. We employ a Mahalanobis nearest-neighbor matching, where we only consider treated firms that are most comparable to a given control group firm. Specifically, for each untreated firm, we keep only the closest treated firm in terms of sales, employees, age, equity and productivity, payment behavior, order situation and business development; all these factors are measured before the legal change took place. The credit analyst opinions range from 1 (best possible opinion) to 5 (worst opinion). The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating/opinion gets worse (better). Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Alternative quasi-natural experiment: MicroBilg

To address remaining concerns with respect to the specific timing of the EU disclosure directive, we re-run our main analysis using an alternative quasi-natural experiment: The MicroBilg. In 2012, Germany changed its disclosure regulation again for a large share of firms. From that point onwards, approximately half of all limited-liability firms were allowed to disclose less information to the public (e.g., fewer notes and less detailed balance sheet information). In addition, firms were allowed to restrict the access of their financial statements to the public (see Gassen and Muhn, 2018). Firms have to meet two out of the following three criteria to be eligible: total assets less than or equal to €350,000, total revenues less than or equal to €700,000, and an average number of up to 10 employees. This change had a significant impact on the number of available financial statements. According to Gassen and Muhn (2023), approximately 70% of eligible firms have restricted public access to their financial statements by 2018. We use this law change to reexamine our main analysis. If the reputational concerns hypothesis holds, we would expect to find that credit ratings and the discretionary opinion of analysts improve in response to the new disclosure regulation.

Table A6

REPORTING REGULATION AND CREDIT RATINGS
(ALTERNATIVE SETTING: MICRO FIRMS DEREGULATION)

Setting:	Micro vs Small Firms -Period (2009 – 2015)				
Outcome	Analyst Opinion	Speculative Grade		Credit Rating Index	
Column	(1)	(2)	(3)	(4)	(5)
Treated x Post	-0.015***	-0.042***	-0.022***	-0.173***	-0.125***
	(0.004)	(0.003)	(0.002)	(0.013)	(0.007)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes	Yes
Credit Analyst Opinion FE	No	No	Yes	No	Yes
Observations	836,511	836,511	836,511	836,511	836,511
Clusters (County)	442	442	442	442	442
R-squared	0.722	0.702	0.893	0.772	0.939

Notes: This table presents OLS regressions on credit analyst opinions and Credit Ratings. Treated firms are limited-liability micro firms operating in Germany that were eligible to reduce their disclosure from 2013 onwards. We define eligible firms as firms that meet at least two of the following three thresholds in 2010: total assets less than or equal to €350,000, total revenues less than or equal to €700,000, and an average number of up to 10 employees. Control firms are those that exceed these threshold in 2010, and do not surpass the thresholds to be categorized as a medium-sized firm. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit analyst opinions range from 1 (best possible opinion) to 5 (worst opinion). The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating/opinion gets worse (better). Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Resembling the previously used DiD design in equation 2 and 3, we compare firms that were eligible to reduce their disclosures from 2013 onwards with firms that were obliged to disclose financial statements over the entire sampling period. Since firms can switch from eligible to non-eligible over time, we define our eligible firms as firms that meet the standards in 2010. Non-eligible firms are those that barely surpass the thresholds. Specifically, we compare eligible firms to firms that are above the micro thresholds, but below the thresholds that define medium-sized companies (total assets < 4,480,000; turnover < 9,680,000; employees < 50). We thus compare micro firms with small firms, as defined in 2010. Using this setup, we investigate how disclosure deregulation impacts credit ratings, the credit expert opinions, and the likelihood to receive a speculative grade over time.

Firms that were eligible to reduce the amount of publicly disclosed financial information are less likely to receive a speculative grade, receive on average a less conservative credit rating, and the credit analyst provide a less conservative opinion. Moreover, once we control for the credit expert opinion, we again see that the relationship between disclosure and credit ratings becomes less pronounced, indicating that the change in ratings is driven by the analyst's opinion, instead of changes in fundamentals. In this setting, however, the effect on credit ratings is not completely mitigated by controlling for the credit expert opinion. This is potentially driven by the limited capital market benefits that these small private firms have from disclosing financial statement information.

Overall, the results are consistent with our main analyses, and support the notion that disclosure regulation leads analysts to provide more conservative credit ratings.

Table A7

REPORTING REGULATION AND CREDIT RATING ACCURACY
ALTERNATIVE CONTROL GROUPS AND OUTCOME VARIABLES

Panel A: Control Group: Unlimited (Germany)

Outcome	Default		Payment Behavior		Order Situation		Type-Two Error		
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated x Post	-0.026***	-0.007**	-0.004	-0.015*	-0.049***	-0.064***	0.0427***	0.0496***	-0.0107**
	(0.003)	(0.003)	(0.007)	(0.008)	(0.016)	(0.015)	(0.008)	(0.011)	(0.005)
Log (Sales +1)		0.008*		-0.030***		0.184***		-0.0394***	-0.0234**
		(0.004)		(0.009)		(0.030)		(0.012)	(0.009)
Log (Age)		0.158***		-0.040***		0.073***		-0.3010***	-0.2785***
		(0.004)		(0.005)		(0.017)		(0.006)	(0.006)
Log (Equity +1)		0.001		0.003		0.003		-0.0136***	-0.0227***
		(0.001)		(0.002)		(0.003)		(0.002)	(0.001)
Log (Productivity +1)		-0.011**		0.028***		-0.195***		0.0509***	0.0340***
		(0.004)		(0.009)		(0.029)		(0.012)	(0.010)
Log (Employees +1)		-0.019***		0.006		-0.190***		0.0327**	0.0308***
		(0.005)		(0.010)		(0.029)		(0.014)	(0.011)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Analyst Opinion FE	No	No	No	No	No	No	No	No	Yes
Payment Behavior FE	No	Yes	No	No	No	Yes	No	Yes	Yes
Order Situation FE	No	Yes	No	Yes	No	No	No	Yes	Yes
Business Development FE	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Additional Controls x Post	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Observations	1,767,631	1,767,631	1,767,631	1,767,631	1,468,247	1,468,247	1,767,631	1,767,631	1,767,631
Clusters (County)	444	444	0.589	0.598	0.723	0.819	444	444	444
R-squared	0.342	0.376	443	443	443	443	0.575	0.633	0.692

Panel B: Control Group: Limited (Austria)

Outcome	Default		Payment Behavior		Order Situation		Type-Two Error		
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated x Post	-0.037***	-0.025***	-0.025**	-0.027*	-0.278**	-0.105	0.0680***	0.0597***	-0.0079
	(0.002)	(0.003)	(0.012)	(0.014)	(0.121)	(0.065)	(0.013)	(0.009)	(0.006)
Log (Sales +1)		0.008*		-0.031***		0.180***		-0.0499***	-0.0234**
		(0.004)		(0.010)		(0.034)		(0.012)	(0.009)
Log (Age)		0.160***		-0.040***		0.064***		-0.2923***	-0.2764***
		(0.004)		(0.005)		(0.017)		(0.005)	(0.006)
Log (Equity +1)		0.002**		0.004*		-0.001		-0.0124***	-0.0241***
		(0.001)		(0.002)		(0.004)		(0.002)	(0.001)
Log (Productivity +1)		-0.010**		0.029***		-0.191***		0.0590***	0.0341***
		(0.005)		(0.010)		(0.033)		(0.013)	(0.010)
Log (Employees +1)		-0.018***		0.008		-0.192***		0.0439***	0.0314***
		(0.005)		(0.011)		(0.034)		(0.015)	(0.011)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	No	No	No	No	No	No	No	No	No
Credit Analyst Opinion FE	No	No	No	No	No	No	No	No	Yes
Payment Behavior FE	No	Yes	No	No	No	Yes	No	Yes	Yes
Order Situation FE	No	Yes	No	Yes	No	No	No	Yes	Yes
Business Development FE	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Additional Controls x Post	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Observations	1,786,837	1,786,837	1,484,391	1,484,391	1,484,391	1,484,391	1,786,837	1,786,837	1,786,837
Clusters (County)	546	546	543	543	543	543	546	546	546
R-squared	0.339	0.374	0.576	0.585	0.688	0.805	0.546	0.609	0.693

Panel C: Control Group: Limited (Germany)

Outcome	Default		Payment Behavior		Order Situation		Type-Two Error		
Column	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated x Post	0.026***	0.009***	0.032***	0.045***	-0.005	-0.018**	0.0149***	0.0245***	-0.0079***
	(0.001)	(0.001)	(0.004)	(0.004)	(0.011)	(0.007)	(0.005)	(0.004)	(0.002)
Log (Sales +1)		0.010**		-0.028***		0.184***		-0.0364***	-0.0248***
		(0.004)		(0.008)		(0.027)		(0.010)	(0.009)
Log (Age)		0.144***		-0.041***		0.072***		-0.2879***	-0.2659***
		(0.004)		(0.005)		(0.016)		(0.006)	(0.006)
Log (Equity +1)		0.001*		0.003*		0.000		-0.0136***	-0.0242***
		(0.001)		(0.002)		(0.003)		(0.002)	(0.001)
Log (Productivity +1)		-0.013***		0.024***		-0.195***		0.0469***	0.0350***
		(0.004)		(0.008)		(0.026)		(0.011)	(0.009)
Log (Employees +1)		-0.021***		0.002		-0.191***		0.0279**	0.0316***
		(0.004)		(0.009)		(0.026)		(0.012)	(0.010)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Credit Analyst Opinion FE	No	No	No	No	No	No	No	No	Yes
Payment Behavior FE	No	Yes	No	No	No	Yes	No	Yes	Yes
Order Situation FE	No	Yes	No	Yes	No	No	No	Yes	Yes
Business Development FE	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Additional Controls x Post	No	Yes	No	Yes	No	Yes	No	Yes	Yes
Observations	2,093,841	2,093,841	1,777,360	1,777,360	1,777,360	1,777,360	2,093,841	2,093,841	2,093,841
Clusters (County)	444	444	444	444	444	444	444	444	444
R-squared	0.336	0.368	0.592	0.600	0.707	0.807	0.343	0.633	0.694

Panel D: Type-Two Error defined as firms that do not default with a rating of B+ or worse						
Outcome	Type-Two Error					
Control Group	Unlimited (Germany)		Limited (Austria)		Limited (Germany)	
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	0.0261***	-0.0070**	0.0540***	0.0334***	0.0201***	0.0057***
	(0.004)	(0.003)	(0.007)	(0.003)	(0.002)	(0.001)
Log (Sales +1)	-0.0117***	0.0085**	-0.0137***	0.0084**	-0.0083**	0.0073**
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.003)
Log (Age)	-0.0833***	-0.0800***	-0.0845***	-0.0844***	-0.0769***	-0.0740***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Log (Equity +1)	-0.0101***	-0.0107***	-0.0109***	-0.0125***	-0.0105***	-0.0113***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Log (Productivity +1)	0.0173***	-0.0037	0.0189***	-0.0033	0.0132***	-0.0029
	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Log(Employees +1)	0.0183***	-0.0007	0.0200***	-0.0006	0.0130***	-0.0002
	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Credit Analyst Opinion FE	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	No	Yes	Yes
Year-County FE	Yes	Yes	No	No	Yes	Yes
Payment Behavior FE	Yes	Yes	Yes	No	Yes	No
Order Situation FE	Yes	Yes	Yes	No	Yes	No
Business Development FE	Yes	Yes	Yes	No	Yes	No
Controls x Post	Yes	Yes	Yes	No	Yes	No
Observations	1,767,631	1,767,631	1,786,837	1,786,837	2,093,841	2,093,841
Clusters (County)	444	444	546	546	444	444
R-squared	0.598	0.692	0.599	0.693	0.595	0.694

Panel E: Type-One Errors defined as firms that default with a rating of A- or better						
Outcome	Type-One Error					
Control Group	Unlimited (Germany)		Limited (Austria)		Limited (Germany)	
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	-0.0038***	-0.0036***	0.0005***	0.0005***	0.0005***	0.0006***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Log (Sales +1)	0.0004	0.0003	0.0003	0.0002	0.0005	0.0004
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log (Age)	-0.0005***	-0.0005***	-0.0004***	-0.0004***	-0.0005***	-0.0005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log (Equity +1)	0.0004***	0.0004***	0.0001	0.0001	0.0001	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log (Productivity +1)	-0.0006	-0.0005	-0.0004	-0.0003	-0.0006	-0.0005
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Employees +1)	-0.0010*	-0.0009	-0.0007	-0.0006	-0.0010**	-0.0009*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Credit Analyst Opinion FE	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	No	No	Yes	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls x Post	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,767,631	1,767,631	1,786,837	1,786,837	2,093,841	2,093,841
Clusters (County)	444	444	546	546	444	444
R-squared	0.312	0.312	0.310	0.311	0.298	0.299

Panel F: Type-One Errors defined as firms that default with a rating of BBB- or better

Outcome	Type-One Error					
Control Group	Unlimited (Germany)		Limited (Austria)		Limited (Germany)	
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	-0.0211***	-0.0188***	-0.0038***	-0.0031***	0.0030***	0.0039***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)
Log (Sales +1)	0.0000	0.0001	-0.0004	-0.0002	0.0001	0.0002
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Log (Age)	0.0093***	0.0093***	0.0091***	0.0091***	0.0083***	0.0084***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log (Equity +1)	0.0012***	0.0015***	0.0008	0.0011**	0.0005	0.0008*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log (Productivity +1)	-0.0016	-0.0015	-0.0011	-0.0011	-0.0014	-0.0015
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Log(Employees +1)	-0.0028	-0.0029	-0.0019	-0.0021	-0.0026	-0.0029*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Credit Analyst Opinion FE	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	No	No	Yes	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls x Post	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,767,631	1,767,631	1,786,837	1,786,837	2,093,841	2,093,841
Clusters (County)	444	444	546	546	444	444
R-squared	0.334	0.336	0.330	0.333	0.325	0.327

Notes: This table presents OLS regressions on default, payment behavior, order outlook, type-two and type-one errors. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have three control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; (2) limited liability firms operating in Austria that were required to disclose from 1996 onward; and (3) German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating gets worse (better). Default is equal to 1 if the firm defaults in the next year and 0 otherwise. Payment behavior ranges from 1 (lowest credit risk) to 6 (highest credit risk). In Panel A to C, type II Error equals 1 when an analyst provides a speculative rating (i.e., credit rating of BB+ or worse) but the firm does not default in the next year; it equals 0 otherwise. In Panel D, type II Error equals 1 when an analyst provides a highly speculative rating (i.e., credit rating of B+ or worse) but the firm does not default in the next year; it equals 0 otherwise. In Panel E, type I error equals 1 when an analyst provides an upper middle investment grade (i.e., credit rating of A+ or better) and the firm does default in the next year. In Panel F, type I error equals when an analyst provides an investment grade (i.e., credit rating of BBB- or better) and the firm does default in the next year. Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A8

THE USE OF POSITIVE PRIVATE INFORMATION AND NEGATIVE PUBLIC INFORMATION BY CREDIT ANALYSTS
ALTERNATIVE CONTROL GROUPS AND OUTCOME VARIABLES

Panel A: Alternative Control Groups

Outcome	Positive Credit Opinion when Positive Private Information is Received			Negative Credit Opinion when Negative Public Information is Received		
Control Group	Unlimited (Germany)	Limited (Austria)	Limited (Germany)	Unlimited (Germany)	Limited (Austria)	Limited (Germany)
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	-0.082***	-0.108***	-0.044***	0.070***	0.018**	0.029***
	(0.014)	(0.017)	(0.005)	(0.008)	(0.009)	(0.003)
Log (Sales +1)	0.037***	0.054***	0.028***	-0.069***	-0.081***	-0.060***
	(0.009)	(0.011)	(0.008)	(0.014)	(0.013)	(0.012)
Log (Age)	0.040***	0.024***	0.038***	0.146***	0.153***	0.140***
	(0.007)	(0.007)	(0.007)	(0.009)	(0.008)	(0.008)
Log (Equity +1)	-0.012***	-0.016***	-0.014***	0.008***	0.010***	0.009***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Log (Productivity +1)	-0.038***	-0.051***	-0.028***	0.011	0.022	0.001
	(0.010)	(0.012)	(0.009)	(0.014)	(0.014)	(0.013)
Log(Employees +1)	-0.016	-0.033***	-0.006	0.003	0.017	-0.005
	(0.011)	(0.013)	(0.010)	(0.016)	(0.015)	(0.014)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	No	Yes	Yes	No	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls x Post	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,468,247	1,484,391	1,777,360	1,468,247	1,484,391	1,777,360
Clusters (County)	443	543	444	443	543	444
R-squared	0.654	0.612	0.642	0.470	0.441	0.458

Panel B: Alternative Outcomes

Outcome	Negative Credit Opinion when Negative Public Information is Received (Number of Employees)			Negative Credit Opinion when Negative Public Information is Received (Productivity)		
Control Group	Unlimited (Germany)	Limited (Austria)	Limited (Germany)	Unlimited (Germany)	Limited (Austria)	Limited (Germany)
Column	(1)	(2)	(3)	(4)	(5)	(6)
Treated x Post	0.084***	0.049***	0.043***	0.068***	0.029***	0.032***
	(0.011)	(0.009)	(0.004)	(0.009)	(0.008)	(0.003)
Log (Sales +1)	-0.129***	-0.139***	-0.110***	0.056***	0.041***	0.057***
	(0.014)	(0.013)	(0.013)	(0.014)	(0.013)	(0.012)
Log (Age)	0.193***	0.201***	0.188***	0.127***	0.134***	0.120***
	(0.011)	(0.010)	(0.010)	(0.009)	(0.008)	(0.008)
Log (Equity +1)	0.012***	0.016***	0.015***	0.003**	0.005***	0.004***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Log (Productivity +1)	0.135***	0.143***	0.116***	-0.115***	-0.101***	-0.117***
	(0.014)	(0.014)	(0.013)	(0.015)	(0.015)	(0.013)
Log(Employees +1)	0.033**	0.043***	0.015	-0.058***	-0.041***	-0.059***
	(0.014)	(0.014)	(0.014)	(0.015)	(0.015)	(0.013)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-County FE	Yes	No	Yes	Yes	No	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls x Post	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,468,247	1,484,391	1,777,360	1,468,247	1,484,391	1,777,360
Clusters (County)	443	543	444	443	543	444
R-squared	0.533	0.495	0.522	0.460	0.430	0.446

Notes: This table presents OLS regressions on the use of information by credit analysts. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have three control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; (2) limited liability firms operating in Austria that were required to disclose from 1996 onward; and (3) German limited liability firms that voluntarily disclosed before 2007. Post is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. "Good Credit Opinion when Positive Private Information is Received" is a dummy variable equal to 1 when analysts provide a positive opinion upon receiving a positive private signal; it equals 0 otherwise. "Negative Credit Opinion when Negative Public Information is Received" is a dummy variable equal to 1 when an analyst provides a negative opinion upon receiving a negative public signal; it equals 0 otherwise. In panel A, a negative public signal is defined as a decrease in revenues. In panel B, a negative public signal is either defined as a decrease in number of employees, or a decrease in productivity. Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A9

QUANTILE REGRESSIONS
ALTERNATIVE CONTROL GROUPS

Panel A: Control Group: Limited (Austria)

Outcome	Credit Rating Index				
Quantile	Quantile 20	Quantile 40	Quantile 50	Quantile 60	Quantile 80
Column	(1)	(2)	(3)	(4)	(5)
Treated x Post	0.064**	0.091**	0.222***	0.282***	0.090
	(0.027)	(0.045)	(0.069)	(0.109)	(0.066)
Treated	-0.054	-0.172**	-0.332**	-0.412**	-0.351***
	(0.042)	(0.076)	(0.138)	(0.180)	(0.117)
Log (Sales +1)	-1.282***	-1.281***	-1.528***	-1.439***	-1.168***
	(0.038)	(0.074)	(0.110)	(0.161)	(0.126)
Log (Age)	-0.280***	-0.355***	-0.395***	-0.434***	-0.391***
	(0.008)	(0.012)	(0.018)	(0.017)	(0.012)
Log (Equity +1)	-0.271***	-0.226***	-0.223***	-0.228***	-0.246***
	(0.004)	(0.005)	(0.005)	(0.006)	(0.006)
Log (Productivity +1)	1.245***	1.219***	1.404***	1.293***	1.103***
	(0.037)	(0.073)	(0.104)	(0.156)	(0.113)
Log(Employees +1)	1.194***	1.120***	1.310***	1.156***	0.919***
	(0.046)	(0.080)	(0.109)	(0.189)	(0.138)
Constant	8.004***	8.348***	8.936***	9.540***	9.372***
	(0.078)	(0.147)	(0.269)	(0.157)	(0.152)
Year FE	Yes	Yes	Yes	Yes	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes
Observations	1,484,391	1,484,391	1,484,391	1,484,391	1,484,391
Clusters (County)	543	543	543	543	543
R-squared	0.556	0.564	0.562	0.560	0.566

Panel B: Control Group: Limited (Germany)					
Outcome	Credit Rating Index				
Quantile	Quantile 20	Quantile 40	Quantile 50	Quantile 60	Quantile 80
Column	(1)	(2)	(3)	(4)	(5)
Treated x Post	0.156***	0.250***	0.531***	0.592***	0.332***
	(0.024)	(0.034)	(0.050)	(0.064)	(0.042)
Treated	0.108***	0.106***	0.085*	0.074	0.050
	(0.018)	(0.029)	(0.049)	(0.079)	(0.053)
Log (Sales +1)	-1.211***	-1.351***	-1.558***	-1.431***	-1.213***
	(0.032)	(0.067)	(0.117)	(0.143)	(0.119)
Log (Age)	-0.279***	-0.342***	-0.378***	-0.422***	-0.391***
	(0.007)	(0.011)	(0.017)	(0.017)	(0.011)
Log (Equity +1)	-0.272***	-0.233***	-0.225***	-0.232***	-0.253***
	(0.003)	(0.004)	(0.005)	(0.005)	(0.005)
Log (Productivity +1)	1.154***	1.285***	1.433***	1.271***	1.130***
	(0.033)	(0.066)	(0.108)	(0.145)	(0.105)
Log(Employees +1)	1.106***	1.201***	1.346***	1.142***	0.966***
	(0.034)	(0.074)	(0.111)	(0.170)	(0.130)
Constant	7.965***	8.143***	8.506***	9.162***	9.113***
	(0.071)	(0.134)	(0.275)	(0.213)	(0.123)
Year FE	Yes	Yes	Yes	Yes	Yes
Payment Behavior FE	Yes	Yes	Yes	Yes	Yes
Order Situation FE	Yes	Yes	Yes	Yes	Yes
Business Development FE	Yes	Yes	Yes	Yes	Yes
Observations	1,777,360	1,777,360	1,777,360	1,777,360	1,777,360
Clusters (County)	444	444	444	444	444
R-squared	0.567	0.573	0.572	0.569	0.575

Notes: This Table presents Quantile regressions of the Credit Rating. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. In Panel A, the control group consist out of limited liability firms operating in Austria that were required to disclose from 1996 onward. In Panel B, the control group consist out of German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., the period when financial statements of treated firms became publicly available. The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating gets worse (better). Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A10

REPORTING REGULATION AND CAREER CONCERNS
ALTERNATIVE CONTROL GROUPS

Panel A: Impact on Credit Expert Opinion

Outcome	Credit Expert Opinion			
Control Group	Limited (Austria)		Limited (Germany)	
Column	(1)	(2)	(3)	(4)
Treated x Post x Past Errors	2.373**	2.001**	0.735**	0.660**
	(0.988)	(0.934)	(0.350)	(0.317)
Treated x Post	0.067***	0.115***	0.098***	0.067***
	(0.015)	(0.020)	(0.006)	(0.005)
Post x Past Errors	1.122	1.195	-0.069	-0.064
	(0.896)	(0.850)	(0.326)	(0.297)
Log (Sales +1)		-0.069***		-0.036***
		(0.012)		(0.009)
Log (Age)		-0.019***		-0.033***
		(0.007)		(0.007)
Log (Equity +1)		0.017***		0.015***
		(0.003)		(0.003)
Log (Productivity +1)		0.067***		0.038***
		(0.012)		(0.010)
Log(Employees +1)		0.049***		0.013
		(0.014)		(0.011)
Firm FE	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes
Payment Behavior FE	No	Yes	No	Yes
Order Situation FE	No	Yes	No	Yes
Business Development FE	No	Yes	No	Yes
Controls x Post	No	Yes	No	Yes
Observations	1,484,391	1,484,391	1,777,360	1,777,360
Clusters (County)	543	543	444	444
R-squared	0.591	0.641	0.614	0.662

Panel B: Impact on Credit Rating Index

Outcome	Credit Rating Index			
Control Group	Limited (Austria)		Limited (Germany)	
Column	(1)	(2)	(3)	(4)
Treated x Post x Past Errors	6.291**	3.863*	1.907	1.768**
	(2.886)	(2.306)	(1.306)	(0.844)
Treated x Post	0.067	0.291***	0.319***	0.199***
	(0.059)	(0.051)	(0.019)	(0.014)
Post x Past Errors	4.509*	4.470**	-0.123	-0.475
	(2.602)	(2.041)	(1.199)	(0.794)
Log (Sales +1)		-0.432***		-0.320***
		(0.036)		(0.029)
Log (Age)		-0.488***		-0.546***
		(0.023)		(0.021)
Log (Equity +1)		-0.134***		-0.150***
		(0.008)		(0.007)
Log (Productivity +1)		0.467***		0.352***
		(0.039)		(0.031)
Log(Employees +1)		0.348***		0.214***
		(0.042)		(0.033)
Firm FE	Yes	Yes	Yes	Yes
Year-Industry FE	Yes	Yes	Yes	Yes
Year-County FE	Yes	Yes	Yes	Yes
Payment Behavior FE	No	Yes	No	Yes
Order Situation FE	No	Yes	No	Yes
Business Development FE	No	Yes	No	Yes
Controls x Post	No	Yes	No	Yes
Observations	1,484,391	1,484,391	1,777,360	1,777,360
Clusters (County)	543	543	444	444
R-squared	0.677	0.826	0.694	0.839

Notes: This table presents OLS regressions on credit analysts' opinions. Treated firms are limited firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have two control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; and (2) German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit analyst opinions range from 1 (best possible opinion) to 5 (worst opinion). The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating/opinion gets worse (better). Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A11

CHANGE IN SENSITIVITY OF DEBT PROVISION TO CREDIT RATINGS
TRADE CREDIT VS. BANK DEBT

Panel A: Control Group: Unlimited (Germany)

Outcome	Log(Trade Credit)	Log(Bank Debt)	Log(Trade Credit)	Log(Bank Debt)
Column	(1)	(2)	(3)	(4)
Treated x Post x Log(Credit Rating Index)	0.371	1.050***	0.278***	0.467***
	(0.241)	(0.266)	(0.101)	(0.132)
Log(Credit Rating Index)	-1.578***	-1.818***	-0.316***	-0.524***
	(0.189)	(0.241)	(0.080)	(0.108)
Treated x Log(Credit Rating Index)	-0.531***	-0.660***	-0.033	0.033
	(0.191)	(0.245)	(0.071)	(0.100)
Post x Log(Credit Rating Index)	-0.252	-0.323	-0.135	-0.115
	(0.223)	(0.249)	(0.097)	(0.120)
Treated x Post	0.522***	0.676***	0.130***	0.156***
	(0.053)	(0.066)	(0.028)	(0.032)
Treated	0.423***	0.382***		
	(0.049)	(0.065)		
Post	0.067	-0.027		
	(0.050)	(0.062)		
Log (Sales +1)			-0.199***	-0.259***
			(0.053)	(0.057)
Log (Age)			0.208***	0.190***
			(0.018)	(0.020)
Log (Equity +1)			0.018**	0.031***
			(0.008)	(0.011)
Log (Productivity +1)			0.349***	0.350***
			(0.054)	(0.057)
Log(Employees +1)			0.550***	0.549***
			(0.060)	(0.067)
Firm FE	No	No	Yes	Yes
Year-Industry FE	No	No	Yes	Yes
Year-County FE	No	No	Yes	Yes
Credit Analyst Opinion FE	No	No	Yes	Yes
Payment Behavior FE	No	No	Yes	Yes
Order Situation FE	No	No	Yes	Yes
Business Development FE	No	No	Yes	Yes
Controls x Post	No	No	Yes	Yes
Observations	187,949	187,949	148,183	148,183
Clusters (County)	443	443	442	442
R-squared	0.094	0.084	0.935	0.930

Panel B: Control Group: Limited (Germany)				
Outcome	Log(Trade Credit)	Log(Bank Debt)	Log(Trade Credit)	Log(Bank Debt)
Column	(1)	(2)	(3)	(4)
Treated x Post x Log(Credit Rating Index)	-0.090	0.265***	0.187***	0.261***
	(0.071)	(0.093)	(0.036)	(0.071)
Log(Credit Rating Index)	-1.469***	-1.609***	-0.586***	-0.527***
	(0.058)	(0.069)	(0.058)	(0.082)
Treated x Log(Credit Rating Index)	-0.615***	-0.862***	-0.134***	-0.189***
	(0.074)	(0.096)	(0.039)	(0.054)
Post x Log(Credit Rating Index)	0.409***	0.564***	0.023	0.188***
	(0.058)	(0.069)	(0.026)	(0.051)
Treated x Post	0.237***	0.379***	0.101***	0.163***
	(0.026)	(0.042)	(0.015)	(0.021)
Treated	-0.717***	-0.823***		
	(0.033)	(0.048)		
Post	0.342***	0.322***		
	(0.018)	(0.029)		
Log (Sales +1)			-0.203***	-0.205**
			(0.077)	(0.098)
Log (Age)			0.822***	0.701***
			(0.085)	(0.113)
Log (Equity +1)			0.478***	0.500***
			(0.025)	(0.028)
Log (Productivity +1)			0.044***	0.093***
			(0.009)	(0.017)
Log(Employees +1)			0.489***	0.382***
			(0.076)	(0.100)
Firm FE	No	No	Yes	Yes
Year-Industry FE	No	No	Yes	Yes
Year-County FE	No	No	Yes	Yes
Credit Analyst Opinion FE	No	No	Yes	Yes
Payment Behavior FE	No	No	Yes	Yes
Order Situation FE	No	No	Yes	Yes
Business Development FE	No	No	Yes	Yes
Controls x Post	No	No	Yes	Yes
Observations	308,595	308,595	290,277	290,277
Clusters (County)	444	444	443	443
R-squared	0.115	0.100	0.879	0.799

Notes: This table presents OLS regressions on firms' debt. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have two control groups with available bank and trade credit data: (1) German unlimited liability firms with the legal forms OHG or KG that were not required before or after 2007 to disclose financial statements; and (2) German limited liability firms that voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The variable 'Log(Trade Credit) is the log of total amount of Trade Credit on a firm's balance sheet in year t. The variable 'Log(Bank Debt) is the log of total amount of Bank Debt on a firm's balance sheet in year t. Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, ** and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A12

CHANGE IN SENSITIVITY – AVERAGE MARGINAL EFFECTS ACROSS GROUPS
ALTERNATIVE CONTROL GROUP

Panel A: Sensitivity between Bank Debt and Credit Ratings (No Controls)				
				Difference Pre- and Post-Period
Control Pre:	-1.609***	Control Post:	-1.045***	0.564***
	(0.069)		(0.097)	(0.069)
Treated Pre:	-2.470***	Treated post:	-1.641***	0.828***
	(0.082)		(0.050)	(0.085)
		Difference-in-Differences in Sensitivity:		0.265***
				(0.093)
Panel B: Sensitivity between Trade Credit and Credit Rating Index (No Controls)				
				Difference Pre- and Post-Period
Control Pre:	-1.469***	Control Post:	-1.060***	0.409***
	(0.058)		(0.088)	(0.058)
Treated Pre:	-2.084***	Treated post:	-1.764***	0.320***
	(0.056)		(0.044)	(0.064)
		Difference-in-Differences in Sensitivity:		-0.090
				(0.071)
Panel C: Sensitivity between Bank Debt and Credit Rating Index (With Controls)				
				Difference Pre- and Post-Period
Control Pre:	-0.527***	Control Post:	-0.338***	0.188***
	(0.082)		(0.085)	(0.051)
Treated Pre:	-0.716***	Treated post:	-0.267***	0.449***
	(0.079)		(0.088)	(0.054)
		Difference-in-Differences in Sensitivity:		0.261***
				(0.071)
Panel D: Sensitivity between Trade Credit and Credit Rating Index (With Controls)				
				Difference Pre- and Post-Period
Control Pre:	-0.586***	Control Post:	-0.563***	0.023
	(0.058)		(0.058)	(0.026)
Treated Pre:	-0.719***	Treated post:	-0.510***	0.209***
	(0.056)		(0.056)	(0.031)
		Difference-in-Differences in Sensitivity:		0.187***
				(0.036)

Notes: This table presents sensitivity statistics between credit ratings and debt. Sensitivities across groups and time period are calculated using the coefficients reported in Online Appendix Table A11. Panel A and Panel B show the results using OLS models without incorporating credit rating information inputs as controls, Panel C and Panel D include these inputs as controls. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. The control group consists of German limited liability firms that already voluntary disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, or when the financial statements of treated firms became publicly available. Variable definitions are provided in the Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.

Table A13

REPORTING REGULATION AND CREDIT RATINGS (DEBT SAMPLES)		
Outcome	Credit Rating Index	
Control Group	Unlimited (Germany)	Limited (Germany)
Column	(1)	(2)
Treated x Post	0.357***	0.197***
	(0.052)	(0.018)
Log (Sales +1)	-0.126	0.085
	(0.089)	(0.068)
Log (Age)	-0.651***	-0.653***
	(0.038)	(0.030)
Log (Equity +1)	-0.146***	-0.167***
	(0.015)	(0.012)
Log (Productivity +1)	0.112	-0.144**
	(0.093)	(0.069)
Log(Employees +1)	0.012	-0.260***
	(0.102)	(0.077)
Firm FE	Yes	Yes
Year-Industry FE	Yes	Yes
Year-County FE	Yes	Yes
Payment Behavior FE	Yes	Yes
Order Situation FE	Yes	Yes
Business Development FE	Yes	Yes
Controls x Post	Yes	Yes
Observations	148,183	290,277
Clusters (County)	442	444
R-squared	0.897	0.901

Notes: This table presents OLS regressions on firms' credit ratings using the reduced sample with non-missing debt data. Treated firms are limited liability firms operating in Germany with the legal forms GmbH or GmbH Co. KG that were obliged to disclose financial statements after 2007. We have two control groups: (1) German unlimited liability firms with the legal forms OHG or KG that were neither required before nor after 2007 to disclose financial statements; and (2) German limited liability firms that already voluntarily disclosed before 2007. *Post* is a dummy variable equal to 1 for all firms for the years after 2007, i.e., when the financial statements of treated firms became publicly available. The credit rating index ranges from 1 (AAA) to 21 (C). A positive (negative) coefficient indicates that the credit rating gets worse (better). Variable definitions are provided in Appendix. Heteroscedasticity-robust standard errors are clustered at the county level and are presented in parentheses. ***, **, and * indicate a significance level of 1%, 5%, and 10%, respectively.