



## Business credit information sharing and default risk of private firms



Maik Dierkes<sup>a</sup>, Carsten Erner<sup>a</sup>, Thomas Langer<sup>a</sup>, Lars Norden<sup>b,\*</sup>

<sup>a</sup> Finance Center Muenster, University of Muenster, Universitätsstraße 14-16, 48143 Münster, Germany

<sup>b</sup> Rotterdam School of Management, Erasmus University, Burgemeester Oudlaan 50, 3000 DR Rotterdam, The Netherlands

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### ABSTRACT

We investigate whether and how business credit information sharing helps to better assess the default risk of private firms. Private firms represent an ideal testing ground because they are smaller, more informationally opaque, riskier, and more dependent on trade credit and bank loans than public firms. Based on a representative panel dataset that comprises private firms from all major industries, we find that business credit information sharing substantially improves the quality of default predictions. The improvement is stronger for older firms and those with limited liability, and depends on the sharing of firms' payment history and the number of firms covered by the local credit bureau office. The value of soft business credit information is higher the smaller the firms and the lower their distance from the local credit bureau office. Furthermore, in spatial and industry analyses we show that the higher the value of business credit information the lower the realized default rates. Our study highlights the channel through which business credit information sharing adds value and the factors that influence its strength.

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### 1. Introduction

Theoretical and empirical research has examined various effects of credit information sharing on lenders, borrowers, and economic activity. Most of these studies document significantly positive effects of information sharing, such as an increase in the supply of credit by banks, a decrease in the costs of credit and realized default rates, and an increase in GDP growth. However, almost entirely missing from these studies is a direct empirical examination of the channel through which these positive effects of information sharing occur. Does information sharing raise the overall accuracy of default predictions in an economy? Which factors influence the potential improvement in default prediction accuracy associated with information sharing? What is the link between credit information sharing, the quality of ex ante default predictions, and ex post default rates? In this paper we intend to fill this gap by investigating whether business credit information sharing helps to better assess the default risk of private (unlisted) firms and which factors influence the magnitude of its marginal value. Our evidence is based on the improvement of default prediction accuracy, which

we study in aggregate, industry-specific, firm-specific, and spatial analyses.

Theory has highlighted several important aspects of credit information sharing (e.g., Millon and Thakor, 1985; Pagano and Jappelli, 1993; Padilla and Pagano, 1997, 2000; Karapetyan and Stacescu, 2010). Later empirical work has provided evidence in support of these theories based on international and country-specific analyses. A first set of empirical studies documents benefits of credit information sharing in a cross-country context (e.g., Jappelli and Pagano, 2002; Miller, 2003; Djankov et al., 2007; Brown et al., 2009; Tsai et al., 2011). A second set of studies investigates the effects of credit information sharing within countries (e.g., Kallberg and Udell, 2003; Doblaz-Madrid and Minetti, 2012; Hertzberg et al., 2011; Behr and Sonnekalb, 2012). For example, Kallberg and Udell (2003) analyze data from the US credit bureau Dun & Bradstreet on 2723 retailing firms from the late 1980s to study whether business credit information is valuable in assessing borrower quality. They show that information on a firm's payment history, the PAYDEX score of Dun & Bradstreet, is significantly related to the firm's probability of survival. We complement and extend the study of Kallberg and Udell (2003) in several dimensions. We analyze the marginal benefit of business credit information sharing by comparing the default prediction accuracy of models that include and do not include business credit information. Moreover, we study which factors influence the potential

\* Corresponding author. Tel.: +31 10 4082807; fax: +31 10 4089017.

E-mail addresses: [maik.dierkes@uni-muenster.de](mailto:maik.dierkes@uni-muenster.de) (M. Dierkes), [carsten.erner@uni-muenster.de](mailto:carsten.erner@uni-muenster.de) (C. Erner), [thomas.langer@uni-muenster.de](mailto:thomas.langer@uni-muenster.de) (T. Langer), [lnorden@rsm.nl](mailto:lnorden@rsm.nl) (L. Norden).

improvement in default prediction accuracy and differentiate between the value-added of hard and soft business credit information. A further strength of our study is that it is based on a large representative dataset that includes firms from all major industries. Therefore we can also examine the heterogeneity across industries.

Our work is also related to [Doblas-Madrid and Minetti \(2012\)](#) who examine the case of information sharing among equipment finance companies. They analyze equipment loans to almost 4000 US businesses and find that the staggered entry of firms in the credit bureau is associated with a drop in firms' delinquency rates by 13% on average (37% for the maximum). This finding can largely be attributed to the disciplining effect of credit information sharing around its introduction. It becomes more costly for firms to default or to be past due with payments when credit information is shared not only among current but also potential future lenders. We take a different perspective by studying the link between the improvement in ex ante default prediction accuracy due to business credit information sharing and ex post default rates in a spatial and industry analysis, respectively.

It is notable that not all previous studies have found positive effects of credit information sharing. Based on a natural experiment in Argentina, where the public credit registry was expanded to all firms, the study of [Hertzberg et al. \(2011\)](#) documents an amplification of coordination effects among lenders when negative credit information was shared in response to the credit registry reform. This study is one of the rare that documents significant negative real effects after the introduction of credit information. Thus, it is ex ante not clear whether and under which conditions a positive or negative effect prevails.

Our study is based on a representative panel dataset from the largest commercial credit bureau in Germany (Creditreform). The biggest European economy is the ideal testing ground to study effects of credit information sharing since the vast majority of all German firms are private and small firms ([Federal Statistical Office, 2009](#)). 96% of all German firms are considered as small- and medium-sized enterprises according to the definition of the European Commission ([European Commission, 2006](#)). The randomly drawn sample comprises more than 25,000 firms over the period from 2002 to 2005 (resulting in approximately 100,000 firm-year observations). Creditreform regularly screens the official German commercial register for new entries to ensure a full coverage of all firms. We focus on private firms because they are smaller, more informationally opaque, riskier, and more dependent on trade credit and bank loans than public firms (e.g., [Petersen and Rajan, 1994](#); [Norden and Weber, 2010](#); [Saunders and Steffen, 2011](#)). We expect that potential benefits of business credit information sharing are particularly relevant for private firms. Moreover, private firms, especially SMEs, are of key importance for economic activity, employment and innovation in many countries.

We conduct three sets of empirical analyses to identify the cumulative value of business credit information sharing and factors that influence its magnitude. First, we compare the accuracy ratio of default prediction models that include and do not include business credit information. The accuracy ratio represents a widely used measure in the credit risk literature and credit rating industry and indicates the aggregate default prediction accuracy in a sample (e.g., [Cantor and Mann, 2003](#); [Engelmann et al., 2003](#)). Second, we define a measure that indicates the likelihood of improvement in firm-specific default predictions due to the addition of business credit information. We investigate the factors that are likely to influence this measure using probit regression models. We also examine the differential impact of hard and soft business credit information (for parallels to the banking literature, see [Berger and Udell, 2002](#); [Petersen, 2004](#); [Berger et al., 2005](#); [Grunert et al., 2005](#)). Third, we test for potential real effects of business

credit information sharing. In a spatial and industry analysis, we investigate whether there is a relation between the improvements in the accuracy of ex ante default risk assessments due to business credit information sharing and realized default rates.

Our first result is that business credit information sharing substantially improves the accuracy ratio of default predictions for private firms. The additional consideration of this information increases the accuracy ratio of default predictions by approximately 20 percentage points. We confirm this result in out-of-the-sample tests and by means of a type I and II error analysis. Interestingly, our main finding is present in most industries (although its magnitude varies substantially). It is very general and robust; a finding that goes beyond the insights of previous studies based on data from single industries. Second, we find that the improvement in default prediction accuracy is more pronounced for older firms and those with limited liability. Interestingly, the value of soft business credit information decreases in firm size and distance from the corresponding local credit bureau office. Third, in a spatial and industry analysis, we find that actual default rates of firms are lower in geographic areas (or industries) in which the ex ante accuracy of default predictions is more strongly improved by additional business credit information sharing. Additional empirical checks confirm that our results are robust.

Our study contributes to the literature on credit information sharing and the growing field of research on private firms in three ways. We highlight a not yet explicitly analyzed channel through which the positive effects of business credit information sharing occur: the improvement in the accuracy of aggregate and firm-specific default predictions. None of the related papers has directly examined the existence and functioning of this channel. We also provide comprehensive evidence on the factors that influence the strength of the channel. This channel is indeed effective: more accurate default predictions due to business credit information are associated with lower future default rates.

The remainder of the paper is organized as follows. In Section 2 we present hypotheses about the value of business credit information sharing, its influencing factors, and its economic consequences. In Section 3 we describe the institutional background and the data. In Section 4 we report our findings on the value of business credit information sharing and on the factors that influence its strength. In Section 5 we investigate the link between ex ante prediction accuracy and ex post default risk in a spatial and industry analysis. In Section 6 we summarize additional empirical checks that confirm the robustness of our findings. Section 7 concludes.

## 2. Hypotheses

Based on prior theoretical and empirical work on credit information sharing and banking we propose the following set of hypotheses. The study of [Kallberg and Udell \(2003\)](#) shows that the payment history of firms is significantly related to their likelihood of default. This result is based on a sample of (small) US firms from a single industry and serves in the context of our study as a motivation for the following hypothesis.

**Hypothesis H1.** Business credit information sharing improves the accuracy of default predictions for private firms

We complement and extend the base hypothesis H1 by two sets of more specific hypotheses: one set relates to the influence of firm characteristics (H2) and the other to the influence of firm-credit bureau characteristics (H3). Firm characteristics can be considered as proxies for firm opacity, quality, and dependence on suppliers (e.g., [Petersen and Rajan, 1994, 1997](#)). Opacity and the number of suppliers, in turn, are related to the amount of information processed by the credit bureau. Therefore, we hypothesize:

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