



Pricing in the online invoice trading market: First empirical evidence

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HIGHLIGHTS

- We study the pricing in the online invoice trading market.
- The interest rate, the duration and the advance rate are determinants of the default probability in invoice trading.
- The pricing is different under an auction mechanism as compared to a fixed-price regime.
- The default, interest and advance rates are on average higher within the auction period.

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ABSTRACT

In recent years, online invoice trading has gained importance in providing SMEs with short-term financing. In this paper, we present first empirical evidence concerning the question whether the risk of payment difficulties is appropriately reflected in the pricing variables. To this end, we investigate predictors of default of online invoice trading platforms. We analyze both the probability of default and the loss rate and find that the interest rate, the duration and the percentage funded have good predictive power. Furthermore, we show that the pricing mechanism (auction vs. fixed prices) helps to explain defaults on online invoice trading platforms.

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1. Introduction

Invoice trading is a fast and easy way in which small and medium sized enterprises (SMEs) can raise short-term debt by pre-financing their outstanding invoices through individual or institutional investors. In this study, we empirically analyze whether the risk of payment difficulties is appropriately reflected in the prices of online invoice trading platforms. To this end, we use a novel dataset stemming from an invoice trading platform to investigate which factors predict defaults, i.e., events in which the investors do not fully receive the invested amount plus interest rate.

SMEs often face difficulties in obtaining sufficient sources of financing. In addition to the traditional factoring market and other forms of financing such as bank loans and overdraft facilities, online invoice trading platforms can help SMEs to raise working capital. Generally, these web-based platforms are hosted by FinTechs. In recent years, the market for online invoice trading

has grown substantially. In the UK, the market volume more than tripled between 2013 and 2015 (Zhang et al., 2016). While in 2013 the volume amounted to £97 m, the market exceeded this figure considerably with nearly £325 m in 2015. From a global perspective, online invoice trading is likely to continue to grow further.

We are the first to analyze this new market of invoice trading on web-based platforms. We use data of the world's largest invoice trading platform MarketInvoice henceforth also called *the platform*, which is based in the UK. To investigate the determinants of repayment difficulties, we focus on crystallized losses and the loss rate of the invoices and apply both logit and tobit models. We find that the interest rate, the duration and the percentage of the invoice funded are related to the default probability. Within our observation period, the platform applies two different market mechanisms to set the prices of the invoices, namely an auction and a fixed-price mechanism. We show that the default probability is lower within the fixed-price regime. However, the gross yield as well as the return for investors are higher within the auction period. On online invoice trading platforms, an invoice is generally sold to

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several investors. Hence, our study also contributes to the growing amount of literature upon different forms of crowdfunding.

2. Related literature

In general, factoring is a short-term supply of financing whereby companies sell their accounts receivables at a discount in exchange for immediate cash. In recourse factoring and usually also in invoice trading, the buyer pre-finances the invoice but does not resume the credit risk for a potential default of the invoice. Klapper (2006) states that factoring is a growing source of financing for SMEs all around the world. However, she finds evidence proving that the factoring market is larger in countries with good economic development and growth as well as in countries with a sound provision of credit information on companies. Soufani (2002b) focuses on the UK factoring market and examines parameters influencing the decision of factoring companies to purchase accounts receivables. Additionally, Soufani (2002a) investigates the choice of companies to use factoring as a source of financing.

In online invoice trading, an invoice is generally sold to one or more investors. Hence, the concept is closely linked to other forms of crowdfunding upon which a vast amount of literature has been published. In particular, previous research deals with determinants of defaults in crowdfunding. Several studies find that the interest rate and other loan characteristics such as the credit score are highly important in explaining the default probability in crowdfunding (see for example Dorfleitner et al., 2016; Serrano-Cinca et al., 2015; Emekter et al., 2015). Yet, further academic work shows that other pieces of information such as the perceived creditworthiness of the borrower (see Duarte et al., 2012) or online friendships (see Lin et al., 2013) are also associated with defaults.

In crowdfunding, prices are generally either set by the platform (fixed price) or emerge in market-based auctions. In the early days of crowdfunding, many platforms preferred the auction mechanism. However, most of these platforms have changed from auctions to fixed prices over time. Wei and Lin (2016) examine the latter price regime change on the US crowdlending platform Prosper. They find that loans are more likely to be funded under a fixed-price regime. However, the default rates are higher when the platform posts the prices, which is also reflected by higher interest rates. While Huang (2017) also focuses on the price regime change on Prosper, Chen et al. (2014) analyze whether the auction on Prosper leads to the lowest payments of borrowers under the assumption of strategic and rational agents.

Further research deals with similar market mechanisms in other crowdfunding forms. Hornuf and Schwienbacher (2017) compare the funding dynamics of equity crowdfunding portals with a fixed price and those using an auction mechanism. In contrast to platforms with fixed prices, the funding patterns of platforms using auctions are U-shaped. Franks et al. (2016) focus on the lending-based crowdfunding platform FundingCircle. Amongst others, they find that auctions generate additional information that helps to predict defaults. Furthermore, there are several studies that compare fixed-price regimes with auction mechanism in other markets (e.g., Wang, 1993, Hammond, 2013, Einav et al., 2017, Chen et al., 2007).

3. Data and methodology

3.1. Institutional background and data

A transaction on the platform constitutes the pre-financing of invoices in the sense of recourse factoring. The investors purchase the accounts receivables but do not assume the risk of the debtor's insolvency. Fig. 1 visualizes how a transaction is proceeded.

After the seller has uploaded the invoice and after the platform has verified it, investors can purchase either the invoice or fractions of it. Dependent on the seller's industry, the duration of an invoice and the stage of the seller's business, the investors fund a fraction of up to 90% and more of the invoice face value. This fraction is called the *advance*. A transaction is frequently split between 20 or more investors. Subsequent to the funding, the seller immediately receives the advance value. Within the payment period, the investors accrue interest on a daily basis until the invoice is repaid. At maturity, the debtor (the seller's customer) repays the full face value of the invoice to the platform. Then the platform pays back the advance value and all accrued interest to the investors. Finally, the seller receives the non-advanced remainder less interest (see MarketInvoice Limited, 2017b, 2016). In case the debtor does not fully pay the invoice, the platform demands that the seller repurchases the invoice. Therefore, only cases in which neither the seller nor the debtor repay the entire advance value plus interest result in crystallized losses for investors. This marks a big difference to the field of crowdlending, where the credit risk solely depends on the risk of the debtor.

Since the end of 2013, the interest rate on the face value of the invoice as well as the maximum advance rate have been predetermined by a platform-internal risk-based pricing model. Within this pricing mechanism, the seller receives the invested amount regardless of whether or not the maximum advance rate is reached. Before December, 2013, this interest rate and the percentage funded were set through a real-time auction mechanism. Before the start of an auction, the seller defines the minimum advance value and the maximum interest rate he or she is willing to pay as well as the duration of the auction. The investors bid based on information about these seller requirements and a rating of the invoice provided by the platform. The bids that satisfy the minimum requirements defined by the seller and that are best in the sense of a high advance value and a low interest rate are executed at the end of the auction at a unique interest rate and at an advance that is as high as possible.¹ According to a statement of the platform, the auction system was no longer suitable because of the rapidly growing volume of invoices and, therefore, they changed to a fixed-price mechanism. Furthermore, the platform states that data on more than 18,200 invoices enables the platform to develop a fixed-price model, which assesses the assets in a timely manner.

To sell invoices companies have to fulfill several requirements defined by the platform such as a turnover of at least £100,000 and a business activity of more than six month. Furthermore, only limited or LLP companies are allowed to use the invoice trading platform. The invoices can be bought by accredited institutional investors, family offices and also self-certified sophisticated investors as well as certificated high net worth individuals.

The dataset used in this paper was obtained from MarketInvoice and contains all completed fundings from March 2011 until mid-May 2017. We only consider closed transactions and therefore exclude all information on invoices that still await repayment and have not yet resulted in crystallized losses. After data cleansing, our dataset includes 19,566 observations.

¹ The realized advance emerges as the sum of the investment volumes of the successful bids divided by face value, while it needs to be less or equal to the maximum advance the successful bidders are willing to accept. Consider for example the auction of an invoice worth £10,000, which the seller wants to be financed at a maximum interest rate of 10% and a minimum advance rate of 60%. We consider four bidders, each offering a volume of £2500. Bidder A offers an interest rate of 8% and a maximum advance rate of 75%, B 7% and 85%, C 9% and 85%, and D 8.5% and 60%, respectively. At the end of the auction, the invoice is sold to A, B, and C for an interest rate of 9%. The advance rate equals 75%. Bidder D is not successful even though his offered interest rate is lower than the winning interest rate of 9%. D only accepts an advance rate of 60%, thus, selling the invoice to A, B, and D would violate this condition.

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