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**Thünen-Series of Applied Economic Theory**  
**Thünen-Reihe Angewandter Volkswirtschaftstheorie**

Working Paper No. 127

**Which information should entrepreneurs on German  
crowdfunding-platforms disclose?**

by

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# Which information should entrepreneurs on German crowdfinancing-platforms disclose?

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## Abstract

The disclosure requirements for firms issuing equity on German crowdfinancing-platforms are quite lax at the moment. This paper states that this loose requirement policy is not optimal in the presence of competition among platforms. First, a simple three-staged theoretical model is derived to demonstrate that competition among the platforms should result in a maximization of disclosure requirements. Second, characteristics about firms and entrepreneurs that should be revealed are identified because they have an empirically verified effect on the risk-return-profile of a company. Third, a recommendation for the practical implementation of improved disclosure requirements is offered.

**Keywords:** crowdfinancing, market microstructure, disclosure requirements, equity, asymmetric information, entrepreneur

**JEL-Codes:** G32, L15, L10, L50, D40

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## 1. Introduction

Crowdinvesting-platforms are quite young in the German financial sector. On these platforms, comparatively small companies can sell equity to a crowd of investors. The term crowd describes the fact that a large number of small private investors buy the available shares. Investors receive specified claims on the upcoming profits in return.

This paper discusses the disclosure requirements of these platforms. Disclosure requirements describe information that must be revealed by equity selling firms. Currently, the disclosure requirements imposed on entrepreneurs are quite lax. For example, to sell equity on the German platform Seedmatch.de, an entrepreneur only needs to write a business plan<sup>1</sup>. This paper is meant to criticize this loose policy and develop a recommendation for practical purposes.

Due to the young age of this investment industry, the economic literature on this topic is rare. Hemer (2011) and Rubinton (2011) wrote introductory working papers about the broader class of crowdfunding-platforms which also include donation platforms. Belleflamme, Lambert, and Schwienbacher (2011) and Agrawal, Catalini, and Goldfarb (2011) provided other noteworthy contributions to crowdfunding.

Crowdinvesting-platforms are similar to stock exchanges because in both market places, equity is sold to a large number of investors. This makes the market microstructure literature about stock exchanges useful in developing the line of argumentation. For instance, Huddart, Hughes and Brunnermeier (1999), Foucault and Parlour (2004), Chemmanur and Fulghieri (2006), Macey and O'Hara (2002), and Aggarwal and Angel (1998) offered notable contributions about the broader topic of disclosure requirements of stock exchanges.

The results of this paper can be divided into three parts. First, the theoretical analysis of Huddart et al. (1999) was simplified and applied to the crowdinvesting-market. It is illustrated that the rivalry among crowdinvesting-platforms for investors' liquidity should create a maximization of disclosure requirements.

Second, based on this result the question immediately arises about specific information that must be revealed by entrepreneurs on German crowdinvesting-platforms. Obviously, information about the entrepreneur and the firm both of which

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<sup>1</sup> <https://www.seedmatch.de/ueber-uns/fuer-startups> (05/29/2012)

have a verified effect on the risk-return profile should be disclosed. On the one hand, investors need information about all aspects that increase or decrease the probability of an upcoming insolvency of a supported firm because such a scenario would involve major losses to equity owners. For example, Balcaen and Ooghe (2004) offered a detailed overview of the statistical methods and results used to analyze business failures.

On the other hand, investors also need information about those characteristics of a firm or an entrepreneur that have a verified effect on upcoming profits. The analysis of firm's profits differs significantly from the analysis of firm's failure. Corporate profits are mainly analyzed by autoregressive methods described, for example, in Kodde and Schreuder (1984). However, these methods are not useful to identify the potential of young companies without sufficient financial history. Therefore, this paper reviews the German economic literature which tries to identify entrepreneurs' and firms' characteristics that significantly influence corporate growth. Articles that analyzed the growth potential of German companies include, for example, Harhoff, Stahl, and Woywode (1998) or Almus (2002). This line of literature allows identifying further information that should be included in disclosure requirements of crowdfundering-platforms.

Third, the results of the theoretical analysis and the investigation of empirical literature are used to formulate a recommendation for practical implementation. This recommendation includes a number of information that should be revealed by entrepreneurs and verified by German crowdfundering-platforms. The recommendation also includes the advice for differing disclosure requirements for firms of different ages.

Chapter 2 of this paper provides a theoretical model to analyze whether a crowdfundering-platform in a competitive market should choose high or low disclosure requirements. Chapter 3 investigates the empirical literature on the characteristics of an entrepreneur and a firm that influence the corporate risk-return profile. Chapter 4 offers a recommendation for the practical implementation. Potential further research questions are discussed in Chapter 5 followed by the conclusions of Chapter 6.

## 2. High disclosure requirements or low disclosure requirements?

Reading this chapter, assume that there are two competing crowdfundering-platforms and a large number of entrepreneurs who will choose one platform to sell their companies' equity. Facing two different disclosure requirements on two competing platforms, one might expect entrepreneurs to choose the platform with less restrictive requirements, because lower requirements imply lower costs of information provision and compliance. This naïve consideration creates the suspicion that competing platforms will choose a minimization of disclosure requirements to attract entrepreneurs.

A similar kind of behavior is a common observation in international tax competition. Competing countries want to attract international companies by choosing a lower corporate income tax compared to other countries. This kind of behavior creates a dynamic of more tax decreases resulting in a so-called race-to-the-bottom, implying a minimization of corporate income taxes<sup>2</sup>. This chapter aims to answer the question of whether competition among crowdfundering-platforms creates a race-to-the-bottom or race-to-the-top of disclosure requirements on these platforms.

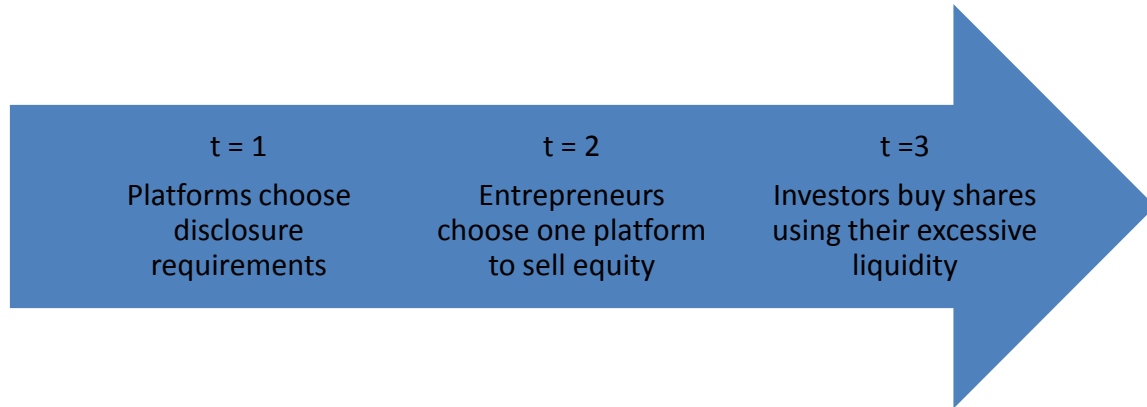
To answer this question, the theoretical model of Huddart et al. (1999) was simplified and modified to be applicable to the crowdfundering context. This article analyzed the disclosure requirements of international stock exchanges. On stock exchanges and on crowdfundering platforms, equity is sold to a large number of investors. Consequentially, the line of argumentation used by Huddart et al. (1999) should also be useful to analyze disclosure policy of crowdfundering-platforms.

Three types of agents exist. First,  $M$  entrepreneurs want to acquire investment capital on a crowdfundering-platform. Second,  $N$  investors with excessive liquidity want to buy corporate equity on a crowdfundering-platform. Third, two competing crowdfundering-platforms  $e = 1$  and  $e = 2$  want to attract entrepreneurs and investors.

The agents become involved in the following course of action. In the first stage, both platforms choose their disclosure requirements simultaneously. In the second stage, entrepreneurs choose one platform to sell their equity. In the third and last stage, investors buy corporate shares using their excessive liquidity.

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<sup>2</sup> Cary (1974): p.701

**Figure 1:** Course of action

An entrepreneur has a strategic advantage because he/she knows the true value of his company  $v_m$ . Just like in Huddart et al. (1999), investors do not know the true value and they can only observe the following public signal about companies' true value<sup>3</sup>:

$$\theta_{em} = v_m + \varepsilon_{em} \quad \text{with } \varepsilon_{em} \sim N(0, \sigma_{\varepsilon e}^2), \text{ e } \in \{1, 2\}, \text{ and } m \in M. \quad (1)$$

The public signal  $\theta_{em}$  is not a precise representation of the firm's true value  $v_m$  because it includes a random normally distributed error term  $\varepsilon_{em}$ . The variance of the error term  $\sigma_{\varepsilon e}^2$  is decreasing in the disclosure requirements of crowdinvesting-platform e.

In Huddart et al. (1999), entrepreneurs trading assets with investors make profits due to their informational advantage. In the initial model, the profits are a result of the pricing mechanism. Huddart et al. (1999) assumed a market maker choosing a market-clearing price after observing the aggregate order flow<sup>4</sup>. But the market maker cannot distinguish between orders of entrepreneurs and orders of investors. When setting the price, the market maker cannot incorporate the informational advantage of entrepreneurs by weighing individual orders of entrepreneurs more

<sup>3</sup> Huddart et al. (1999): p.243

<sup>4</sup> Huddart et al. (1999): p. 241

compared to those of individual orders of investors<sup>5</sup>. Thus, in the initial model, an entrepreneur will only sell shares when the public signal is more optimistic than the true value.

In the initial model, average profits of an entrepreneur who is selling shares to an investor are decreasing in the disclosure requirements. The same relationship between entrepreneurs' profits and disclosure requirements is assumed in the context of crowdfinancing-platforms, even though there are no market makers. It seems plausible to assume that an entrepreneur who is choosing the price of his/her firm's shares by him or herself self cannot be worse off compared to a situation where a neutral market maker chooses the price.

Only two levels of disclosure requirements are assumed, that is, high disclosure requirements, implying  $\sigma_{\epsilon e}^2 = \sigma_{\epsilon h}^2$ , and low disclosure requirements, implying  $\sigma_{\epsilon e}^2 = \sigma_{\epsilon l}^2$ . Thus, obviously  $\sigma_{\epsilon h}^2 < \sigma_{\epsilon l}^2$ . Accordingly, even the high disclosure requirements do not imply an elimination of the entrepreneur's informational advantage, that is,  $\sigma_{\epsilon h}^2 > 0$ <sup>6</sup>.

Assumingly, an entrepreneur selling shares on a crowdfinancing-platform will always realize benefits, because he/she profits from increased diversification of wealth and additional financial funds. However, the size of his/her benefits depend on the disclosure requirements of the platform, that is  $\pi_E(\sigma_{\epsilon l}^2) > \pi_E(\sigma_{\epsilon h}^2) > 0$ . The reason for the inverse relationship between disclosure requirements and entrepreneur's benefits is that low disclosure requirements make it easier for him/her to create an optimistic public signal about his/her firm. This could happen for example by concealing some negative information about the firm's prospects, which is easier in the presence of lax disclosure requirements.

The relationship between disclosure requirements and aggregate benefits of investors is the other way round. It is assumed here that on average investors earn positive returns for participating in the crowdfinancing-market. This is a plausible assumption, since on the closely related stock exchanges, initial public offerings of corporate equity are usually associated with so called underpricing<sup>7</sup>. Thus, if corporate shares that are initially sold to the public on stock exchanges must be

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<sup>5</sup> Huddart et al. (1999): p. 243

<sup>6</sup> Huddart et al. (1999): p. 243

<sup>7</sup> For example Ljungqvist (2007) offered an overview of the economic literature related to IPO-underpricing.



underpriced, corporate shares sold on crowdfunder-platforms should also be underpriced. Nonetheless, it is assumed here that the required underpricing for a successful funding on a crowdfunder-platform is increasing in the disclosure requirements. Consequently, investors buying shares on a platform with more restrictive disclosure requirements will make bigger profits compared to investors buying shares on a platform with less restrictive requirements, that is,  $\pi_I(\sigma_{\varepsilon h}^2) > \pi_I(\sigma_{\varepsilon l}^2) > 0$ . Obviously, the marginal aggregate benefits of investors from increased disclosure requirements,  $\pi_I(\sigma_{\varepsilon h}^2) - \pi_I(\sigma_{\varepsilon l}^2)$ , equal the marginal loss of entrepreneurs from increased disclosure requirements,  $|\pi_E(\sigma_{\varepsilon h}^2) - \pi_E(\sigma_{\varepsilon l}^2)|$ .

Simplifying further analysis, it is assumed that neither the entrepreneurs nor the investors face any further direct costs. This assumption is justified if the entrepreneur's costs of information provision, for example, in the form of providing balance sheets and qualification certificates, and the investor's costs of screening investments, like reading business plans and financial forecasts, are seen as negligible.

A crowdfunder-platform earns a fixed percentage of the provided capital if the investment target is surpassed within a certain period. Therefore, a platform's gross payoff from a successful funding  $\pi_P$  is independent of the level of its disclosure requirements. If the platform chooses low disclosure requirements, no further costs arise. However, if the platform chooses high disclosure requirements, screening costs of verifying an entrepreneur's provided information of  $c$  arise, with  $\pi_P - c > 0$ <sup>8</sup>. With these assumptions, the platforms and the entrepreneurs are interested in low disclosure requirements.

Backwards induction is used here to solve the described three-staged game and to find out whether competition among platforms forces a race-to-the-top or a race-to-the-bottom of disclosure requirements. In the **third stage**, investors decide on which platform they want to participate to buy corporate shares. If both platforms choose the same level of disclosure requirements, that is  $\sigma_{\varepsilon 1}^2 = \sigma_{\varepsilon 2}^2$ , all investors will use one half of their liquidity to buy shares on both platforms. If there are different levels of disclosure requirements on the platforms, investors will use their entire liquidity to buy

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<sup>8</sup> The assumption that platforms conduct some form of screening is consistent with observed firm policies of these platforms. For example, see <http://www.seedmatch.de/ueber-uns/fuer-investoren> (03/01/12)

equity on the platform with higher disclosure requirements  $\sigma_{ee}^2 = \sigma_{eh}^2$  because this will maximize their expected profits.

In the **second stage**, entrepreneurs choose a platform to sell their corporate shares. If an entrepreneur faces two platforms with identical disclosure requirements, he/she will be indifferent to choosing a platform. If there are two different levels of disclosure requirements, one might expect him/her to choose the platform with lower requirements and therefore higher profits for the entrepreneur. However, this is not optimal because the platform with lower disclosure requirements will not attract any liquidity. Consequently, an entrepreneur faced with two platforms with different disclosure requirements will be forced to sell his/her firm's equity on the platform with high disclosure requirements.

In the **first stage**, platforms choose their level of disclosure requirements. Obviously, the two platforms would maximize their total profits if they both chose high disclosure requirements. Both platforms could realize high profits  $\pi_p$  without bearing the screening costs  $c$  for every successful funding. Nevertheless, this situation is a prisoner's dilemma. If one platform chooses high disclosure requirements, it will attract the entire liquidity. The other platform would not make any profits. Thus, in equilibrium, both platforms will choose high disclosure requirements and realize profits of  $\pi_p - c > 0$  for every successful funding.

The preceding analysis shows that competition among platforms should create a race-to-the-top of disclosure requirements. It is plausible to expect that the growing competition among the platforms will force the competitors to make their current loose disclosure requirements stricter in the future. Therefore, the question that arises immediately is, which precise information should entrepreneurs disclose?

### **3. Which precise information should be disclosed?**

Potential investors should get access to the information about the firms and entrepreneurs that is necessary to analyze upcoming profitability of investments and the implied risks. Subchapter 3.1 briefly describes the conducted literature research. Subchapter 3.2 lists all the information that has a significant impact on the risk-return-profile of a company, according to empirical literature in the field of economics.

#### **3.1 Literature research procedure**

An intensive literature research of German and international empirical literature has been conducted to identify firm and entrepreneur characteristics with a significant effect on the returns or risks of a company. This research can be divided into two parts. On the one hand, factors influencing the risk of a firm had to be identified. The essential risk for an investor buying corporate shares on a crowdfundering-platform is the scenario of a firm failure. Obviously, the definition of a firm failure is ambiguous, as several definitions are used in the literature. Most studies define a company that files for bankruptcy under national law as a failed company. However, several other studies have analyzed different ways of firm failure, for example voluntary liquidation.

Using the literature on firm failures, characteristics that are more likely to lead to a firm failure could be identified. One might expect that all characteristics that increase the likelihood of a firm failure have a negative effect on a firm's profitability. However, this is not necessarily true. For example, high-tech firms typically have a comparatively high expected profitability while their high dependence on research and development exposes them to comparatively high risks. Thus, the fact that there is not an inverse relationship between risk and profitability in general justifies the second part of the literature research, which focuses on identifying factors with significant effect on corporate profits.

As described by Moskowitz and Vissing-Jorgensen (2002), it is very difficult to measure the profitability of non-publicly traded companies for several reasons. One evaluation problem arises because in contrast to publicly traded companies corporate shares are not traded continuously on public markets. Therefore, permanent

information about the current market value of a company is not available. Thus, capital gains of non-publicly traded companies cannot be measured directly.

Another problem arises because available data from profits of non-publicly traded companies are severely biased for several reasons. First, firms receive strong tax incentives to minimize their publicly announced profits, creating an underestimation of real firm profitability. Second, the data of firm profits are not suitable for estimating returns on investment, because it usually remains unclear whether a certain amount of profits is due to financial investment or human capital effort. This problem arises because many entrepreneurs do not pay an appropriate wage for their own work. This fact makes corporate profits of non-publicly traded companies an inseparable compensation for two different inputs, namely investment capital and human capital.

Due to these estimation problems, no noteworthy empirical articles analyzed the relationship between firm or entrepreneur characteristics and profits of German non-publicly traded companies. Nevertheless, the literature on firm growth, measured usually as growth of the number of employees, is an appropriate proxy for corporate profits. It is plausible to assume that high profitability characterizes fast growing firms. Thus, using the assumed positive correlation between growth and profits, the empirical growth literature was used to identify factors that should have a significant effect on firm profits.

### **3.2 Information to evaluate the risk-return profile of a non-publicly traded company**

This section describes the results of the literature research. This chapter includes financial information from balance sheets (3.2.1), information about the human capital of entrepreneurs (3.2.2), and information about the firm itself.

#### **3.2.1 Balance Sheet Data**

Limited liability companies are obliged to make balance sheets publicly available. This obligation is meant to reveal the financial situation of a company. Therefore, balance sheets are obviously important in evaluating the risk-return profile of a

company. Consequentially, a long history of empirical articles attempted to use balance sheets to analyze and forecast corporate risks and profits.

In the economic literature about firm failure, several statistical methods have been applied. Beaver (1966) began analyzing firm failures with simple univariate discriminant analysis while Altman (1968) was the first to use multiple discriminant analysis. Ohlson (1980) was a pioneer in using logit-analysis, while Zmijewski (1984) pioneered in using probit-analysis. By applying these methods, scientists could identify ratios of balance sheet data with significant explanatory power for upcoming firm failure. Typical balance sheet ratios are for example cash flow to total debt, net income to total assets<sup>9</sup>, market value of equity to book value of debt<sup>10</sup>, total liabilities to total assets<sup>11</sup>, or current assets to current liabilities<sup>12</sup>.

However, balance sheet analysis should not be restricted to a few important ratios because in this context more information is generally better. For example, Franken (2007) and Perederiy (2007) developed forecast models for failure of German firms. They were not interested in identifying certain balance sheet ratios with a significant effect on the failure probability, as economists would, instead they were interested in a maximization of the accuracy of the model as a whole. Franken (2007) used a large number of balance sheet ratios and compared the forecast accuracy of a neural network model to the forecasts of a logit-model, finding out that the former was more accurate<sup>13</sup>. Perederiy (2007) compared a logit model using traditional ratios to a logit model using new combined balance sheet ratios to find out that combined ratios lead to forecasts that are more accurate<sup>14</sup>.

Balance sheet data can also be used to forecast upcoming corporate profits. However, the available profit forecast methods known in the literature are exclusively autoregressive and therefore quite naïve. These autoregressive or extrapolative methods just use the profits of preceding periods to forecast profits in the future.

Due to the obvious weakness of these methods, only a few of them should be mentioned here. Kodde and Schreuder (1984) analyzed the forecast accuracy of nine

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<sup>9</sup> For example Beaver (1966): table 2 on p.81

<sup>10</sup> For example Altman (1968): p.594

<sup>11</sup> For example Ohlson (1980): table 4 on p.121

<sup>12</sup> For example Zmijewski (1984): table 3 on p.69

<sup>13</sup> The main results of Franken (2007) can be seen in Table 1 on p.12 and Table 2 on p.18

<sup>14</sup> The main results of Perederiy (2007) can be seen in Table 4 on p.13

different autoregressive profit forecast models<sup>15</sup>. In their study, the most successful model was a random walk model that forecasted next year's profits using the profits of two preceding years and a random component illustrated by a Wiener process<sup>16</sup>.

To sum up, there is a long history of analyzing balance sheets to identify potential corporate risks and profits. The analysis of risks created a wide range of sophisticated methods and convincing results. The rule of thumb that more information is better than less information is obviously true for this area of balance sheet analysis. This is not true for the analysis of corporate profits. The statistical methods applied in this area seem to be comparatively naïve and the information typically used is restricted to former profits. Nonetheless, entrepreneurs on crowdfundering-platforms should definitely be obliged to disclose balance sheet data to give investors a meaningful insight into the financial constitution of the companies.

### 3.2.2 Information about a firm's human capital

Obviously, a firm's human capital will have an effect on its financial prospects. Therefore, entrepreneurs selling equity on a crowdfundering-platform should be obliged to disclose information, which is necessary to evaluate their expertise.

An important measure of human capital is the **education** and **working experience** of members of an entrepreneurial team. Firms of entrepreneurs with a higher educational degree or more working experience are expected have a lower probability of firm failure and to generate larger average profits.

Prantl (2003) used a Cox-proportional hazard rate model to analyze factors that can explain firm failures of East- and West-German start-up companies after reunification. She found that firms from both parts of Germany were exposed to a lower risk of insolvency if members of the entrepreneurial had a university diploma. It was particularly useful to have business administration or engineering diplomas, but a master craftsman's certificate also had a significant negative effect on the probability of insolvency<sup>17</sup>.

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<sup>15</sup> Kodde and Schreuder (1984) offer an overview of analyzed models in table 1 on p.385

<sup>16</sup> Kodde and Schreuder (1984): p.388

<sup>17</sup> Prantl (2003): Table 3 on p.39

Anders and Szczesny (1996) analyzed insolvency risks of German small and medium-sized enterprises from 1989 to 1993 using a logit model and neural network model. They found that the insolvency risk of these companies decreased if a member of the entrepreneurial team owned a master craftsman's certificate or a university diploma<sup>18</sup>.

Brüderl, Preisendörfer, and Ziegler (1992) analyzed firm exits of Upper Bavarian firms between 1985 and 1990. Using a Proportional Hazard Log-Logistic model, they found a significantly negative relationship between the probability of a firm exit on the one hand and the years of schooling, work experience, and industry-specific work experience on the other hand<sup>19</sup>.

As described in Chapter 3.1, due to the lack of literature on profits of non-publicly traded companies, the literature on firm growth was used instead. Almus (2002), using German data of newly founded firms after reunification, found that the probability of a firm belonging to the upper 10% of the fastest growing companies increases significantly if a member of the entrepreneurial team has a doctor or professor's degree<sup>20</sup>.

Another important human capital characteristic is an entrepreneur's **age**, because assumingly, there is a positive correlation of the entrepreneur's age and his experience and wealth. Consequently, a firm's insolvency risk should decrease and its expected profits should rise with the age of the entrepreneur.

Prantl (2003) provided evidence to support these expectations. The results of her data revealed a significantly negative relationship between an entrepreneur's age in the moment of firm formation and the probability of insolvency.

Harhoff, Stahl and Woywode (1998) analyzed firm growth of German companies after reunification. According to the age of the leading entrepreneur, they divided the observed firms into four classes of age categories,: younger than 31, 31 to 45, 46 to 60, and older than 60. However, none of these binary dummy variables had a significant effect on the probability of insolvency or on firm growth<sup>21</sup>.

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<sup>18</sup> Anders and Szczesny (1996): Table 1 on p.12

<sup>19</sup> Brüderl et al. (1992): the main results of the firm failure risk analysis is on p.236

<sup>20</sup> Almus (2002): Table 5 on p.1506

<sup>21</sup> Harhoff et al. (2003): Table VII on p.476 and Table IX on p.482.

Human capital of a firm should increase if there is an entrepreneurial **team**. Thus, the risk of insolvency should be lower and the expected profits should be higher if a firm consists of an entrepreneurial team instead of a single entrepreneur.

Prantl (2003) found that firms established by a team face a significantly lower risk of insolvency. This effect is intensified if the qualifications of members of the entrepreneurial team are high and heterogeneous. In her analysis West-German companies, whose entrepreneurial teams included individuals with at least two different qualifications, such as, master craftsman's diploma, diploma of business administration, diploma of engineering or another university diploma, faced a significantly lower risk of insolvency<sup>22</sup>.

Almus (2002) found that start-ups consisting of at least five entrepreneurs had a higher probability of belonging to the 10% of the fastest growing companies. However, due to low t-value, this result was not statistically significant<sup>23</sup>.

Thus, empirical evidence on the relationship between human capital and a firm's risk and growth potentially justifies that crowdfundering-platforms force entrepreneurs to reveal information about their human capital.

### 3.2.3 Information about firm characteristics

Some characteristics of a firm as an entity are independent of the human capital of its entrepreneurial team. The following subchapter identifies firm characteristics with a verified effect on a company's risk-return profile.

One decisive firm characteristic is firm **size**. In the empirical literature, a company's size is usually measured in terms of the number of its employees. It is plausible to assume a negative relationship between a firm's size and its probability of insolvency because bigger companies should have improved access to financial resources or even political support. The relationship between size and profitability is less clear. Because the literature on firm growth was used to approximate firm profitability, one might expect a negative relationship between size and profitability. The reason is that small companies with few employees have a smaller calculation base, therefore, they

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<sup>22</sup> Prantl (2003): Table 3 on p.39

<sup>23</sup> Almus (2002): Table 4 on p.1505



are more likely to report high growth rates than are huge companies employing several thousand people.

In contrast to the expectations, Prantl (2003) found a significant positive relationship between the log of the number of employees of a company at market entry and the firm's probability of insolvency. At the same time, she found a negative relationship between the log of the squared number of employees and the probability of insolvency. Thus, small firms face an increasing risk of insolvency as they grow, but once a certain firm size is surpassed, the risk of insolvency decreases again<sup>24</sup>.

Harhoff et al. (1998) reported similar results. The maximum number of employees according to the quadratic insolvency risk function is 18. The authors assume that the probability of comparatively big companies decreases because creditors of big companies are more willing to accept informal settlements to avoid expensive and time-consuming insolvency proceedings<sup>25</sup>.

As expected, Harhoff et al. (1998) found a negative but decreasing relationship between firm size and firm growth in the same article<sup>26</sup>. Almus (1992) – not testing for quadratic relationship – found a linear negative relationship between firm size at market entry and the probability of a company belonging to the upper 10% of the fastest growing companies<sup>27</sup>.

Another important firm characteristic is a firm's **legal form**. An entrepreneur faced with unlimited liability will try to avoid risks. On the one hand, this should result in a lower probability of insolvency among unlimited liability firms rather than limited liability firms. On the other hand, unlimited liability will decrease the ability to realize projects that are more profitable. Therefore, unlimited liability firms are expected to grow faster and realize a bigger profitability.

Several articles, for example Anders and Szczesny (1996) and Harhoff et al. (1998) reported a significantly higher probability of insolvency of limited liability firms<sup>28</sup>. However, the effect of limited liability seems to differ among non-publicly traded

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<sup>24</sup> Prantl (2003): Table 3 on p.39

<sup>25</sup> Harhoff et al. (1998): Table V on p.471 includes the results, while an intuitive interpretation is offered on p.472

<sup>26</sup> Harhoff et al. (1998): Table VIII on p.480 and Table IX on p.482

<sup>27</sup> Almus (2002): Table 4 on p.1505

<sup>28</sup> Anders und Szczesny (1996): Table1 on p.12. Harhoff et al.(1998) Table V on p.471

companies and publicly traded companies because Harhoff et al. (1998) found an increased insolvency risk only for German firms with legal form GmbH and GmbH & Co. KG while German firms with legal form AG faced lower risks.

Several articles also confirmed the expectation that limited liability firms grow faster. Almus (2002) found a significantly increased probability of a limited liability firm belonging to the upper 10% of the fastest growing companies<sup>29</sup>. The analysis of Harhoff et al. (1998) demonstrated a significantly increased growth potential for limited liability companies<sup>30</sup>.

Moreover, a firm's **ownership structure** has a significant effect on its risk-return profile. A comparatively young company should profit from maintaining a close relationship with a well-established firm. This might take the form of a shareholding or a franchise. Thus, firms cooperating with well established other firms in the described way should be less exposed to a risk of insolvency and should have a comparatively high profitability.

According to Harhoff et al. (1998) companies under complete control of a parent company are exposed to a significantly lower probability of insolvency<sup>31</sup>. Prantl (2003) conducted a more differentiated analysis, which revealed a similar relationship. Not just subsidiary companies under complete control of a parent company had a significantly lower probability of insolvency, but also companies with minority stake of a parent company<sup>32</sup>. The researcher also found that firms acting as franchisees were exposed to a lower risk of insolvency<sup>33</sup>.

Start-ups analyzed in Harhoff et al.'s (1998) study had a significantly higher firm growth if a well-established company was involved rather than an independent firm formation<sup>34</sup>. Thus, empirical evidence seems to confirm the assumed relationship between ownership structure and firm growth.

The risk-return profile of each company depends also on the **industry** of its entrepreneurial activity. It is not useful to formulate expectations about the risk-return

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<sup>29</sup> Almus (2002): Table 4 on p.1505 and Table 5 on p.1506.

<sup>30</sup> Harhoff et al. (1998): Table VIII on p.480

<sup>31</sup> Harhoff et al. (1998): Table V on p.471

<sup>32</sup> Prantl (2003): Table 3 on p.39

<sup>33</sup> Prantl (2003): Table 3 on p.40

<sup>34</sup> Harhoff et al. (1998): Table V on p.471

profiles of different industries at this moment because the definition of industries differs fundamentally in the empirical literature. Nonetheless, a short overview of the results of industry-specific effects on the risk-return profile of companies is presented below.

Using slightly different definitions and reference industries, Anders and Szczesny (1996) and Harhoff et al. (1998) found that manufacturing companies are exposed to higher probability of insolvency<sup>35</sup>. According to Anders and Szczesny (1996), trade companies are significantly less prone to insolvency. A number of other industries that have been tested did not show a statistically significant differing risk of insolvency<sup>36</sup>.

According to Harhoff et al. (1998), firms in the manufacturing, construction, and services industries grow significantly faster compared to their sole proprietorships counterparts<sup>37</sup>. Almus (2002) found, that companies in construction, communication, and the curiously defined industry of “not knowledge-based business related services” belong significantly more often to the upper 10% of the fastest growing companies<sup>38</sup>.

Another important firm characteristic influencing the risk-return profile of a company is its **geographical location**. The population density of a company’s location usually measures this characteristic. There are two conflicting aspects of a high (or low) population density. On the one hand, high population density might bring a bigger demand for a firm’s products and services. On the other hand, there should be increased competition as well as comparatively high real estate and human capital costs in highly populated areas. Thus, the relationship between a firm’s geographical position and its risk-return profile is not obvious.

Prantl’s (2003) data revealed a significantly positive relationship between the population density of a firm’s location and its probability of insolvency<sup>39</sup>. Thus, firms in rural areas seem to be less prone to an involuntary firm exit compared to firms in

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<sup>35</sup> Harhoff et al. (1998) used single proprietorships as the reference industry (p.471), while Anders and Szczesny (1996) did not make any statement about the used reference industry.

<sup>36</sup> Anders and Szczesny (1996): Table 1 on p.12. Harhoff et al. (1998):Table V on p.471

<sup>37</sup> Harhoff et al. (1998): Table VIII on p.480

<sup>38</sup> Almus (2002): Table 4 on p.1505 and Table 5 on p.1506

<sup>39</sup> Prantl (2003): Table 3 on p.40

urban areas. Therefore, it seems as if the negative effects of increased competition in urban areas exceed the benefits of potentially bigger demand.

A similar relationship exists between population density and firm growth. According to Almus (2002), population density has a significantly negative influence on a firm's probability of belonging to the upper 10% of the fastest growing companies.

A number of other potential firm characteristics are used in the empirical analysis of firm exits and growth. For example, Brüderl et al. (1992) used the binary independent variable "follower business" coded as one if the business idea of an entrepreneur cannot be described as an innovative new idea<sup>40</sup>. Almus (2002) defined a firm as "technology-intensive" if its research and development expenditures are higher than 3,5% of its total revenue<sup>41</sup>. These characteristics make sense in an ex post analysis of firm exit and growth. However, these variables are susceptible to manipulation in an ex ante questionnaire because every investor could just claim to establish a technology-intensive firm to realize innovative business ideas. Thus, these characteristics are not useful for the screening process of a crowdfinancing-platform and therefore cannot be included in the disclosure requirements.

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<sup>40</sup> Brüderl et al. (1992): Table 2 on p.235

<sup>41</sup> Almus (2002): Table 5 on p.1506

#### 4. Practical Implementation

This chapter summarizes the results of the preceding theoretic analysis and the literature overview to formulate a recommendation for practical implementation. The main result of Chapter 2 indicated that competition among platforms should enforce a race-to-the-top strategy regarding disclosure requirements. It is important to notice here that this does not mean that entrepreneurs should be forced to reveal all the listed information about their human capital or their firm to every internet user. Such a policy would be incompatible with privacy protection. Nevertheless, crowdfundering-platforms could screen entrepreneurs and verify their information. This process might be annoying to some entrepreneurs. Nonetheless, this procedure is necessary to reduce informational asymmetries between entrepreneurs and investors.

Entrepreneurs trying to sell their firms' equity to investors on a crowdfundering-platform are not homogeneous. One major difference is the different age of individual companies. There are comparatively old and well-established companies as well as newly formed companies. Thus imposing the same disclosure requirements on different companies cannot be sensible.

On international stock exchanges, companies who want to sell their corporate stocks can choose different listing standards. At the Deutsche Börse, firms can choose between three different listing standards, the Prime Standard, the General Standard, and the Entry Standard<sup>42</sup>. One aspect of the listing standard involves the disclosure requirements. Since different disclosure requirements impose different costs for emitters, this differentiation is meant to attract companies of different size and age. While the quite restrictive Prime Standard is attractive for mature and big firms, the Entry Standard attracts small and medium-sized enterprises. Crowdfundering-platforms should use the same strategy.

Table 1 describes disclosure requirements for practical implementation. It begins with information that even very young companies can reveal. Analogous to Chapter 3, this information is divided into balance sheet data, human capital characteristics, and firm

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<sup>42</sup> Xetra Deutsche Börse Group (2012): „Ihr Weg an die Börse – ein Leitfaden“. Link: [http://deutsche-boerse.com/dbag/dispatch/de/binary/gdb\\_content\\_pool/imported\\_files/public\\_files/10\\_downloads/33\\_going\\_being\\_public/50\\_others/sm\\_emittentenleitfaden.pdf](http://deutsche-boerse.com/dbag/dispatch/de/binary/gdb_content_pool/imported_files/public_files/10_downloads/33_going_being_public/50_others/sm_emittentenleitfaden.pdf)

characteristics. A crowdfinancing platform should ask entrepreneurs for certificates verifying this information.

Young companies should provide all the required information to create a reliable opening balance sheet. Certain balance sheet information, like cash-flow ratios, does not make sense because it will create too pessimistic forecasts. However, information about the resources and costs of a company is sensible. This includes bills of tangible assets, like machines, certificates of intangible assets, like patents, or bills of operating expenses, like heating costs. This information reveals how much an entrepreneur invested before selling equity on a crowdfinancing-platform, which is necessary for investors to decide whether the offered amount of equity is adequate or fair.

Table 1: Recommendation for disclosure requirements for companies selling equity on a crowdfinancing-platform.

<b>1. Disclosure requirements for companies younger than two years old</b>
<b>a) Disclosure requirements for balance sheet data</b> Required information to create an opening balance sheet: <ul style="list-style-type: none"> <li>- Bills of tangible fixed assets (machines etc.)</li> <li>- Certificates of intangible fixed assets (patents etc.)</li> <li>- Bills of operating expenses (heating costs etc.)</li> </ul>
<b>b) Disclosure requirements for human capital information</b> Identity cards of members of the entrepreneurial team Certificates of education, apprenticeship and employment Certificates verifying self-employed experience Credit reports like German "Schufa-Auskunft"
<b>c) Disclosure requirements for firm characteristics</b> Company agreement as <ul style="list-style-type: none"> <li>- certificate of legal form and</li> <li>- pre-investment ownership structure</li> </ul> Tenancy agreement as <ul style="list-style-type: none"> <li>- certificate for the geographical location</li> </ul> Labor agreements as <ul style="list-style-type: none"> <li>- certificate for the number of employees</li> </ul> Industry-specific authorization or fellowships as <ul style="list-style-type: none"> <li>- certificate of industry affiliation</li> </ul>
<b>2. Additional disclosure requirements for companies older than two years</b>
Complete balance sheets of the last two fiscal years

Information confirming the human capital of an entrepreneurial team is particularly important. This begins with the identity card of an entrepreneur verifying his or her age. As we have seen, there is a positive relationship between an entrepreneur's age on the one hand and firm profits and the survival chances on the other hand. To evaluate a firm's competence, the entrepreneur must reveal relevant certificates of educational degrees and working experience. If an entrepreneur has been self-employed, he/she should reveal acquired licenses or other documents verifying his/her experience. As evidence for the trustworthiness of an entrepreneur, he/she could use credit reports or a police clearance certificate. For example, the German

Peer-to-Peer loan platform Smava asks creditors for a so-called “Schufa-Auskunft” as a proof of their creditworthiness<sup>43</sup>.

As we have seen in Chapter 3.2.3, characteristics of the firm itself provide important information for investors. A company agreement, if available, can be used to verify the legal form of a company and the pre-investment ownership structure. To document the geographical location of a company, tenancy agreements should be disclosed. The economics literature has used the number of a company’s employees to measure firm size. Consequentially firm size should be verified by forcing entrepreneurs to reveal labor agreements. To confirm the affiliation of a company to a certain industry, industry-specific authorizations or fellowships should be disclosed.

The disclosure requirements described so far referred to the information that any firm should be able to deliver no matter how young or old it is. However, what is some additional information that older firms should reveal? As we have seen in Chapter 3.2.1, balance sheet data can be used to build simple profit forecast models. However, most of these autoregressive models use balance sheet data collected over at least two years. Therefore, a sensible age threshold for the application of more restrictive disclosure requirements is two years. This means that, every firm that is older than two years should be forced to reveal balance sheets for the last two fiscal years.

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<sup>43</sup> Barasinska and Schaefer (2010): p.6



## 5. Further Research

The analysis so far raises many new questions about crowdfunder research. On the one hand, theoretical approaches of market microstructure and industrial organization might suggest a slightly different outcome when platforms compete with each other. This immediately raises the question of whether market regulation by governmental authorities is necessary, if the socially desirable race-to-the-top does not occur. On the other hand, a number of new questions in the empirical analysis of risks and returns of small and medium-sized firms arises.

### 5.1 Further theoretical research

The main result of Chapter 2 revealed that competition among crowdfunder-platforms would create a race-to-the-top strategy for disclosure requirements and therefore a socially desirable minimization of informational asymmetry between entrepreneurs and investors. However, if the competitive forces are not strong enough, problems related to informational asymmetry, such as moral hazard and adverse selection, could become expensive disadvantages for investors. If entrepreneurs used lax disclosure requirements to mislead investors, investors would finally abstain from market participation. This risk justifies the discussion on whether competitive forces in the crowdfunder-market will be strong enough.

Convincing arguments assume that intense competition among platforms will arise. The legal barriers and financial costs of market entry are quite low. The number of new platforms, such as Investtor.de or Innovestment.de, in the German market is constantly rising which indicates a strong evidence for healthy competition. Even a monopolistic platform would be exposed to competition from traditional forms of investment, such as equity funds. Besides that, as Baumol, Panzar and Willig (1982) have shown, potential market entry of competitors disciplines a monopolistic firm.

Some arguments generate doubts about whether intense competition in the crowdfunder-market will arise. First, first-mover advantages could create a national market leader, resulting in the formation of a natural monopoly<sup>44</sup>. However, theoretically, the formation of a natural monopoly requires high fixed costs to justify

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<sup>44</sup> Lieberman and Montgomery (1988) offer an overview of first mover advantages.

only one market participant on the supply side. As mentioned before, this is not true for the crowdfinancing-market because of negligible entry costs.

Second, platforms could use a product differentiation strategy to reduce competition. This could take the form of different platforms using different disclosure requirements. Foucault and Parlour (2004) applied Shaked and Sutton's (1982, 1983) general qualitative product differentiation argument on the competition among international stock exchanges. In Foucault and Parlour (2004), the qualitative differentiation of stock exchanges arises because the exchanges use different trading technologies. This strategy allows for more than one stock exchange, even though the stock exchange with the qualitatively best trading technology showed the biggest profits<sup>45</sup>. This argument might also be applicable to the differentiation of disclosure requirements of competing crowdfinancing-platforms. The result that the quality-leader realizes the biggest profits still implies a strong incentive for a maximization of disclosure requirements.

Geographical product differentiation is another option. Individual platforms could concentrate their activity on certain geographical areas. This strategy seems plausible because investors want to monitor the firm in which they have invested. This makes regional concentrated investments sensible, thus resulting in limited capital mobility. Huddart et al. (1999) have analyzed this effect of trapped liquidity on the disclosure requirements of stock exchanges as a robustness check<sup>46</sup>. Their result suggested that trapped liquidity could enable comparatively lax disclosure requirements but the mobile liquidity would be directed completely to the stock exchange with the highest disclosure requirements<sup>47</sup>. Thus, the incentive for crowdfinancing-platforms to maximize their disclosure requirements probably remains strong even in the presence of geographical product differentiation and trapped liquidity.

Chemmanur and Fulghieri (2006) wrote another interesting article analyzing competition among closely related stock exchanges. In their model, two stock exchanges compete for listings of international companies. The main determinant of competition is listing standards. The decisive difference between Chemmanur and

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<sup>45</sup> Foucault and Parlour (2004): proposition 6 on p.434 describes the coexistence of a number of stock exchanges, while corollary 3 on p.346 describes that the quality-leader realizes the biggest profits.

<sup>46</sup> Huddart et al. (1999) discuss the effect of trapped liquidity in Chapter 4.2 on pp.252 ff.

<sup>47</sup> Huddart et al. (1999): proposition 6 on p.253

Fulghieri's (2006) study on the one hand and Huddart et al.'s (1999) study on the other hand, is that the former assumes that investors on both exchanges are not mobile at all. This assumption contributes to their result that a race-to-the-bottom does not occur. Instead, listing standards are increasingly restrictive if a stock exchange has a good reputation and few institutional investors<sup>48</sup>.

A number of theoretical models created the suspicion that competition among crowdfinancing-platforms will not enforce a maximization of disclosure requirements. The resulting informational advantages of entrepreneurs are socially undesirable and could lead to a market breakdown if investors abstained from market participation. This would necessitate market regulation by a governmental authority. The simple three-staged model presented here was meant to illustrate that the mobility of investors' liquidity is the decisive competitive force and that further theoretical analysis of the crowdfinancing-market seems promising. The before mentioned models of market microstructure and industrial organization might be a good starting point.

## 5.2 Further empirical research

Various small and medium-sized firms realized successful fundings on crowdfinancing-platforms. The online shop Comopol managed to raise €95000 from 180 investors on a crowdfinancing-platform in 2011<sup>49</sup>. The question is, what are the effects of such a huge and diffuse investor base? As we have seen in Chapter 3.2.3, the size of an entrepreneurial team is an important characteristic of a firm's human capital. Analysis of the effect of the number of investors could be a sensible empirical expansion. If skills and knowledge of investors contributed to the risk-return profile of a company, it would make sense to impose more restrictive disclosure requirements on investors as well.

Additionally, investors on crowdfinancing-platforms could benefit from new and simplified econometric models analyzing corporate risks and profits of small and medium-sized companies. Simplifying the presentation of empirical results would help investors use available information more efficiently.

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<sup>48</sup> Chemmanur and Fulghieri (2006): propositions 4-6 on p.477/478

<sup>49</sup> Report from German *Wirtschaftswoche* (12/12/2011)

## 6. Conclusion

This paper focused on the disclosure requirements imposed on the entrepreneurs selling equity on crowdfinancing-platforms. First, a three-staged model was developed to demonstrate that increasing competition among crowdfinancing-platforms should enforce a race-to-the-top strategy for disclosure requirements.

Second, the empirical literature on survival chances, profits, and growth of small and medium-sized enterprises was used to identify factors contributing to the risk-return profile of a company. Especially information about a firm, its human capital and balance sheet data showed significant explanatory power.

Third, a recommendation for a practical implementation was formulated. The recommendation included to force entrepreneurs to reveal a list of data to be screened by the crowdfinancing-platform. The judicial limits of the proposed recommendation have not been discussed here.

Fourth, additional theoretical research questions and ideas for empirical research have been suggested.

This work is an appeal to crowdfinancing-platforms to impose more restrictive disclosure requirements on their customers in order to increase the transparency of the market. At the same time, it is a request to economists to devote effort to crowdfinancing-research. Both would increase the social acceptance of crowdfinancing-platforms.

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