

Discussion Paper No. 13-018

## **Corporate Main Bank Decision**

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**ZEW**

Zentrum für Europäische  
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Centre for European  
Economic Research

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## Nicht-technische Zusammenfassung

Kleine und mittlere Unternehmen profitieren aus mehreren Gründen von einer engen Hausbankbeziehung. Es erleichtert den Finanzierungszugang und Hausbanken können sich in einer angespannten Unternehmenssituation "gegen den Wind lehnen" und das Unternehmen weiter finanzieren. Eine enge Hausbankbeziehung bietet somit eine Art Liquiditätsversicherung. Dies ist insbesondere für Unternehmen mit einem hohen Risiko attraktiv. Allerdings ist eine solche Bankbeziehung mit höheren Transaktionskosten verbunden. Kostensensitive Unternehmen mit geringem Risiko sind weniger bereit solche Transaktionskosten zu tragen.

Suchen Unternehmen eine Hausbank entsprechend des eigenen Risikos bzw. der Möglichkeit einer Unterstützung im Falle einer Krise? In diesem Papier untersuche ich die Hausbankentscheidung von Unternehmensgründungen in Deutschland. Der deutsche Bankenmarkt eignet sich aufgrund des hohen Marktanteils von Sparkassen und Genossenschaftsbanken hierfür besonders. Sparkassen und Genossenschaftsbanken haben ein Mandat bzw. eine Mission Statement die regionale Wirtschaft zu fördern und Unternehmen in einer Krise zu unterstützen. Private Banken hingegen haben keine solche Festlegung. In diesem Papier wird der Einfluss verschiedener Kriterien auf die Wahl der Hausbank untersucht, beispielsweise die Nachfrage nach einer Liquiditätsversicherung, die Kostensensitivität und das Risiko des Unternehmens zum Gründungszeitpunkt.

Das KfW/ZEW Gründungspanel ist eine repräsentative Befragung junger Unternehmen in Deutschland und beinhaltet Informationen zum Unternehmen und den Gründerpersonen. Darüber hinaus wurden Informationen zur gewählten Hausbank und der Bedeutung verschiedener Kriterien bei dieser Entscheidung erhoben. Die Analyse basiert auf nahe zu 1.900 Unternehmensbeobachtungen der Gründungskohorten 2009 bis 2011. Alternative Banken, die dem Unternehmer zu Verfügung standen, wurden über das ZEW Bankpanel ermittelt. Die Wahl der Hausbank wurde in zwei Schritten untersucht. Zunächst wurde mittels eines Logit Modells die Wahl des Typs der Hausbank untersucht (Sparkasse oder Genossenschaftsbank versus Privatbank). In einem zweiten Schritt wurde mit Hilfe eines Nested Logit Modells die Wahl einer der Bank selbst analysiert.

Die Ergebnisse zeigen, dass Unternehmen, für die eine erwartete Unterstützung der Bank im Falle einer Unternehmenskrise eine sehr hohe Bedeutung hat, mit höherer Wahrscheinlichkeit eine Sparkasse oder Genossenschaftsbank wählen. Werden Beziehungen aus einer persönlichen bzw. privaten Bankbeziehung als wichtig erachtet bleiben diese Unternehmen mit einer höheren Wahrscheinlichkeit ebenfalls bei ihrer Sparkasse oder Genossenschaftsbank als bei einer Privatbank. Kostensensitive Unternehmen wählen eher eine Privatbank. Allerdings gibt es keine Hinweise darauf, dass Unternehmen eine Bank entsprechend ihres Ausfallrisikos eine Hausbank wählen. Banken mit einem hohen Marktanteil haben eine höhere Wahrscheinlichkeit als Hausbank gewählt zu werden. Die Distanz zwischen dem Kunden und der Filiale ist aus ökonomischer Sicht unbedeutend.

## Executive Summary

Building up close main-bank relationships can be beneficial to small and medium sized firms for several reasons. For mature firms, relationship lending eases access to bank finance and positively affects firm innovation activity. As a further advantage, a relationship bank is able to “*lean against the wind*” if a firm is in financial distress. Relationship banking therefore provides an insurance for liquidity and is especially attractive for high risk firms. But firms face transaction costs in providing information. Cost sensitive firms with low risk might not want to bear these costs and ask for more transaction oriented banking. A bank’s ability to offer relationship banking depends on its portfolio characteristics, hierarchy, investment in specialization, and strategy. For banks that have higher refinancing costs than others, it is hard to invest in specialization to offer the advantages of relationship banking and simultaneously offer competitive interest rates. Such banks have incentives to compete in debt repayments. In other words, those banks offer cheap loans and services to cost sensitive firms with low default risk and which do not demand liquidity insurance.

Do firms select the main bank relationship according to their risk or preferences for being helped in difficult times? I empirically test this for newly established German firms. High market shares of public and cooperative banks make the German banking system particularly interesting with regard to this question. Both *Sparkassen* and cooperative banks have a mission statement and implicit or explicit guarantees, reducing refinancing costs. But private banks are not restricted to a certain lending or liquidation policy and have incentives to offer transaction oriented banking, thus attracting low risk firms. I analyse a firm’s main bank choice related to its demand for liquidity insurance, its sensitivity to costs, and its ex ante default risk.

The KfW/ZEW Start-up Panel, a representative sample of young firms in Germany, paints a rich picture of firm and entrepreneurial characteristics. It includes detailed information on firms’ criteria for choosing a main bank relationship, the selected bank, and previous private relationships with that bank. I use nearly 1,900 observations on firms established between 2009 to 2011. Alternative banks and their characteristics are identified using the ZEW Bank Panel. I test for risk considerations in a firm’s initial main bank choice in two steps. In the first step, I employ a logit model to estimate the probability of choosing a certain bank type. In the second step, I employ a nested logit model to estimate the probability of choosing a bank out of a set of alternative banks.

I find that firms for which “*expected bank support in financial distress*” is of the utmost importance choose a relationship oriented bank. Entrepreneurs who consider their personal bank relationship to be valuable to their firm are also more likely choose a relationship oriented bank. However, I do not find that firms select their main bank according to ex ante risk measured by predicted default probability. Cost sensitive firms are more likely to choose a private bank. Furthermore, I find that a bank’s local competence is an important selection factor. Banks with a high regional market share and those that are regionally concentrated are more likely to be chosen. The distance between firm location and bank branch is not economically significant.

# Corporate main bank decision

Daniel Höwer \*

April 5, 2013

## Abstract

Do firms select their main bank relationship according to their risk or risk preferences? Relationship banking is attractive for high risk firms since it improves their access to finance and provides liquidity insurance. Low risk firms instead may not want to bear the additional costs. I employ a nested logit model to study the determinants of the main bank relationship decision by newly established German firms. I find that firms that ask for bank support in case of financial distress are more likely to choose a relationship-oriented bank, such as a public or cooperative bank. Cost sensitive firms are more likely to choose a private bank. But I find no evidence that firms select a bank according to ex ante risk. Transaction oriented banks are not able to attract low risk firms.

**Keywords:** Relationship Banking, Start-up, Entrepreneurship, Financing Choice

**JEL Classification:** G21, G32, M13

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**Potential conflict of interest:** In this study I use three data sets: First, the KfW/ZEW Start-up Panel ([www.gruendungspanel.de](http://www.gruendungspanel.de)). This panel is co-funded by the KfW Banking group ([www.kfw.de](http://www.kfw.de)), the Centre for European Economic Research ([www.zew.de](http://www.zew.de)), and Creditreform ([www.creditreform.de](http://www.creditreform.de)). Second, the Mannheim Enterprise Panel that contains firm credit rating information collected by Creditreform. The Mannheim Enterprise Panel is only possible by a long-term collaboration between Creditreform and ZEW. I acknowledge ongoing technical support by Creditreform. Third, the ZEW Bank Panel is generated by the ZEW. An overview of third-party funded projects I was involved in is published on my personal web site: <http://www.zew.de/en/mitarbeiter/mitarbeiter.php3?action=mita&kurz=dho>

## 1 Introduction

Building up close main-bank relationships can be beneficial to small and medium sized firms for several reasons. For mature firms, relationship lending eases access to bank finance (Berger and Black, 2011; Elsas and Krahn, 1998; Petersen and Rajan, 1994; Cole, 1998) and positively affects firm innovation activity (Herrera and Minetti, 2007). As a further advantage, a relationship bank is able to “*lean against the wind*” if a firm is in financial distress (Petersen and Rajan, 1997). Based on the information gathered by multiple interactions, a relationship bank is better informed and therefore capable of evaluating a firm’s going concern value. Such a bank makes more efficient liquidations keeping financing distressed but viable firms (Chemmanur and Fulghieri, 1994). Relationship banking therefore provides an insurance for liquidity and is especially attractive for high risk firms. But firms face transaction costs in providing information. Furthermore, banks have an informational monopoly and bind firms to this relationship, which allows inter-temporal cost sharing and bank rent seeking. Therefore, cost sensitive firms with low risk might ask for more transaction oriented banking.

A bank’s ability to offer relationship banking depends on its portfolio characteristics, investment in specialization, and strategy. Berger and Udell (2011) argue that hierarchal banks are less capable of processing soft-information, such as an entrepreneur’s trustworthiness. They show empirically that larger banks are less capable of passing along soft-information within the hierarchy and are therefore less involved in relationship lending. Brown et al. (2012) show that larger banks react more strongly to hard-facts, such as credit ratings, than do small banks. There is a further literature shows that the characteristics of the bank portfolio affect a firm’s probability of experiencing distress and subsequent market exit (Peek and Rosengren (2005), Fukuda et al. (2009), and Höwer (2009)) or innovation activity (Höwer et al., 2011). Furthermore, banks need to invest in specialization in order to offer relationship banking (Boot and Thakor, 2000). For banks that have higher refinancing costs than others, it is hard to invest in specialization to offer the advantages of relationship banking and simultaneously offer competitive interest rates. Matthey (2010) argues that such banks have incentives to compete in debt repayments. In other words, those banks offer cheap loans and services to cost sensitive firms with low default risk and which do not demand liquidity insurance.

Do firms select the main bank relationship according to their risk or preferences for being helped in difficult times? I empirically test this for newly established German firms. High market shares of *Sparkassen* and cooperative banks make the German banking system particularly interesting with regard to this question. Both *Sparkassen* and cooperative banks have a mission statement and implicit or explicit guarantees, reducing refinancing costs. But private banks are not restricted to a certain lending or liquidation policy and have incentives to offer transaction oriented banking, thus attracting low risk firms. I analyse a firm’s main bank choice related to its demand for liquidity insurance, its sensitivity to costs, and its ex ante default risk. For my analyses, I identify the main bank initially chosen, as well as banks that were also available to the firm. The set of alternatives varies over firms, depending on the local banking market. I focus on newly established

firms since there is no previous financial track record or entrepreneurial experience in that particular business and the bank choice is not influenced by the decision or timing of switching the main bank.

The KfW/ZEW Start-up Panel, a representative sample of young firms in Germany, paints a rich picture of firm and entrepreneurial characteristics. It includes detailed information on firms' criteria for choosing a main bank relationship, the selected bank, and previous private relationships with that bank. I use nearly 1,900 observations on firms established between 2009 to 2011. Alternative banks and their characteristics are identified using the ZEW Bank Panel. I test for risk considerations in a firm's initial main bank choice in two steps. In the first step, I employ a logit model to estimate the probability of choosing a certain bank type. In the second step, I employ a nested logit model to estimate the probability of choosing a bank out of a set of alternative banks.

The empirical analysis suggests that the firm chooses a bank and not the reverse. Only 13% of all firms were restricted in their choice in terms of a bank's refusal to offer an account or grant a loan. I find that firms for which "*expected bank support in financial distress*" is of the utmost importance choose a relationship oriented bank. Entrepreneurs who consider their personal bank relationship to be valuable to their firm are also more likely choose a relationship oriented bank. However, I do not find that firms select their main bank according to ex ante risk measured by predicted default probability. Cost sensitive firms are more likely to choose a private bank. Furthermore, I find that a bank's local competence is an important selection factor. Banks with a high regional market share and those that are regionally concentrated are more likely to be chosen. The distance between firm location and bank branch is not economically significant.

The present paper is structured as follows. In the following section, I review the literature on relationship banking and describe the institutional background of the German banking system. In Section 3, I describe the data set used. In Section 4, I present the logit model for firm decisions as to the type of main bank. In Section 5, I present a nested logit model. In this model, a firm chooses a particular bank out of a set of alternatives. In Section 6, I discuss the results and provide further robustness checks. Section 7 concludes.

## 2 Relationship vs. Transaction Oriented Banking

The choice of a bank is related to transaction costs and to the bank services offered. But firms may also take into account that their main financing partners can influence their decisions, and are able to liquidate the firm. In the first part of this section, I review the literature on relationship banking. I elaborate characteristics that describe whether a firm is more likely to demand relationship oriented banking or transaction oriented banking. In the second part of this section, I describe the German banking system. Institutional differences within the banking sector help to discriminate between banks that are more likely to offering relationship oriented banking than to offer transaction oriented banking.

## 2.1 Firm Characteristics and the Demand for Relationship Banking

The literature on firm financing and financial intermediation stresses that the probability a firm's being liquidated depends on the source of its financing, and that a firm selects its financing sources according to the firm's default risk or the risk preferences of its owners. Chemmanur and Fulghieri (1994) argue that bank loans are more expensive than publicly traded debt. They show that firms with a higher liquidation risk select bank loans over publicly traded debt, because renegotiation is easier with a single or a few banks than with anonymous debt holders. Wilner (2000) argues that trade credit partners have a stake in the firm and are less likely to liquidate a firm in financial distress than are banks. Petersen and Rajan (1997) and Huyghebaert et al. (2007) find empirical evidence that credit constrained firms are more likely to use the more expensive trade credit instead of bank financing. But differences exist even within banking, and there is usually a distinction made between relationship and transaction oriented banking.

Ongena and Smith (1998) define relationship banking as "the connection between a bank and a customer that goes beyond the execution of simple, anonymous, financial transactions". It is characterized by "close monitoring, renegotiability, and implicit long-term contractual agreements" (Berlin and Mester, 1998). A bank gains an informational advantage over its competitors by privately observing the client's payment behavior. Banks further reduce the information asymmetries between themselves and the firm and gain inside information by observing a firm's financial and entrepreneurial decisions (Fama, 1985; James, 1987).

A close bank-firm relationship can be beneficial for the firm for several reasons. First, asymmetric information in credit markets can lead to credit constraints (Stiglitz and Weiss, 1981). Gathering information over time can therefore improve the firm's access to finance. Harhoff and Koerting (1998) as well as Angelini et al. (1998) show that the probability that a firm gets a credit is positively related to the length of the firm-bank relationship. I therefore expect that firms seeking bank finance choose a relationship orientated bank.

Second, relationship banking offers greater flexibility when renegotiation is needed (Petersen and Rajan, 1994). Discretion in the decision to liquidation is vital for the bank as well as for the firm. Banks' investing in screening and monitoring are better in evaluating distressed projects. Such a bank makes more efficient liquidation decisions, than a bank that follows a strict liquidation rule (Chemmanur and Fulghieri, 1994).

From the firm's perspective, the attempt on the part of a relationship oriented bank for efficient liquidation can be seen as implicit liquidity insurance. In the case of a liquidity shock, such a bank puts more effort into the evaluation of a firm's solvency. That bank will continue financing if the firm is considered to be solvent and the costs can be recouped by future transactions. Relationship lending can be seen as a commitment to continue doing business together through financially tough times (Ongena and Smith, 1998), and such banks "would lean against the wind" (Petersen and Rajan, 1994). Elsas and Krahen (1998) find that main banks in Germany with strong firm relationships do so, and do continue to lend to customers after a worsening of the client's credit rating. Also Höwer (2009) find that financially distressed firms that have close bank relationships have a lower market exit probability. Especially firms with high default risk have incentives to choose

a financing partner offering such an implicit liquidity insurance.

Relationship banking is related with higher pecuniary and non-pecuniary costs. Boot and Thakor (2000) argue that banks need to invest in relationship banking. The screening and monitoring costs need to be reimbursed by the bank's clients. In relationship banking, both the customer and the bank are willing to make temporary sacrifices in order to obtain future benefits (Ongena and Smith, 1998).<sup>1</sup> Thus, clients are willing to accept higher up-front interest payments if the relationship promises liquidity insurance or lower repayments in the future. Non-pecuniary costs arise through interactions between the entrepreneur and the bank, such as the provision of confidential information and transaction costs for meetings.

Based on the above literature review regarding relationship banking of mature firms, I expect the following behavior of newly established firms. Firms with comparably high default risks or managed by entrepreneurs asking for liquidity insurance are more likely to select a relationship oriented bank. In contrast, cost-sensitive firms and those with low default risk are more likely to select a transaction oriented bank.

## 2.2 The German Banking System and Identification of Relationship Oriented Banks

In the literature, relationship banking is identified by either using firm–bank relationships or bank characteristics. Identification based on the characteristics of the firm–bank relationship use its duration (Elsas and Krahen, 1998) or its scope (i.e., financing volume (Degryse and Ongena, 2005)). This however is not useful in the context of this study. My interest is in testing whether newly established firms with certain characteristics are more likely to choose a transaction or a relationship oriented bank. Similar to Elyasiani and Goldberg (2004), I use bank characteristics to distinguish between transaction and relationship oriented banks.

In this study, I use the differences in ownership and governance within the German banking system to distinguish between relationship and transaction oriented banks. The German banking system can be characterised as a “Three Pillar System,” referring to public, cooperative, and private banks, all active as universal banks (Engerer and Schrooten, 2004). *Sparkassen* have a “public mandate” to foster regional development and support firms as long as is economically reasonable. In Germany, this objective is codified in the laws governing *Sparkassen*. *Sparkassen* are owned by the district or municipality. Local politicians are represented in the board of supervisors to ensure that the bank fulfils its mandate. *Landesbanken* are the central banks of the *Sparkassen*, but also have their own business clients. These banks are jointly owned by the regional *Sparkassen* association and the federal states. Until 2005, the owners of *Sparkassen* and *Landesbanken* provided an unlimited cover in case of the bank's financial distress (so-called *Gewährträgerhaftung*

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<sup>1</sup>Studies concerning the effect of relationship banking on interest rates analyze the intertemporal behavior and find mixed results. Chemmanur and Fulghieri (1994) predict decreasing interest rates and collateral requirements while the relationship matures (see also Santikian (2011)). In contrast, Greenbaum et al. (1989); Rajan (1992) predict increasing interest rates since lenders recoup the initially subsidized interest rates. I am not aware of studies analyzing the differences in interest rates and fees between relationship oriented and transaction oriented banks for equally risky firms.

and *Anstaltslast*). This regulation was removed for competitive reasons. However, the *Sparkassen* banking sector still provides implicit guarantees by either direct bail-out or mergers within the sector, and a bank's risk from former financial contracts are covered until 2015.<sup>2</sup>

Most cooperative banks are organized locally, whereas some cooperative banks are active nationwide but specialize in certain industries (e.g. the *Deutsche Apotheker und Ärztebank* specialized for pharmacies and medical practitioners). Cooperative banks are owned by members which can be private persons or firms. A cooperative bank's aim is "to promote the acquisition and the business of members" (Engerer, 2006). Hakenes and Schnabel (2011) show that cooperative banks perform the same functions as *Sparkassen*. Members face an additional payment liability in case of bank insolvency, which lowers the costs of refinancing. They are represented in the board of supervisors to ensure the fulfilment of the bank's mission. *Sparkassen* and especially cooperative banks have a close branch network. This makes them more capable of collecting soft information than are private banks.

Private banks have no mission statement similar to those *Sparkassen* and cooperative banks, but are shareholder value oriented. It is argued that private banks face higher refinancing costs, because these are neither protected by (explicit or implicit) guarantees nor by the owners' additional liability. As Matthey (2010) point out, "*to what extent the true objective functions differ is subject to debate. But public banks usually have the mandate to support the economy, which they cannot publicly breach. Accordingly, most borrowers assume that if they take out a loan from the public bank their firm will not get liquidated at the first sign of financial difficulties. Independently of the public bank's true objective function this perception may suffice to allow private banks to enter the market, separate the borrower pool, and obtain profits in equilibrium*". In the theoretical model of Matthey (2010), private banks have incentives for offering more attractive loans to safe firms by a lending policy that includes the liquidation of any distressed borrower. The expected returns of safe firms are higher than those of risky firms, and private banks can offer lower interest rates that overcome their cost disadvantage. Even explicit guarantees of *Sparkassen* to phase out the mandate do not. *Sparkassen* and cooperative banks still describe their business model as being oriented "towards common welfare, based on economic performance" (DSGV, 2008). A Private bank's liquidation policy needs to be credible. This does not rule out intensive firm-bank relationships where private banks collect confidential information by multiple interactions with the firm. But entrepreneurs need to believe that renegotiation is much harder with private than with non-private banks, and self select accordingly.

Another aspect of the German banking system is that some banks have restricted spatial business areas. The so-called "regional principle" should ensure that *Sparkassen* and most cooperative banks have a natural interest in their region's performance. This restriction influences the pool of alternative banks from which a firm can choose. I classify a bank in terms of its spatial business area as being either regionally, supra-regionally, or

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<sup>2</sup>The bail-out of *Landesbanken* by *Sparkassen* associations and states in the aftermath of the financial crisis serves as anecdotic evidence.

Table 1: Bank business area and market share by bank type (2009)

Bank type	Statistic	Bank business area			Total (4)
		regional (1)	super-regional (2)	national (3)	
<b>Public banks</b>	<b># banks</b>	<b>395</b>	<b>41</b>	<b>3</b>	<b>439</b>
	market share	0.42	0.06	0.01	0.49
<b>Cooperative banks</b>	<b># banks</b>	<b>904</b>	<b>233</b>	<b>17</b>	<b>1,154</b>
	market share	0.20	0.07	0.01	0.28
<b>Private banks</b>	<b># banks</b>	<b>114</b>	<b>62</b>	<b>32</b>	<b>208</b>
	market share	< 0.01	0.01	0.22	0.23
<b>Total</b>	<b># banks</b>	<b>1,413</b>	<b>336</b>	<b>52</b>	<b>1,801</b>
	market share	0.62	0.13	0.24	1.00

*Note:* This table presents the number of banks according to their bank type and scope of business area, as well as the share of German banks that have a main bank relation with a particular bank. Information on the number of banks active in banking with businesses is provided in the ZEW Banking Panel. Information on firm shares is estimated based on the Mannheim Enterprise Panel. Banks are classified as follows: portfolio firms spread over up to ten districts as regional, between eleven to 40 districts as supra-regional, and more than 40 districts as national.

*Source:* ZEW Bank Panel and MUP (ZEW) 2012, author's own calculations.

nationally active. The scope of action of a bank is determined on the basis of the spatial distribution of its clients. For each bank, I count the number of districts in which its clients are located. In some cases, banks have only a single client in a district. To avoid inflating the figures with such cases, I only consider firm–bank relationships if the following criteria hold: First, at least three clients are located in a given district. Second, the share of observed firm–bank relationships of a given district to all firm–bank relationships observed is larger than 0.24%. This criterion is equivalent to a bank with clients equally distributed among the 412 German districts. Banks with clients in up to ten districts are defined to be regionally active banks, between eleven and 40 districts, super-regionally active, and above 40 districts, nationally active.

In Table 1, I present the number of active banks in 2009 according to their ownership type and the scope of their spatial business area. The table shows that 395 *Sparkassen* sector banks were regionally active. These banks served as the main bank for 42% of all firms active in Germany. Nearly two out of five cooperative banks are active on the regional level only, serving as the main bank relationship for 20% of all customers.

### 3 Description of the Data Set

My analysis is based on the KfW/ZEW Start-up Panel. This panel is a representative sample of newly established firms in Germany. The KfW/ZEW Start-up Panel is a stratified random sample, drawn from the MUP that has a nearly full coverage of the economically active firms located in Germany. Firm level data of the MUP is collected by Creditreform, which is the largest credit rating agency in Germany. The stratification criteria are the year of establishment, the firm's industry coding, and KfW support.<sup>3</sup> Firms in high-tech industries and with KfW support are oversampled in order to ensure having sufficiently

<sup>3</sup>Certain industries are excluded, such as agriculture. KfW is a promotional bank at the federal level in Germany. KfW provides support not only by promotional loans but also by other subsidies, such as financial funds for entrepreneurial coaching. A firm is stratified as KfW supported if it received any kind of support from the KfW.

many observations to evaluate either group. The KfW/ZEW Start-up Panel is a yearly survey and started in 2008. The survey is conducted using computer assisted telephone interviews. The sample screening ensures that only independent businesses, i.e., businesses that do not belong to a group of companies, are interviewed (see Fryges et al., 2010, for a more detailed description of the data set).

The KfW/ZEW Start-up Panel contains information on the funding, economic activity and the managers of newly established firms. The fifth wave of the KfW/ZEW Start-up Panel, which was conducted in 2012, contains information regarding the firm's main bank decision. In addition to the ordinary questionnaire, firms founded in the years 2009 to 2011 were asked the questions presented in Figure 1. In the interviews, 3075 firms classified their main bank as either *Sparkasse*, cooperative, private, or non-existent (question (1) of Figure 1).

Figure 1: Bank choice related part of the KfW/ZEW Start-up Panel questionnaire

<b>1. To which banking group does your Hausbank belong to?</b>	Yes				
(a) Sparkassen ( <i>INT: also Landesbanken</i> )	<input type="checkbox"/>				
(b) Cooperative banks ( <i>INT: Sparda-Bank, PSD-Banken</i> )	<input type="checkbox"/>				
(c) Large or private banks ( <i>INT: Deutsche Bank, Commerzbank, former Dresdner Bank, Postbank, HypoVereinsbank, other regional banks, direct banks, affiliates of international banks</i> )	<input type="checkbox"/>				
<i>INT: Please do not read aloud the following options:</i>					
(d) No house bank/main bank	<input type="checkbox"/>				
(e) Do not know / Refuses to answer	<input type="checkbox"/>				
<b>2. Did you or another member of the management team participate in a private or business relationship with your Hausbank before it became the official Hausbank of your firm?</b>	Yes	No			
	<input type="checkbox"/>	<input type="checkbox"/>			
<b>3. Which criteria were important to you while searching for an adequate Hausbank? Please rank the following criteria on a scale of 1 to 5 with 1 being of utmost importance and 5 being of no importance.</b>	of utmost importance	of great im- portance	somewhat important	not very important	of no im- portance
Prog: Rotate answers	1	2	3	4	5
(a) Specialized industry expertise of the bank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(b) Expected support in case of a critical business development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(c) Supply of specialized financial services, i.e. international trade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(d) Geographical proximity to the bank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(e) Favorable market conditions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>4. With which other banks did you have conversations about house bank relationships? With (other) . . .</b>	Yes	No			
<i>INT: In case of several members of the board of management, one member conversing with the bank will suffice.</i>					
(a) Sparkassen	<input type="checkbox"/>	<input type="checkbox"/>			
(b) cooperative banks	<input type="checkbox"/>	<input type="checkbox"/>			
(c) large or private banks	<input type="checkbox"/>	<input type="checkbox"/>			
<b>5. Did one of the banks with which you had these talks reject running a debit account, a loan or other business relationships?</b>	Yes	No	Do not know / Refuses to answer		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

*Note:* These questions were part in the fifth wave of the KfW/ZEW start-up Panel conducted as a computer assisted telephone interview (CATI) in 2012. The query was limited to firms up to the age of three.

In addition to the survey data, the MUP contains, for most of the firms, information on the bank's name, local branch, and type of the bank that serves as the firm's main bank relationship, as well as for up to five further bank relationships. In Table 2, I show that for 1862 cases, or 52%, the main bank information provided in the MUP is consistent with the KfW/ZEW Start-up Panel (Column (1)). Column (2) shows that in 10% of the cases, the bank type information is inconsistent. The bank information in the MUP is

missing for 1330 firms (37%).

The data set is complemented by the ZEW Bank Panel. This panel contains information about the characteristics of each bank's portfolio, regarding business clients. The characteristics are calculated based on the firm-main bank relationships observed in the MUP. There are two advantages in using the ZEW Bank Panel, compared to the publicly available data, such as the bank balance sheet data from Bankscope provided by Bureau van Dijk, which is often used in empirical studies. First, especially for small banks, balance sheet data is often not available. See, however from Table 1, that regionally active, typically small, banks have a large market share in terms of main bank relationships. The ZEW Bank Panel covers any bank having relationships with German firms. Second, the ZEW Bank Panel allows a more detailed analysis of the characteristics of the banks' portfolio, such as industry concentration or market shares in local banking markets, than does the balance sheet data.

Table 2: Sample structure and identification of main-bank relationships

Year of foundation	Statistics	KfW/ZEW Start-up Panel bank information is ...			Total
		consistent with MUP (1)	inconsistent with MUP (2)	unknown in MUP (3)	
<b>2009</b>	<b>obs.</b>	<b>644</b>	<b>139</b>	<b>312</b>	<b>1,095</b>
	%	0.59	0.13	0.28	1.00
<b>2010</b>	<b>obs.</b>	<b>648</b>	<b>106</b>	<b>432</b>	<b>1,186</b>
	%	0.55	0.09	0.36	1.00
<b>2011</b>	<b>obs.</b>	<b>570</b>	<b>119</b>	<b>586</b>	<b>1,275</b>
	%	0.45	0.09	0.46	1.00
<b>Total</b>	<b>obs.</b>	<b>1,862</b>	<b>364</b>	<b>1,330</b>	<b>3,556</b>
	%	0.52	0.10	0.37	1.00

*Note:* This table presents the sample structure and the identification of a firm's main bank relation. The KfW/ZEW Start-up Panel provides information on the type of the firm's main bank relation. The Mannheim Enterprise Panel (MUP) provides information a firm's main bank and bank type. The table presents the number of observations and share of firms for which information from both data sets regarding firms' main bank type is either consistent, inconsistent, or missing in the MUP.

*Source:* KfW/ZEW Start-up Panel and MUP (ZEW) 2012, author's own calculations.

## 4 Logit Model Approach

To examine firms' criteria and characteristics for choosing a main bank relationship I employ a logit regression model. The model employed has the following specification:

$$\begin{aligned}
 \ln\left[\frac{p(\text{Non-Private Bank}_i=1)}{1-p(\text{Non-Private Bank}_i=1)}\right] = & \alpha_0 + \alpha_1 \times \text{ex ante risk} \\
 & + \alpha_2 \times \text{Criteria} \\
 & + \alpha_3 \times \text{Previous personal relation} \\
 & + \alpha_4 \times \text{Seeking external finance} \\
 & + \alpha_5 \times \text{Signal: No gov. support} \\
 & + \alpha_6 \times \text{Export / Born global} \\
 & + \varepsilon
 \end{aligned} \tag{1}$$

## 4.1 Variable Description

**Dependent Variable** In this model, “Non-private bank<sub>*i*</sub>” is an indicator of the bank type that serves as the main bank relationship for firm<sub>*i*</sub>. As a result of the discussion in Section 2.2 regarding the German banking system, one can infer that private banks are more transaction oriented whereas non-private banks are more relationship oriented. The dummy variable is unity if the selected bank is either a *Sparkasse*, a *Landesbank*, or a cooperative bank. In Table 3, I present the distribution of the main bank relationship by bank type within the sample. *Sparkassen* have the highest share of main bank relationships, serving 49% of all newly established firms. *Landesbanken* only serve a small fraction, 2%. Nearly one-third of newly established firms have their main relationship with a cooperative bank, whereas these banks have the closest branch network (44% of all observed branches are from cooperative banks). The variable “Non-private bank” is zero for the following banks: *Deutsche Bank* (6% market share in main bank relationships with newly established firms), *Commerzbank* (7%), *Postbank* (3%), and *HypoVereinsbank* (Member of *UniCredit*; 2%), as well as other private banks (2%).<sup>4</sup> The distribution of banking groups for start-up firms within the sample is representative for Germany and is similar to those of established small and medium sized firms.

Table 3: Main-bank relationships of newly established firms

	Public banks		Cooperative banks	Private banks	
firm obs	946		559	357	
share	51%		30%	19%	
	Sparkasse	Landesbank	Cooperative banks	Large banks	other pr. banks
firm obs	906	40	559	326	31
share	49%	2%	30%	18%	2%
No. of active banks†	429	10	1,154	4	205
No. of bank branches†‡	1,946	71	2,516	890	286

*Note:* This table presents descriptive statistics on the main bank choice as a decision tree. Figures for firm observation and firm shares are taken from the KfW/ZEW Start-up Panel for consistent observation with the MUP. Figures for Number of active banks and bank branches are from the ZEW Banking Panel and restricted to main business bank relations observed by *Creditreform*.

† Figures presented for the year 2010; ‡ No. of bank branches reflect the count of branches that are identified by *Creditreform* and must not reflect branch network definition of a particular bank.

*Source:* ZEW Bank Panel and MUP (ZEW) 2012, author’s own calculations.

**Independent Variables—Ideal data set and proxies used** I present the descriptive statistics of the main explanatory variables in Table 4. The table shows the mean values within the sample, as well as the mean conditional on the type of the main bank chosen. In addition, the table shows the expected sign for the logit regression with private banks as base category.

My main interest is in the role of firm risk in the entrepreneur’s initial main bank choice. In an ideal setting, I would be able to distinguish between a bank’s supply of a liquidity insurance and a firm’s demand for such. The firm demand for an insurance

<sup>4</sup>During the years of observation, *Postbank* was taken over by *Deutsche Bank*. *Postbank* is left as an option since it still operates under the brand “*Postbank*.”

depends on the firm risk and the entrepreneur’s belief that the insurance is valid. Previous research has shown that firm risk need not correlate with the entrepreneur’s confidence or risk assessment. A confident entrepreneur might see a low probability of becoming financially distressed, and hence not asking for liquidity insurance no matter what the true risk is. Therefore, an ideal set of variables would contain a measure of ex ante default risk and of the entrepreneur’s subjective risk assessment.

A firm’s credit rating, generally available in the MUP as provided by *Creditreform*, would perform as an adequate proxy of firm ex ante risk. However, the *Creditreform* rating information is not available for the firm’s initial year (see Brown et al. (2012)). Therefore, I use a prediction of firm market exit probability as a proxy for ex ante risk. The KfW/ZEW start-up panel contains a core set of variables for each firm related to its initial year. The information on market exit is either provided by the survey or by the MUP. I use a 90 % random subsample of the firms founded in 2005 to 2007, estimating a probit regression model for firm market exit within three years after its establishment, on firm and entrepreneurial characteristics. In Table A.1 in the Appendix, I present the definitions, the descriptive statistics, and the estimated coefficients of the variables employed. The variable “*market exit probability*” is an out-of-sample prediction for the sample firms founded in 2009 to 2011.

In order to test the goodness-of-fit, I use the remaining 10% subsample of firms founded in 2005 to 2007 with known market exit for an out-of-sample prediction. In Figure A1 in the Appendix, I plot the Receiver Operator Characteristics (ROC) curve. This curve draws the probability of detecting a true state (sensitivity) against the probability detecting a false state ( $1 - \text{specificity}$ ). The area under the curve provides a measure of the discrimination. The diagonal line (Area under ROC curve = 0.5) suggests no discrimination whereas 1 would be perfect discrimination. The estimated area under ROC curve coefficient of 0.73 is considered an acceptable level of discrimination (Hosmer and Lemeshow, 2000). For a self selection strategy adopted by private banks to be successful, ex ante high risk firms would need to choose a non-private bank. I therefore expect a positive sign for ex ante risk and non-private banks.

A sound measure for entrepreneurial confidence and subjective risk assessment is missing in the data. However, in the interview, entrepreneurs were asked to rank the importance of the following criteria for selecting their initial main bank, on a five point Likert scale: “Expected support in case of a critical business development” (Question 3 (b) of Table 1). This measures the entrepreneur’s demand for liquidity insurance in difficult times. It might not be directly related with the entrepreneur’s subjective probability of becoming financially distressed. Even if an entrepreneur would consider this as an extreme event, it is severe for firm survival. No matter the reason, firms with a demand for liquidity insurance should be more likely to choose a relationship oriented bank. I therefore expect a positive sign in the logit regression. The measure is noisy for at least two reasons. First, the entrepreneur must be willing to give the bank a stake in the firm. Otherwise the bank will have no interest in supporting the firm. Second, the entrepreneur needs to expect that at least some banks would support the firm. The latter reason is not a problem for identification because if an entrepreneur did not expect support from a single bank, this criteria

would be of no importance for that entrepreneur. For the interpretation of this variable, one has to keep in mind that during the telephone interview, entrepreneurs respond to the question up to three years after the initial bank was selected. Therefore, it cannot be ruled out that the entrepreneurs' answers were biased by either business developments or by experience with the bank selected.

The descriptive statistics in Table 4 reveal that bank support is a very important criterion for over one-third of all firms. It further provides univariate evidence that firms that expect bank support in difficult times are more likely to choose a non-private bank. The share of firms for which this criterion is of utmost importance is 39% for *Sparkassen* and 38% for cooperative banks, compared to 24% for private banks.

Table 4: Firm characteristics and selected bank type

Question table 1		Mean conditional on chosen main bank type:			Mean Full Sample	Exp. Sign Base: Private Bank
		Public (869)	Cooperative (508)	Private (323)		
1.	No. of observations	(869)	(508)	(323)	(1,700)	
2.	Previous bank relation	69%	62%	54%	64%	+
3.(a)	Criteria: Industry competence†	9%	11%	9%	10%	+/-
3.(b)	Criteria: Support in crisis†	39%	38%	24%	36%	+
3.(c)	Criteria: Specialized fin. services†	6%	5%	9%	6%	-
3.(d)	Criteria: Favorable market conditions†	27%	31%	34%	29%	-
3.(e)	Criteria: Closeness to bank†	48%	48%	24%	43%	+
4.	Talks with multiple banks	51%	58%	59%	54%	+
5.	Bank loan/service denied	13%	14%	12%	13%	+/-
	Market Exit Prob (3 years)	16%	16%	17%	16%	+
	Demand for bank finance	57%	61%	32%	53%	+
	Signal: No Governmental sup- port	33%	31%	55%	37%	-
	Demand for equity finance	4%	5%	8%	5%	-
	Export	11%	11%	14%	12%	-

Note: † Criterion was of utmost importance (5 scale likert).

Source: KfW/ZEW Start-up Panel and MUP (ZEW) 2012, author's own calculations.

Based on the discussion of relationship banking, I employ two further variables, previous personal bank relationship and seeking bank financing. First, I use the indicator variable “*previous personal bank relations*” (Question 2 of Figure 1). Personal relationships are valuable if the firm seeks a close bank relationship and the managers consider the bank as capable of processing personal information. Previous private bank relationships cannot reduce information asymmetry between the firm and bank about the new project, but banks can use the information about the managers personal trustworthiness and liability. This can become especially important if firms are in financially difficult times. The identification of this variable is the reverse. Given that personal information is of less value for private banks, such entrepreneurs would need to build a new relationship anyway. Since relationship-oriented firms are more capable to process this type of information, those might be better able to bind those clients. Therefore, I expect a positive sign of “*previous personal bank relation*”. Table 4 shows that nearly two third of all firms use a bank that served as personal main bank relationship of the entrepreneur. 66% of firms that choice a non-private bank already had previous personal relationships. This share is smaller within the group choosing a private bank (55%).

Second, I consider firms seeking bank finance in the initial year. With increasing debt the financiers' influence increases. The financiers can decide to liquidate the firm if necessary. Further, relationship banking might increase access to finance. Following Brown et al. (2012), I define firms with demand for external finance if the firm reported difficulties and/or used external finance. Demand for bank finance includes the use of long-term, short-term debt, and promotional loans, as well as reported difficulties seeking bank finance.<sup>5</sup> I expect the coefficient to be positive for non-private banks. Descriptive statistics already indicate such a relationship. The share of firms seeking bank finance is higher for firms that choose a *Sparkasse* (56%) and cooperative (59%) compared to a private bank (32%).

I use two variables to identify firms seeking transaction-oriented banks. First, firms stating "*favorable market conditions*" as a very important criterion selecting a bank (Question 3 (b) of Figure 1) may not be willing to accept higher costs from relationship-oriented banks. The share of firms for which favorable market conditions are of utmost importance is higher for private banks (36%) compared to *Sparkassen* (28%) or cooperative banks (31%).

Second, firms can signal their low risk status to transaction-oriented banks by foregoing public support. Such is offered by the German federal and state governments to newly established firms. On their web page the German federal ministry of economics and technology lists 193 different public programs available for newly established firms. The executing institutions also provide assistance applying for subsidies to keep firms' administration costs at a low, affordable level. The chance to receive funding is relatively high. Based on figures of the KfW/ZEW Start-up Panel only 8% of firms seeking public funding were denied. Not demanding public support then can serve as a signal for low risk. I expect the sign to be negative. Demand for governmental support is defined as the use and/or stated difficulties attracting either promotional loans, state guarantees, start-up grants from the federal employment agency, or other forms of subsidies. The share of firms not demanding public support is higher for private main banks (55%) compared to *Sparkassen* or cooperative banks (36% and 32%).

As further criteria, I control for banks' "*industry competence*" and "*specialized financial products*". An entrepreneur might consider that banks with high competence or experience in the firms business is better able to assess the firms business model. Höwer et al. (2011) show that firms with relationship to a bank experienced in the firms industry invest more in R&D. Large, private banks might find it easier organising competence centers for special fields due to the number of customers. However, especially in the cooperative banking sector industry specialized banks exist. For this reason there is no expectation regarding the coefficient's sign. Depending on their business models firms might also demand specialized financial services, e.g. export financing. Large, private banks are directly connected internationally. Those banks can offer specialized financial products in-house. Smaller *Sparkassen* and cooperative banks instead need to cooperate with their central institutes. Entrepreneurs might consider that *Sparkassen* and cooperative banks are less

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<sup>5</sup>Loans from the KfW (on the federal level) and other state promotional banks are mostly granted by a firms' main bank, while the promotional bank covers up to 80% of the main bank's loan default risk.

competent in that field and expect higher (transaction) costs. Descriptive statistics reveal that the share of firms for which specialized financial services was of utmost importance is higher for private (9%) compared to cooperative banks (5%) or *Sparkassen* (6%). I therefore expect the coefficient to be negative.

Further, I employ a set of control variables that have a potential influence on main bank choice. A full list of variable definition and descriptive statistics is provided in Table A.2 in the Appendix. Next to loans, banks offer a variety of financial services. The share of firms for which specialized financial products was a very important criterion, as well as for exporting firms, is higher for private banks. Export is an indicator variable that takes on the value of one if the firm was able to sell products on international markets. I also control for firm size at start-up, entrepreneurs' education, industry experience, and demand for external equity (e.g. Venture Capital, Business Angels, mezzanine capital). Firm size is measured as the number of employees at start-up, with an indicator variable that equals one if the firm was founded by a team. I account for entrepreneurs with a university degree and those that hold a master craftsman's diploma. For entrepreneurial experience, I distinguish between successful entrepreneurs that sold a previous business or run multiple businesses from unsuccessful ones (restarter). I control for ten industries, including four high-tech (see Table A.6 in the Appendix for industry classification).

The variables "*bank intensity*", "*local banking market competition*" and regional classification control for regional aspects the where firm is located. "*Bank intensity*" is measured as the number of banks active in the firm's district divided by the number of active firms in that district. I measure "*local banking market competition*" as the number of firms that switched their main bank relationship within the firm's district in proportion to the number of active firms. Further, districts are classified based on the population density as either metropolises, major cities, hinterland, urban areas, or rural areas, defined by the federal office for building and regional planing.

## 4.2 Results of the Logit Model

In Table 5 I present the results of the logit model of the firm's main bank selection. As dependent variable I use non-private banks (*Sparkassen*, *Landesbanken*, and cooperative banks) with private banks as the base category. From the discussion on bank types above, non-private banks are supposed to be more relationship-oriented than private banks. A positive coefficient therefore suggests that respective firms are more likely to choose a relationship-oriented bank. Next to the coefficient I present the marginal effects (dydx). All three specifications presented are based on the sample of consistent bank information (see Table 2 column (1)).

The first specification is used as the base model. It includes variables on entrepreneurial, firm, and regional characteristics. In the second specification, I introduce choice criteria. The third specification additionally covers variables regarding firms' demand for external finance. The number of observations drops by a quarter because firms entering the panel a year after start-up are asked regarding demand for external finance only. The main explanatory variable coefficients remain stable in all specifications and also for other specifications were I additionally use observations with missing bank information in the MUP

Table 5: Main results – Chosen main-bank type (logit model)

Dependent Variable: Non-private Bank (Base: Private Bank)	Base		Choice Criteria		Financing sources	
	Coef. (S.E.) (1)	Margin (2)	Coef. (S.E.) (3)	Margin (4)	Coef. (S.E.) (5)	Margin (6)
Personal prior relation			0.445** (0.139)	0.059** (0.039)	0.601*** (0.164)	0.078*** (0.028)
Talks with multiple Banks			-0.297* (0.146)	-0.039* (0.020)	-0.328 (0.172)	-0.042 (0.020)
Bank loan/service denied			0.405 (0.216)	0.053 (0.026)	0.122 (0.256)	0.016 (0.026)
Market Exit Prob (3 years)			-2.041 (1.413)	-0.269 (0.178)	-0.878 (1.789)	-0.113 (0.178)
Criteria: Industry competence			-0.314 (0.254)	-0.041 (0.030)	-0.342 (0.309)	-0.044 (0.309)
Criteria: Support in crises			0.596*** (0.164)	0.079*** (0.026)	0.584** (0.194)	0.075** (0.026)
Criteria: Specialized financial services			-0.698** (0.265)	-0.092** (0.033)	-0.672* (0.330)	-0.087* (0.330)
Criteria: Favorable market conditions			-0.645*** (0.156)	-0.085*** (0.026)	-0.671*** (0.183)	-0.087*** (0.183)
Criteria: Short distance to bank			0.929*** (0.153)	0.122*** (0.026)	1.129*** (0.181)	0.146*** (0.026)
No. of bank relations			0.114 (0.197)	0.015 (0.026)	0.062 (0.247)	0.008 (0.247)
Demand for bank finance					0.813*** (0.191)	0.105*** (0.191)
No demand gov support					-0.374* (0.178)	-0.048* (0.178)
Demand for external equity					-0.429 (0.326)	-0.055 (0.326)
Export					-0.029 (0.241)	-0.004 (0.241)
Sales	-0.125 (0.220)	-0.018 (0.026)	-0.111 (0.228)	-0.015 (0.026)	-0.019 (0.293)	-0.003 (0.293)
Proprietorship	-0.449** (0.148)	-0.063** (0.026)	-0.583** (0.182)	-0.077** (0.026)	-0.380 (0.227)	-0.049 (0.227)
Firm size (employees)	0.114** (0.038)	0.016** (0.003)	0.121** (0.038)	0.016** (0.003)	0.070 (0.041)	0.009 (0.041)
Management team	0.023 (0.154)	0.003 (0.026)	0.013 (0.160)	0.002 (0.026)	0.129 (0.185)	0.017 (0.185)
Entrepreneurial record	-0.418** (0.159)	-0.059** (0.026)	-0.427* (0.174)	-0.056* (0.026)	-0.334 (0.189)	-0.043 (0.189)
University degree	-0.068 (0.167)	-0.010 (0.026)	-0.040 (0.173)	-0.005 (0.026)	-0.080 (0.200)	-0.010 (0.200)
Master craftsman	0.289 (0.200)	0.041 (0.026)	0.216 (0.209)	0.028 (0.026)	0.193 (0.252)	0.025 (0.252)
Metropolises	-1.190*** (0.235)	-0.168*** (0.026)	-1.021*** (0.244)	-0.134*** (0.026)	-0.746* (0.298)	-0.096* (0.298)
Major city	-0.410* (0.175)	-0.058* (0.026)	-0.344 (0.181)	-0.045 (0.026)	-0.351 (0.209)	-0.045 (0.209)
Urban area	0.072 (0.248)	0.010 (0.026)	0.121 (0.264)	0.016 (0.026)	-0.108 (0.302)	-0.014 (0.302)
Rural area	-0.636** (0.211)	-0.090** (0.026)	-0.588** (0.222)	-0.077** (0.026)	-0.603* (0.267)	-0.078* (0.267)
Bank intensity (district)	0.225 (0.287)	0.032 (0.026)	0.287 (0.300)	0.038 (0.026)	0.410 (0.361)	0.053 (0.361)
Banking competition (district)	-46.012 (24.574)	-6.494 (0.026)	-38.152 (25.403)	-5.024 (0.026)	-16.159 (30.489)	-2.086 (0.026)
Year Dummies		Yes		Yes		Yes
Industry Dummies		Yes		Yes		Yes
Constant		1.646*** (0.374)		1.370** (0.524)		0.719 (0.649)
Observations		1,700		1,700		1,273
LR Chi2		133		233		235
log likelihood		-760.18		-710.00		-518.63

*Note:* In this table I present the results after a logit regression for observations with consistent bank type information in the KfW/ZEW Start-up Panel and Mannheim Enterprise Panel. I use “Non-private bank” as the dependent variable in all specifications. This indicator variable is one if the selected main bank is non-private and zero otherwise. The regressions are based on three samples: “Base” includes entrepreneurial and regional characteristics. “Criteria” additionally includes variables regarding selection criteria. Sample size reduces for “Financing sources” since demand for finance and exports for the initial year is asked if the firm enters the Panel in its second year only. Standard errors are presented in parentheses. \*, \*\*, and \*\*\* denote significance level on the 10, 5, and 1% levels, respectively.

*Source:* ZEW Bank Panel, KfW/ZEW Start-up Panel, and MUP (ZEW) 2012, author’s own calculations.

(see Table 2 column (3)).

**Variables indicating relationship orientation** I first consider the variables indicating relationship oriented firms. As discussed above, private banks do not have a mission statement or mandate and entrepreneurs might anticipate renegotiations in episodes of distress to be much tougher with private compared to non-private banks. Consistent with expectations, I find that entrepreneurs for whom “*expected support in case of a critical business development*” was of utmost important criteria while searching the main bank relationship are more likely to choose a non-private bank. Those entrepreneurs have a 8% higher probability of choosing a *Sparkasse* or cooperative bank. A successful self selection strategy, offering low cost transaction oriented banking as discussed by Matthey (2010), would require attracting low default risk firms. The results of my empirical model do not confirm such a pattern. The effect of the variable “*predicted default probability*” of choosing a non-private bank is not statistically significantly different from zero.

There are at least two explanations for this. First, an entrepreneur’s demand for liquidity insurance need not depend on an objective risk measure. An entrepreneur might also want to be insured against an event that is unlikely but existential for the firm. Second, an entrepreneur’s own beliefs regarding the probability of distress might not correlate with the predicted market exit probability. As an attempt to control for entrepreneurs’ (over)confidence and expectations, I employed further specifications including indicator variables “*implementing business ideas*”, and “*expected higher salary*” as motives for start-ups, as well as “*expected sales decline*”. None of these three variables are significant. For expected sales decline, this might be the case because entrepreneurs build up their business in the first years. In the sample, only a small fraction of firms’ expected sales decline from the initial year to the second. Both motivations might be related to higher an entrepreneurial confidence higher than for those that start business as a way out of (expected) unemployment. However, the introduction of these variables do not change the results for the main explanatory variables.

Although private banks might not attract low risk clients to a larger extent than non-private banks, a self selection strategy by private banks could still be fruitful. Bank clients do not necessarily demand bank financing. The average risk in private bank’s loan portfolio could be lower if only low risk firms demand bank financing or if private banks employ stricter rules. I find that firms with “*demand for bank finance*” (used or reported difficulties with bank finance) have a 10% higher probability choosing a non-private bank. This might be the case because firms think that non-private banks are more likely to grant loans. Other empirical studies have shown that firms seeking bank finance face more difficulties if their main bank is a private bank (Brown et al., 2012), as well as having a more relaxed access to bank financing due to relationship banking (Elsas and Krahnen, 1998). When a firm uses bank financing, the bank’s stake in the firm increases. I used two interaction terms to control for a joint effect of “*demand for bank finance*” and “*predicted default probability*”, as well as “*demand for bank finance*” and the criterion “*expected support in case of difficult business development*”. Neither of these two interaction terms is significant (not reported in the table). This could be the case because

the variable “*demand for bank finance*” is restricted to the firm’s initial year. Fryges et al. (2012) show that the fraction of firms using external finance increases with firm age. 70% of all five year old firms used external financing at least once, with bank finance as the most important source of external finance. Firms that anticipate future demand for bank finance might consider support in financial distress as important. This however can hardly be observed in the initial year.

I find that entrepreneurs who had previous personal or business related relationships with the firm’s main bank have a nearly 10% higher probability of selecting a non-private bank. If entrepreneurs consider personal relationships to be meaningless, they would choose a bank for other reasons and the coefficient would have been insignificant. An entrepreneur could also stay with their personal prior bank relationship just for convenience. This, however, should not be related to bank type, and the coefficient should again be insignificant. I therefore infer that entrepreneurs’ evaluations of personal relationships and their being valuable for a firm main bank relationship, differ across bank types. An entrepreneur with a previous personal bank relationship to a *Sparkasse* or cooperative bank might expect that their bank is capable of processing personal information also for the new firm. A *Sparkasse* or cooperative bank is therefore more capable of binding those customers that seek to build a close firm–bank relationship. An entrepreneur with a private bank as their previous personal relationship might consider this personal information as less valuable for a new firm–bank relationship. Such an entrepreneur would need to build up a firm–bank relationship without personal information anyway. Compared to *Sparkassen* and cooperative banks, private banks are therefore less able to bind such entrepreneurs. In these considerations, I assume that the choice of a personal main bank relationship was not influenced by a potential future start-up. I also control for entrepreneurial experience to rule out the described effect’s not being influenced by previous firm–bank relations.

**Variables indicating a transaction orientation** The variables indicating transaction oriented firms also have expected signs. Firms for which “*favorable market conditions*” are of utmost importance are more likely to choose a private bank. The coefficient is statistically significant and the marginal effect suggests that cost sensitive firms are nearly 8% less likely to choose a non-private bank. The results indicate that those entrepreneurs consider that non-private banks offer services and loans at higher costs, and so choose a private bank. The distinction between relationship and transaction oriented banks by their type can serve as an explanation. Relationship-oriented banks need to invest in specialization (Boot and Thakor, 2000). Entrepreneurs might infer that this investment comes with higher costs. For entrepreneurs, comparing costs for bank services can become very difficult due to cross selling and interest rate differences. Even if cost differences did not exist, would be sufficient that entrepreneurs expect them to exist. In addition, entrepreneurs take into consideration the higher transaction costs related to relationship oriented banks that are due to the higher frequency of meetings and the need to provide information. Firms that are cost sensitive do not consider relationship lending as important use a private bank.

I find a weak negative significant effect of firms’ foregoing governmental support on

their choice of a non-private bank. As described in subsection 4.1, the cost of applying for governmental support is affordable and the chances of receiving it are quite high. So why do firms “leave money on the table” and why are those firms more likely to end up with a private bank? Public subsidies are intended to improve the situations of high risk firms. Low risk or good performing firms should not be subsidized. I find that firms that did not apply for subsidies in their initial year have a nearly 5% lower probability of using a non-private bank. Firms approaching a private bank could therefore use “not demanding subsidies” as a signal to indicate their low level of risk.

**Results for the control variables** Firms seeking specialized financial products, e.g., export financing or warranty guarantees, are more likely to choose a private bank. The majority of firms that choose a private bank have a relationship with one of the large banks. These banks have better and more direct international connections. In general, *Sparkassen* and cooperative banks also offer all types of bank services. However, specialized services are provided by their central banks. Local *Sparkassen* and cooperative banks therefore might be less experienced and the transaction costs might increase, as a further institution is involved. Private banks instead have in-house competence center for specialized financial services.

Entrepreneurial and firm characteristics seem not to play a major role in the choice of the main bank. Larger firms, in terms of the number of employees at the start of their business, have a higher probability of choosing a non-private bank, whereas firms in the legal form of a limited liability company are more likely to use a private bank. Entrepreneurs with previous entrepreneurial experience are also more likely to choose a private bank. But the findings for these three variables are not robust and vanish as soon as I introduce variables regarding demand for external finance.

There are two interesting effects regarding regional characteristics. First, firms in regions classified as metropolitan areas or major cities are less likely to choose a non-private bank than are firms located in urban areas. Second, and even more interesting, firms located in rural areas are less likely to choose a non-private bank than are firms in urban areas. This is surprising, because it is often argued that *Sparkassen* and cooperative banks are dominant in rural areas. The descriptive statistics of the distance by bank type and regional type also reveal that *Sparkassen* and cooperative banks are located closer to firms than are private banks. The mean distance of the closest *Sparkasse* in rural areas is 2.2 km, of cooperative banks 2.3 km, and of private banks 12 km.<sup>6</sup> In rural areas, those branches of *Sparkassen* and cooperative banks are typically small and provide services for private households. Firms seeking bank financing or with a demand for specialized services might be asked to approach the bank’s headquarter or a better suited branch. Even if local branch managers might be in close contact with these units and are asked about the entrepreneur’s reliability, the entrepreneur would have to face travel costs. Due to these transaction costs, entrepreneurs in rural areas might be more likely to choose a private bank than are entrepreneurs in urban areas.

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<sup>6</sup>The direct distance presented seems quite close for rural areas. But note that firms are most likely to choose a location close to any existing infrastructure.

## 5 Nested Logit Model Approach

The empirical model presented above is imprecise in that a firm chooses a bank and not just a bank type. Now I use a model that allows each firm to choose a main bank from a set of alternative banks. This version of a nested logit model (McFadden, 1978) is well suited to deal reasonably flexible with the size of firm observations, bank alternatives, and a large set of observed variables describing firms' choice. Each firm  $i$  chooses a bank  $k$  out of a set of alternatives from which to choose. The individuals are firms established in the year of observation. The alternatives from which to choose are the universal banks active in business financing. Each bank belongs to a single banking group  $j$  (either non-private or private).

The firm's utility obtained from choosing a bank  $k$  out of a banking group  $j$  can be expressed as

$$U_{jk} = V_{jk} + \varepsilon_{jk} \quad (2)$$

with  $k = 1, 2, \dots, K_j$ ,  $j = 1, 2, \dots, J$ .

The nested logit model arises when the error terms  $\varepsilon_{jk}$  have the generalized extreme value distribution with joint cumulative distribution

$$G(Y) = \sum_{j=1}^J \left( \sum_{k=1}^{K_j} Y_{jk}^{1/\rho_j} \right)^{\rho_j} \quad (3)$$

where the scale or dissimilarity parameter  $\rho_j$  is inversely related to the correlation between  $\varepsilon_{jk}$  and  $\varepsilon_{jl}$ . The parameter  $\rho_j$  can be interpreted as the degree of independence of the error terms among alternatives within a nest. The larger the  $\rho$ , the greater the independence and the less the correlation between the error terms. The outcome variable  $Y_{jk}$  either takes the value unity if the bank alternative is chosen as the main bank relationship, or zero otherwise. The parameter  $V_{jk}$  from Equation 2 can be evaluated as

$$V_{jk} = z'_j \alpha + x'_{jk} \beta_j \quad (4)$$

where  $z_j$  is a vector of variables varying over firms (individual-specific) and  $x_{jk}$  is a vector of variables varying over banks or both firms and banks (individual-alternative specific). The probability of the nested logit model with generalized extreme value distribution can be expressed as

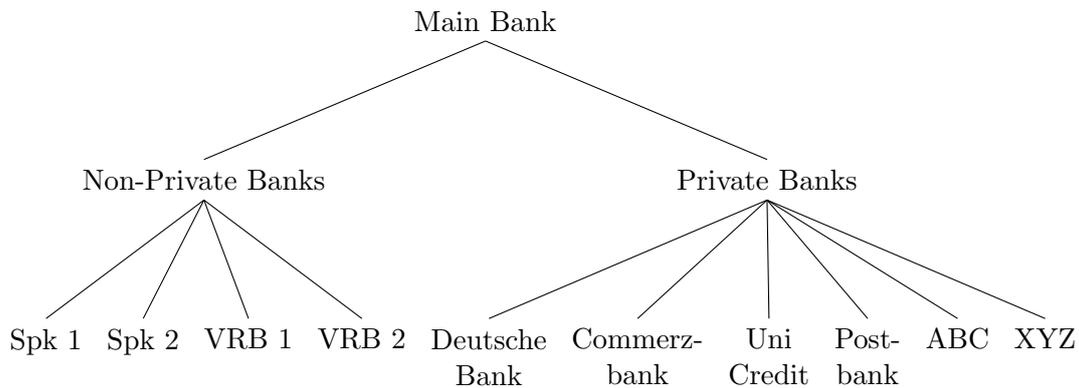
$$p_{jk} = \frac{\exp(z_j \alpha + \rho_j I_j)}{\sum_{m=1}^J \exp(z'_m \alpha + \rho_m I_m)} \times \frac{\exp\left(\frac{x'_{jk} \beta_j}{\rho_j}\right)}{\sum_{l=1}^{K_j} \exp\left(\frac{x'_{jl} \beta_j}{\rho_j}\right)} \quad (5)$$

where

$$I_j = \ln\left(\sum_{l=1}^{K_j} \exp\left(\frac{x'_{jl} \beta_j}{\rho_j}\right)\right) \quad (6)$$

is the inclusive value. The nested logit model can be decomposed into two logits ( $p_{jk} = p_j \times p_{k|j}$ ). That is the probability that firm  $i$  chooses the banking group  $j$  (the first part of

Figure 2: Decision tree — Main bank choice



Equation 5, that is similar to the logit model presented above) times the probability that the firm chooses bank  $k$  conditional on choosing bank group  $j$  (second part of equation 5). The inclusive value  $I_j$  serves as a convenient statistical test of whether the two decisions should be nested. If the coefficient of the inclusive value is zero, there is no nesting of the decisions and Equation 5 reduces to the unconditional probability of choosing bank  $k$  times the probability of choosing the banking group.

### 5.1 Sampling the Set of Alternatives

The definition of the decision tree and the set of alternatives is crucial for this kind of analysis. First, I test for the optimal number of nests. As mentioned in Section 2.2 universal banks active in business finance are organized in three banking groups, but *Sparkassen* and cooperative banks have similar business concepts (Engerer, 2006; Hakenes and Schnabel, 2011). I employ a Hausman test of the independence of irrelevant alternatives after a conditional logit model for the choice of bank type, with alternative varying variables. The test results suggest pooling *Sparkassen*, *Landesbanken*, and cooperative banks in a single nest.

In Figure 2, I present the tree structure used. In the first layer, the firm chooses one of the nests, either non-private (*Sparkassen*, *Landesbanken*, and cooperative banks) or private banks. In the second layer, the firm selects a bank from among the alternatives in the chosen nest.

For technical and practical reasons, I need to reduce the set of alternatives from which each firm can choose. The likelihood function requires that there is an observation for each firm and alternative. Technically, the number of parameters getting estimated for each variable added is multiplied by the number of alternatives. Practically, firms are not able to choose any bank active in Germany because some have constrained geographical business areas. In general, those banks are allowed to serve clients within their business area only. This policy is not that strict in practice and one observes relationships with firms especially in neighboring regions. However, it is unlikely that a *Sparkasse* in southern Germany would actively attracts firms in northern Germany. Because there are no clearly defined local banking markets in Germany, I use three strategies to sample banks into a

set of alternatives from which a particular firm can choose.

**Sampling based on bank branch network** In the first sampling strategy, I assign banks to a firm’s choice set if the bank operates a branch close to the firm’s location. Each set of alternatives consists of eleven banks. It contains the branch with the closest distance of a *Landesbank* and each large bank (*Deutsche Bank*, *Commerzbank*, *Postbank*, and *UniCredit*). The firm can further choose from among two *Sparkassen*, two cooperative banks, and two private banks, that have the branches closest to the firm’s location. If the chosen main bank relationship does not belong to the sampled set, a randomly selected bank of the same type gets replaced.

**Sampling based on 25 a km radius** Within the sample, the 90th percentile firm has its main relationship with a bank branch located 25 kilometers away from the firm. In the second sampling strategy, I therefore assign a bank to a firm’s choice set if the bank operates a branch within 25 kilometers of the location of the firm. If a bank operates several branches within that distance, I use the information of the closest branch. A sampled bank branch gets replaced if the chosen bank branch is from the same bank. The selected main bank is added if it does not operate a branch within the 25 km radius. The number of alternatives varies over firms according to local bank intensity.

**Sampling based on bank client structure** Both of these sampling strategies are based on bank branch networks. Although most firms choose a bank from among those with a branch close to the firm, this does not fully reflect the firm’s options. Banks that are active nationwide but operate only a few branches are less likely to be sampled into a firm’s set of alternatives. Those banks might be specialized in the firm’s industry and therefore be potentially attractive as a financing partner.

The third strategy is therefore based on the bank’s client structure. Basically, a bank is sampled if it has clients in the firm’s region. There is a trade-off between false sampling and not sampling. False sampling might accrue, because a bank’s client moved to another region but kept its relationship. But, a nationwide bank might not be sampled because it is small and does not yet have sufficient number of customers in the region yet. For sampling, I use the classification of nationally, supra-regionally, and regionally active banks, introduced in Section 2.2 (see also Table 1). First, the firm can choose any bank that is nationally active. Second, a firm can choose a supra-regionally active bank if that bank serves clients in the firm’s regional planning area. Third, a firm can choose a regionally active bank if that bank serves clients in the firm’s district.

The number of alternatives varies, over firms, from 57 to 195, according to local bank intensity. The number of alternatives and parameters is still high. McFadden (1973) shows that using a random subsample of alternatives one can obtain efficient and consistent estimates of multinomial logit models with alternative varying variables. In the regression, I use a random sample of one-third of the bank alternatives per firm. The number of alternatives per firm varies between 19 and 65. Again, if the chosen main bank relationship does not belong to the sampled set, a randomly selected bank of the same type gets

replaced.

## 5.2 Empirical Equation and Data Used

Since bank level information is required, I use the sample of observations with consistent bank type information in both the KfW/ZEW Start-up Panel and the MUP (column (1) in Table 2). In order to test for the hypothesis by taking alternative banks into account, I estimate the following specification of a nested logit model:

$$\begin{array}{llll}
 \text{Main Bank (0;1)} & = & \rho & \text{Dissimilarity parameter} \\
 & + & \alpha_1 & \text{ex ante risk} \\
 & + & \alpha_2 & \text{Criteria} \\
 & + & \alpha_3 & \text{Previous personal relation} \\
 & + & \alpha_4 & \text{Seeking external finance} \\
 & + & \alpha_5 & \text{Signal: No gov. support} \\
 & + & \alpha_6 & \text{Export / Born global} \\
 & & & \left. \vphantom{\begin{array}{l} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \\ \alpha_6 \end{array}} \right\} \begin{array}{l} \text{individual} \\ \text{specific} \end{array} \\
 & + & \beta_1 & \text{Market share} \\
 & + & \beta_2 & \text{Bank size} \\
 & + & \beta_3 & \text{Bank industry and spatial concentration} \\
 & + & \beta_4 & \text{Distance (firm - bank branch)} \\
 & & & \left. \vphantom{\begin{array}{l} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{array}} \right\} \begin{array}{l} \text{alternative} \\ \text{varying} \end{array}
 \end{array} \quad (4.7)$$

$\left. \begin{array}{l} \text{Base:} \\ \text{Private bank} \end{array} \right\}$

$\left. \begin{array}{l} \text{chosen} \\ \text{main} \\ \text{bank} \end{array} \right\}$

**Dependent Variable** The indicator variable “main bank” serves as the dependent variable. The variable is unity if the bank is selected as the main bank relationship and zero otherwise. Explanatory variables are grouped into either firm specific variables  $\alpha$  or alternative varying variables  $\beta$ .

**Data for the bank type nest ( $\alpha$ )** I use the variable “non-private bank” for identification of the first layer. This indicator variable is unity for non-private banks and zero for private banks. The vector of variables  $z_j$  to estimate  $\alpha$  consists of the same set of individual specific variables used in the logit regression model above. In addition, I estimate  $\rho$  as the dissimilarity parameter that indicates the correlation of errors within the nest.

**Data for individual banks ( $\beta_j$ )** The vector  $x'_{jk}$  includes a set of variables varying over firms and alternatives. As alternative variables I employ bank portfolio characteristics using the ZEW Bank-Panel calculated based on firm–bank relationships observed in the MUP. Since loan volume is missing from the MUP, all characteristics are based on firm–main bank relationships of nearly all firms in Germany. Weighting by the firm’s labor force reflects the fact that, in general, larger firms demand higher loan volumes and more intensive financial services. I excluded observations of large firms with more than 50,000 employees for the calculation of this measure. Even after the data cleaning process, e.g., controlling for sales figures in the employment data field or double counting, there are potential errors. The effect of this error on bank characteristics increases with the number of employees. I tested 10,000 and 40,000 employees as alternative thresholds, without severe effects on the results.

The descriptive statistics on these variables are shown in Table 6. Note that these statistics are for banks that serve as the main bank relationships of the observed firms. The interpretation of the table is as follows. Consider the figures regarding the bank

market share in the firm’s district for non-private banks in the first row of Table 6. The mean market share in the firm’s district is 27% for *Sparkassen*, 7% for cooperative, and 13% for private banks. The market share of banks serving as a main bank relationship in the full sample is 18%. The values of the bank portfolio characteristics are asymmetrically distributed among the three banking groups (see Table A.3 in the Appendix).

Table 6: Characteristics of chosen main banks

No of observations	Mean given chosen main bank is:			Mean Full Sample (1,700)	Definition	Exp. Sign
	Public (869)	Coop. (508)	Private (323)			
Bank size (division)	60	16	101	55	$= \frac{\sum_{b=1}^{Bank} Firm_{i,b} \times Emp_i}{1,000}$	
Bank size (total)	60	16	3,014	608	$= \frac{\sum_{b=1}^{Bank} Firm_{i,b} \times Emp_i}{1,000}$	
Bank market share in district	0.27	0.07	0.13	0.18	$= \frac{\sum_{b=1}^{Bank} Firm_{i,d,b} \times Emp_i}{\sum_{d=1}^{District} Firm_{i,d} \times Emp_i}$	+
Bank regional concentration	0.63	0.57	0.03	0.50	$= \sum_{b=1}^{Bank} (\frac{Firm_{i,d,b} \times Emp_i}{Banksize_b})^2$	+
Bank industry specialization	0.03	0.04	0.03	0.04	$= \frac{\sum_{b=1}^{Bank} Firm_{i,ind,b} \times Emp_i}{Banksize_b}$	+
Distance to bank branch	11	17	45	19	Direct distance between firm location and bank branch location in km.	-
Distance to Bank headquarter	16	24	257	64	Direct distance between firm location and bank headquarter location in km.	-

*Definition of indicators:* i = firm; b = bank; d = district; ind = industry

*Source:* ZEW Bank Panel, KfW/ZEW Start-up Panel, and MUP (ZEW) 2012, author’s own calculations.

In the empirical banking literature, bank size is often used as a proxy for a bank’s ability to process soft information (e.g. Stein, 2002; Berger and Black, 2011). Bank size is usually measured by the bank’s total assets. In the publicly available data bases for bank balance sheet information, such as Bankscope, the total assets are missing for a large share of the banks. This would reduce the sample size significantly. Therefore, I measure “*bank size*” as the total labor force of the firms for which the bank serves as the main bank. The Spearman rank correlation between the total assets reported in bank scope and bank size provided in the ZEW Bank panel for the year 2009 is 0.80, and significant at the one percent level. I incorporate a squared term that controls for a potential non-linear effect of bank size on the firm’s main bank choice. Large banks are mostly organized in regional divisions. I calculated the bank size of large banks according to their regional reporting required by German banking supervisory authorities. These regions correspond in general to the states (*Bundesländer*). Cooperative banks are the smallest banks, followed by *Sparkassen* and *Landesbanken*. Although large banks are split regionally, those are much bigger than the banks from the other groups.

I use the variable “*bank market share in district*” to control for a bank’s engagement in the firm’s region. I measure bank market share as the total labor force of the firms for which the bank serves as the main bank and that are located in the entrepreneur’s district in proportion to the total number of labor employed in the entrepreneur’s district. I expect a positive correlation of bank market share and firm’s main bank choice.

The variable “*banking market concentration*” provide information about the regional

concentration within a bank’s portfolio. It is measured in the same way as the Herfindahl Index: taking the sum of squared district shares within the bank portfolio. District shares are calculated as the total labor force of the firms located in a particular district for which the bank serves as a main bank, divided by the “*bank size*”. The variable “*bank industry expertise*” is related to the industry of each firm. I calculate this variable as the total labor force of the firms with the same industry code as the observed firm for which the bank serves as a main bank, divided by “*bank size*”.

Since entrepreneurs also might consider traveling costs when choosing a main bank relationship, I incorporate the variable “*distance to branch/headquarter*”. I expect a negative sign for distance. I use the STATA program “geodist” to calculate the distance as a direct line between the firm and the bank branch/headquarter. The geocodes are imported from google maps and based on the postal codes and city for the bank branches and the exact addresses for the firms and bank headquarters.

### 5.3 Results of the Nested Logit Model

In Table 7, I present the main results of the nested logit model. For comparison, I show the three sampling strategies: (1) closest distance to bank branch; (2) banks with branches within 25 km of the firm’s location; and (3) client structure – banks active in the firm’s district. For each sampling strategy, I present a base specification with the bank’s market share and regional concentration, a specification with the bank size and industry specialization, as well as a specification that further includes the distance between the firm and the bank branch. Table A.5 in the Appendix presents results with the full set of variables.

I calculate the average marginal effects after the nested logit using the method presented in Cameron and Trivedi (2009). I increase the value of an observed alternative varying variable for non-private banks by one standard deviation. Presented marginal effects correspond to the mean of the difference in predicted probabilities before and after the amendment. I present the marginal effects of the alternative varying variables for all three specifications in Table 8.

I first consider the estimated dissimilarity parameter, which indicates to what extent the error terms within a nest are correlated. A dissimilarity parameter of unity would indicate that there is no such correlation, and the nest might be inappropriate. The test of dissimilarity rejects the hypothesis that the dissimilarity parameter equals unity for all specifications. The value of the estimated coefficient  $\rho$  differs over specifications. In specifications based on the branch network (1) and (2),  $\hat{\rho}$  is smaller for private than for non-private banks, but for client structure (3), the reverse. The value of the estimated coefficient  $\rho$  increases once I introduce the variable distance to branch in km for the specifications “closest branch” and “client structure.” This might be driven by the fact that far away alternatives have a stronger effect. For the specification “closest branch,” this is the case because a chosen main bank relationship that is far away enters the set of alternatives. In the specification “client structure,” nationwide banks with few branches enter the choice set, affecting the mean distance.

All the results of the main explanatory variables presented for the logit model above remain stable in the nested logit. For the control variables, I find that firm size in terms

Table 7: Main results (coefficients) – Chosen main-bank relationship (nested logit model)

Sampling Strategy: Dependent Variable:	Closest Branch			Branches within 25 km			Client Structure		
	Base	Size	Distance	Base	Size	Distance	Base	Size	Distance
<b>Main bank</b>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Alternative varying (<math>\beta</math>)</b>									
Bank market share in district	1.743** (0.73)	2.242*** (0.62)	3.573*** (0.63)	2.548*** (0.80)	3.138*** (0.75)	3.184*** (0.76)	5.312*** (0.73)	6.301*** (0.73)	6.483*** (0.71)
Bank regional concentration	0.383** (0.17)	0.764*** (0.23)	1.171*** (0.24)	0.01 (0.04)	0.198** (0.08)	0.203** (0.09)	0.459*** (0.08)	0.863*** (0.14)	0.619*** (0.13)
Bank size (ln)		0.367*** (0.14)	0.561*** (0.17)		0.622*** (0.18)	0.641*** (0.18)		0.850*** (0.20)	0.825*** (0.20)
Bank size (ln, sq)		-0.018** (0.01)	-0.030*** (0.01)		-0.032*** (0.01)	-0.033*** (0.01)		-0.037*** (0.01)	-0.036*** (0.01)
Bank industry specialization		4.030*** (1.26)	4.835*** (1.26)		3.915*** (1.07)	4.061*** (1.11)		2.370*** (0.48)	3.940*** (0.71)
Distance to bank branch in km			0.008*** (0.00)			0.000 (0.00)			-0.006*** (0.00)
<b>Individual specific (<math>\alpha</math>)</b>									
<b>Criteria:</b>									
Industry competence	-0.288 (0.31)	-0.27 (0.31)	-0.23 (0.32)	-0.114 (0.34)	-0.087 (0.34)	-0.077 (0.34)	-0.233 (0.32)	-0.176 (0.33)	-0.123 (0.34)
Support in crises	0.574*** (0.19)	0.569*** (0.20)	0.551*** (0.20)	0.553*** (0.21)	0.540** (0.21)	0.539** (0.21)	0.549*** (0.20)	0.560*** (0.20)	0.558*** (0.20)
Specialized fin services	-0.702** (0.33)	-0.718** (0.33)	-0.727** (0.34)	-0.773** (0.36)	-0.756** (0.36)	-0.760** (0.36)	-0.743** (0.35)	-0.805** (0.36)	-0.797** (0.36)
Favorable market conditions	-0.674*** (0.18)	-0.693*** (0.18)	-0.629*** (0.19)	-0.652*** (0.20)	-0.665*** (0.20)	-0.665*** (0.20)	-0.648*** (0.19)	-0.695*** (0.19)	-0.716*** (0.19)
Short distance to bank	1.121*** (0.18)	1.126*** (0.18)	1.108*** (0.18)	1.194*** (0.20)	1.193*** (0.20)	1.190*** (0.20)	1.092*** (0.19)	1.073*** (0.19)	1.064*** (0.19)
<b>Firm Characteristics:</b>									
Personal prior relation	0.630*** (0.16)	0.606*** (0.16)	0.582*** (0.16)	0.705*** (0.17)	0.697*** (0.17)	0.707*** (0.17)	0.637*** (0.16)	0.579*** (0.17)	0.608*** (0.17)
Talks with multiple Banks	-0.313* (0.17)	-0.311* (0.17)	-0.319* (0.17)	-0.327* (0.18)	-0.328* (0.18)	-0.323* (0.18)	-0.289 (0.18)	-0.284 (0.18)	-0.264 (0.18)
Bank loan/service denied	0.121 (0.26)	0.129 (0.26)	0.106 (0.26)	0.17 (0.28)	0.188 (0.28)	0.192 (0.28)	0.181 (0.26)	0.21 (0.27)	0.206 (0.27)
No. of bank relations	0.084 (0.24)	0.004 (0.24)	-0.063 (0.24)	0.099 (0.25)	0.036 (0.26)	0.038 (0.26)	0.116 (0.25)	-0.004 (0.25)	0.043 (0.25)
Demand for bank finance	0.822*** (0.19)	0.799*** (0.19)	0.759*** (0.19)	0.782*** (0.20)	0.771*** (0.20)	0.773*** (0.20)	0.882*** (0.20)	0.912*** (0.20)	0.928*** (0.20)
No demand gov support	-0.366** (0.18)	-0.375** (0.18)	-0.399** (0.18)	-0.456** (0.19)	-0.471** (0.19)	-0.477** (0.19)	-0.379** (0.19)	-0.382** (0.19)	-0.375** (0.19)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$\rho$ Non-private banks	0.350** (0.15)	0.547*** (0.16)	0.788*** (0.15)	0.276*** (0.09)	0.411*** (0.10)	0.422*** (0.10)	0.332*** (0.05)	0.537*** (0.07)	0.592*** (0.07)
$\rho$ Private banks	0.250** (0.11)	0.349*** (0.11)	0.450*** (0.10)	0.237*** (0.08)	0.367*** (0.10)	0.392*** (0.10)	0.420*** (0.07)	0.638*** (0.09)	0.911*** (0.13)
LR Chi2	316	296	286	320	303	297	298	278	257
Observations	13,992	13,992	13,992	39,720	39,720	39,451	38,998	38,998	38,998
Cases	1,272	1,272	1,272	1,182	1,182	1,176	1,273	1,273	1,273
Alternatives per cases:									
Minimum	11	11	11	4	4	4	19	19	19
Average	11	11	11	33.6	33.6	33.5	30.6	30.6	30.6
Maximum	11	11	11	136	136	136	65	65	65

Note: Standard errors are presented in parentheses. \*\*, and \*\*\* denote significance level on the 10, 5, and 1% levels, respectively.  
Source: ZEW Bank Panel, KfW/ZEW Start-up Panel, and MUP (ZEW) 2012, author's own calculations.

Table 8: Main results (marginal effects) – Chosen main-bank relationship (nested logit model)

Sampling Strategy		Closest Branch	Branch within 25km	Client Structure
<b>Bank size</b>	public	0.018263	0.006797	0.009460
	private	-0.015219	-0.015867	-0.010071
<b>Bank market share</b>	public	0.081273	0.015848	0.044148
	private	-0.067727	-0.036997	-0.046999
<b>Bank regional concentration</b>	public	0.026846	-0.000195	-0.000295
	private	0.000687	0.000456	0.000314
<b>Bank industry share</b>	public	0.018263	0.006797	0.009460
	private	-0.015219	-0.015867	-0.010071
<b>Distance to bank</b>	public	0.000203	-0.000002	-0.000044
	private	-0.000169	0.000006	0.000047

Note: This table presents the results of the marginal effect of bank individual specific variables after the Nested Logit model. Marginal effects are estimated as the mean of the difference in predicted probability after an increase of each variable for private banks by one standard deviation.

Source: ZEW Bank Panel, KfW/ZEW Start-up Panel, and MUP (ZEW) 2012, author's own calculations.

of the number of employees is positive and significant. This finding suggests that larger firms are more likely to choose a non-private bank. The finding on firm size of the logit version was similar but not robust.

I now consider the alternative varying variables. I find an inverse U-shaped relationship of bank size with a firm's main bank choice, with a positive effect on bank size and a negative effect on the squared term of bank size. The results on bank size suggest that firms choose a bank of a sufficiently large size whereas the bank should not be too large. On the one hand, larger banks are more hierarchically structured (Berger and Black, 2011). In more hierarchic institutions it becomes harder to pass soft information up the hierarchy. On the other hand, banks that are too small might have difficulties in building the competence required by entrepreneurs. Growth oriented entrepreneurs might also take into consideration that a small bank's lending policy will be limited by bank capital requirements.

The bank's market share in the firm's district has a positive effect on the entrepreneur's main bank choice. For the client structure specification, a marginal increase of market share for non-private banks increases the probability that a bank of this type is chosen by 4.4 percentage points, whereas it decreases the probability that a private bank is chosen by 4.7 percentage points. Banks with a high market share in the firms region have detailed local knowledge. Those banks are more capable of assessing a firm's riskiness and market chances, especially for firms with a local market orientation. Those banks can also use their local knowledge to assess the entrepreneur's trustworthiness.

The probability of being chosen for a main bank relationship increases with the bank's regional concentration. Regional concentration can also be interpreted as a measure of a bank's hierarchic structure, similar to bank size. The more regionally concentrated is the bank, the shorter is the distance between the branch and the headquarters. The bank staff might thus be more closely related, and find it easier to share information. The bank's policy in general might be more regional focused. The marginal effect of bank's regional concentration is rather small. In the specification for client structure, a marginal increase in a non-private bank's concentration increases the probability that a private bank is chosen by 0.003 percentage points and decreases the probability that a non-private bank is chosen by 0.003 percentage points.

Although bank competence in the firm's industry is not an important criterion when choosing a banking group, it influences the selection of a particular bank. The results on alternative specific variables reveal that a bank's likelihood of being chosen increases with the share of the firm's industry within the bank's portfolio. The results suggest that firms do not relate industry competence with a banking group. From a firm's perspective, bank industry competence could ease the firm's access to bank finance, since the bank is more capable of evaluating the firm's project. The economic effect of an increase of industry competence for non-private banks on the probability of choosing a private vs. non-private bank is quite small.

In specifications (3), (6), and (9), I introduced the distance between the firm's location and the bank branch as a further control variable. The sign of the estimated coefficient in the sampling strategy "closest bank branch" is positive. This effect is driven by the

sampling strategy, because banks were replaced if the bank with a higher distance did not belong to the original set of alternatives. This sampling effect is less severe for the strategy “branches within 25 km” and non-existent in the strategy “bank client structure.” In both, the coefficient is negative. As travel costs increase for the entrepreneur and the banker, who potentially considers on-site visits, the bank is less likely to be chosen. This is consistent with the finding for the individual specific variables, that closeness to the bank is an important criterion for choosing a non-private bank. But the effect of actual distance to the chosen bank is quite small. As the distance of a non-private bank increases by 1 km, the probability that such a bank is chosen reduces by 0.005 percentage points for the “client structure” sampling strategy. Given that most chosen banks are within 25 km, distance is not economically relevant. There are two potential explanations for this. First, Petersen and Rajan (2002) argue that distance might become less important due to improved lending technologies. They state that public information increases also for small firms and banks need less direct contact. This is not the case for the firms under observation. Most firms are proprietorship and do not need to publish financial statements; and their credit ratings are published only as the firms get older. Second, and more likely, bank intensity is relatively high in Germany. Firms have many alternative bank branches within a short distance from the firm’s location. Therefore, differences in transaction costs might not be severe.

## 6 Discussion

In this section I discuss further aspects that might influence firm’s selection of a main bank. The chosen nested logit model specification should closely reflect the entrepreneur’s decision making process. In the following, I discuss alternative decision trees. In Table 9 I present a subsample analysis for high-tech industries, personal bank relationships prior to the start of the business, and talks with multiple banks, in general supporting the decision tree used in the main model presented above. It is often argued that banks are less capable of evaluating high-tech industries than traditional industries, and therefore high-tech firms face more difficulties seeking bank finance (Colombo and Grilli (2007); Brown et al. (2012)). Due to these differences, the importance of the selection criteria might differ between firms in traditional and in high-tech industries. I split the sample according to these two industry types and present the coefficients after a logit model in column (1) for traditional industries and (2) for high-tech industries in Table 9. The results suggest that the criteria are not important for high-tech industries.

An alternative tree structure could be that firms first decide whether to stay with the bank with which they already have a personal relationship. If not, they might choose a bank according to the decision tree presented above. The descriptive statistics reveal that approximately two-thirds of all firms use their personal relationship for their firm as well. But these groups do not differ with respect to other choice variables, such as a firm’s seeking bank finance or talking to multiple banks. In columns (3) and (4) of Table 9, I present a subsample analysis with respect to prior personal bank relationship. The results suggest that there are no big differences in the significance and magnitude of the

Table 9: Results of subsample analyses – Chosen main-bank type

Specification: Dependent Variable Main Bank	Logit				Nested Logit			
	Hightech		Prior relations		Bank talk		Client Structure Bank talk	
	No (1)	Yes (2)	No (3)	Yes (4)	Single (5)	Multiple (6)	Single (7)	Multiple (8)
Bank market share in district							8.225*** (1.32)	6.259*** (0.94)
Banking market concentration							0.786*** (0.22)	0.599*** (0.19)
Bank size (ln)							0.867** (0.34)	0.933*** (0.30)
Bank size (ln, sq)							-0.037* (0.02)	-0.042** (0.02)
Bank industry specialization							3.785*** (1.03)	4.650*** (1.12)
Distance to bank branch in km							-0.004*** (0.00)	-0.009*** (0.00)
<b>Non-Private Bank</b>								
Personal prior relation	0.743** (0.24)	0.393 (0.24)			0.459 (0.27)	0.754*** (0.22)	0.376 (0.23)	0.780*** (0.23)
Demand for bank finance	0.720** (0.27)	0.873** (0.29)	1.157*** (0.31)	0.636* (0.27)	0.833** (0.31)	0.847*** (0.26)	0.902*** (0.34)	0.998*** (0.27)
Talks with multiple Banks	-0.352 (0.26)	-0.494* (0.25)	-0.605* (0.29)	-0.272 (0.23)				
Criteria: Industry competence	-0.361 (0.39)	-0.54 (0.57)	-0.11 (0.46)	-0.821 (0.45)	0.451 (0.62)	-0.703 (0.38)	0.646 (0.69)	-0.35 (0.42)
Criteria: Support in crises	0.855** (0.29)	0.46 (0.28)	0.739* (0.32)	0.636* (0.26)	0.363 (0.32)	0.683** (0.25)	0.313 (0.35)	0.678** (0.27)
Criteria: Specialized fin services	-0.499 (0.43)	-1.029 (0.57)	-0.668 (0.52)	-0.747 (0.46)	0.03 (0.73)	-1.055** (0.41)	-0.759 (0.77)	-1.080** (0.44)
Criteria: Favorable market conditions	-0.996*** (0.27)	-0.415 (0.27)	-0.697* (0.28)	-0.804** (0.26)	-0.748* (0.32)	-0.688** (0.24)	-0.728** (0.34)	-0.740*** (0.26)
Criteria: Short distance to bank	0.979*** (0.27)	1.441*** (0.27)	1.212*** (0.29)	1.175*** (0.25)	1.476*** (0.30)	1.015*** (0.24)	1.368*** (0.33)	1.031*** (0.26)
Market Exit Prob (3 years)	0.063 (2.60)	-2.376 (2.64)	-0.669 (2.76)	-1.082 (2.54)	2.207 (2.85)	-3.682 (2.49)	3.928 (2.65)	-0.585 (2.23)
No. of bank relations	0.43 (0.36)	-0.174 (0.36)	0.469 (0.43)	-0.113 (0.32)	-0.113 (0.41)	0.052 (0.33)	-0.608 (0.46)	0.269 (0.33)
Bank loan/service denied	0.115 (0.34)	0.29 (0.41)	-0.056 (0.35)	0.779 (0.44)		0.172 (0.27)	0.331 (0.28)	
No demand gov support	-0.45 (0.28)	-0.369 (0.24)	-0.682* (0.30)	-0.219 (0.24)	-0.477 (0.27)	-0.381 (0.25)	-0.417 (0.30)	-0.403 (0.27)
Demand for external equity	-0.178 (0.54)	-0.665 (0.45)	-1.242* (0.54)	-0.044 (0.47)	-0.272 (0.53)	-0.539 (0.45)	0.175 (0.58)	-0.658 (0.48)
Export	-0.622 (0.35)	-0.598 (0.36)	-0.276 (0.36)	0.34 (0.36)	-0.358 (0.42)	0.115 (0.32)	-0.379 (0.46)	0.218 (0.34)
Sales	-0.076 (0.53)	-0.018 (0.37)	-0.728 (0.54)	0.093 (0.37)	0.512 (0.43)	-0.546 (0.44)	0.281 (0.44)	-0.056 (0.40)
Proprietorship	-0.444 (0.34)	-0.431 (0.32)	0.064 (0.37)	-0.814** (0.31)	-0.273 (0.35)	-0.515 (0.32)	-0.413 (0.35)	-0.098 (0.31)
Firm size (employees)	0.083 (0.06)	0.044 (0.07)	0.078 (0.06)	0.037 (0.05)	0.022 (0.05)	0.134* (0.06)	0.035 (0.06)	0.123** (0.06)
Management team	0.111 (0.28)	0.225 (0.26)	0.135 (0.31)	0.126 (0.25)	0.398 (0.29)	-0.131 (0.26)	0.45 (0.31)	-0.141 (0.27)
Entrepreneurial record	-0.690* (0.29)	0.035 (0.26)	-0.403 (0.32)	-0.289 (0.26)	-0.334 (0.29)	-0.237 (0.26)	-0.14 (0.32)	-0.215 (0.28)
University degree	-0.013 (0.31)	-0.043 (0.28)	0.115 (0.34)	-0.169 (0.27)	-0.445 (0.31)	0.27 (0.28)	-0.427 (0.34)	0.462 (0.29)
Master craftsman	0.172 (0.33)	0.408 (0.41)	-0.263 (0.39)	0.724 (0.39)	0.367 (0.44)	0.22 (0.33)	0.462 (0.47)	0.423 (0.34)
Industry and Year Dummies		Yes		Yes		Yes		Yes
Regional controls		Yes		Yes		Yes		Yes
public_tau Constant							0.614*** (0.11)	0.667*** (0.11)
private_tau Constant							1.066*** (0.23)	0.957*** (0.18)
Constant	1.92 (1.02)	0.479 (0.93)	1.095 (1.11)	1.596 (0.82)	-0.272 (1.04)	1.475 (0.90)		
Observations	759	514	450	823	579	694	17,715	21,283
LR Chi2	120	104	116	156	116	152	106	147
log likelihood	-250.28	-254.85	-201.02	-290.94	-216.31	-284.86	-940.26	-1,282.49

Note: In this table I present the results of subsample analysis. In column (1) only lowtech and in column (2) only hightech firms are sampled. In column (3) firms are sampled where entrepreneurs did not have a personal relationship with the selected bank prior the start of the business and in column (4) if the entrepreneur did have such a relationship. Firms in columns (5) and (7) are sampled if the firm did not have talks to multiple banks. In columns (6) and (8) only firms are sampled if the firm talked to multiple banks. Standard errors are presented in parentheses. \*, \*\*, and \*\*\* denote significance level on the 10, 5, and 1% levels, respectively.

Source: ZEW Bank Panel, KfW/ZEW Start-up Panel, and MUP (ZEW) 2012, author's own calculations.

coefficients.

Firms that use the bank with prior personal relationships might talk with multiple other banks in order to reduce the financing costs. In a further specification, I find evidence for such a strategy. I used an interaction term of talks to multiple banks and the criterion of “*favorable market conditions*”. In this specification both indicator variables were insignificant whereas the interaction term becomes significant.

This finding suggests that firms first decide whether they approach a single bank or talk to multiple banks. Due to the transaction costs for bank talks, one can expect that firms need specific criteria to be fulfilled in order to choose a main bank relationship. In columns (5) to (8) of Table 9, I present the subsample analysis for the logit and nested logit model. For firms that talked with only a single bank, the criteria “*short distance*,” “*favorable market conditions*,” and “*demand for bank finance*” are also significant. For firms that talked to multiple number of banks, “*support in financial distress*” and “*specialized financial services*” are significant, in addition. This is in line with the expectation that those firms that talk to multiple banks are more likely to have certain criteria that need to be fulfilled. The signs of the coefficients are also in line with expectations regarding relationship/transaction-orientation.

The analysis is based on the assumption that the firm chooses a bank, whereas banks remain passive. This might not be the case and banks might play a more active role. Banks can use different marketing and selection strategies to attract new customers. They might also differ in their screening methods. Next to scoring models, banks could, e.g., use behavioral models that use information on entrepreneur’s personal cash management. The model used by a particular bank is unknown. However, such behavioral models would require that data from previous personal relationships are available. Throughout the empirical models, I control for previous personal bank relationships. Another aspect of a more active role of banks is that banks can deny a relationship. This need not happen offensively, and a bank could deny single financial services or offer them only at a high cost. The entrepreneurs were asked whether a bank denied a loan, current account, or other financial services. I use this information to control for whether a firm’s choice set was restricted. Only a small fraction of firms were denied by any bank. Only a couple of firms reported not having a main bank relationship. The results suggest that in most cases, the main bank relationship is selected by the firm.

During the process of starting a business, banks give advice to entrepreneurs. If the advice depends on the banking group, it could lead to potential endogeneity difficulties. I discuss the two variables most prone to endogeneity problems: not demanding governmental support, and the firm’s legal form. Banks are involved in many schemes of public funding in Germany. Private banks (24%) less frequently offer a combination of own and publicly supported funding by themselves, than do *Sparkassen* and cooperative banks (40% and 42%; Source: KfW/ZEW Start-up Panel). However, the endogeneity problems might not be severe, for two reasons. First, information about public subsidies is easily accessible on the internet. Second, most entrepreneurs ask chambers of commerce for general advice before starting a business. Any firm, including a bank, is a mandatory member of the chamber of commerce. Therefore, chambers of commerce do not have in-

centives to provide different information about governmental subsidies and types of main bank relationships. Formally, the entrepreneur's personal financial liability depends on the firm's legal form. Banks use different contracts to secure credit provided to the firm by the entrepreneur's personal wealth if the firm is a limited liability. The techniques do not differ between bank types and there is no reason to believe that the advice in favor of or against a legal form depend on the bank type.

## 7 Conclusion

Financing sources differ in their liquidation policies. The theoretical literature predicts that firms choose financing sources according their own risk. *Sparkassen* and cooperative banks have a mandate or mission statement to support troubled but viable firms. Private banks have no restrictions on their lending strategy. These banks have incentives to offer transaction oriented banking and attract low risk firms. Employing a rich data set on newly established firms, I test whether firms chose their main bank relationship according to their risk. I find that firms for which bank support in financially difficult times is of utmost importance are more likely to choose a *Sparkasse* or cooperative bank. Entrepreneurs who consider previous personal relationships as important for the firm–bank relationship are more likely to “stay” with a non-private bank. Firms seeking bank finance in their initial year are also more likely to choose a non-private bank. Cost sensitive firms, however, are more likely to choose a private bank. Firms not asking for governmental subsidies might signal their low risk to private banks. But I did not find significant differences in the predicted default probability among bank types.

The findings suggest that private banks might be expected to be tougher in renegotiation. But if a self selection strategy by private banks exist, it might not work out well. Such a strategy would be successful if private banks attract clients with a low risk of default. An entrepreneur's risk assessment might not be correlated with the “objective” risk. The risk portfolio observed is that of all clients, and need not reflect the average risk of a banks' loan portfolio. However, because switching rates are low in general, banks grant loans mostly within their existing portfolio. The results further indicate that private banks have less rent seeking potential. Private banks attract cost sensitive clients that are probably more likely to switch the bank relationship.

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## A Appendix

Table A.1: Market exit - Descriptive statistics and probit results

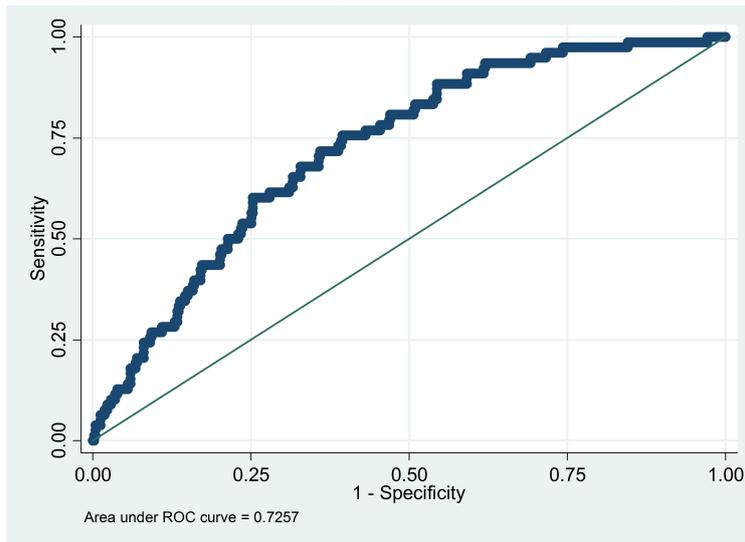
Variable	Descriptive Statistics					Market Exit	
	N	Mean	Min	Max	SD	Coefficient	S.E.
<b>Firm size and Team</b>							
No. of employees (full time equivalent)	5795	1.27	0.00	282.5	6.139	0.01	(0.01)
No. of team members	5.795	1.41	1	12	0.818	0.00	0.00
Age of oldest team member	5.795	39.60	16	93	9.870	-0.015	(0.03)
Age of oldest team member (sq.)	5.795	1665.65	256	8649	828.716	0.00	(0.00)
Material expenses	5.795	0.63	0.00	1	0.483	0.00	(0.00)
Female Entrepreneur (at least one)	5.795	0.19	0.00	1	0.389	-0.013	(0.11)
Entrepreneur was unemployed prior foundation	5.795	0.17	0.00	1	0.375	0.00	(0.00)
No. Of team members with entrepreneurial experience	5.795	0.20	0.00	3	0.568	0.00	(0.00)
No. of patents granted prior foundation	5.795	0.20	0.00	180	4.175	0.002	(0.01)
craft	5.795	0.27	0.00	1	0.444	-0.298**	(0.13)
Limited liability	5.795	0.30	0.00	1	0.459	-0.704***	(0.12)
<b>Motivation</b>							
Motivation - Implementation of a business idea*	5.795	0.33	0.00	1	0.471	0.114	(0.10)
Motivation - Avoiding a situation of unemployment*	5.795	0.18	0.00	1	0.383	0.252**	(0.12)
Motivation - Others*	5.795	0.03	0.00	1	0.183	0.007	(0.23)
<b>Education and Experience</b>							
Industry experience (years)	5.795	13.56	1	54	9.419	0.00	(0.00)
Industry experience (years, sq.)	5.795	272.54	1	2916	340.463	0.00	(0.00)
Qualification in business	5.795	0.26	0.00	1	0.438	0.00	(0.00)
Qualification in business and technology	5.795	0.06	0.00	1	0.244	0.00	(0.00)
Qualification in technology	5.795	0.61	0.00	1	0.487	0.00	(0.00)
Portfolio Entrepreneur	5.795	0.05	0.00	1	0.213	0.00	(0.00)
Restarter	5.795	0.04	0.00	1	0.186	0.00	(0.00)
Serial Entrepreneur	5.795	0.02	0.00	1	0.146	0.00	(0.00)
no qualification	5.795	0.03	0.00	1	0.176	0.387	(0.24)
Master Craftsman	5.795	0.26	0.00	1	0.437	0.135	(0.12)
University degree	5.795	0.39	0.00	1	0.488	0.153	(0.11)
<b>Regional and Industry characteristics</b>							
East Germany	5.795	0.18	0.00	1	0.385	0.00	(0.00)
Metropolitan areas and central cities	5.795	0.22	0.00	1	0.414	0.00	(0.00)
Urban areas	5.795	0.44	0.00	1	0.496	-0.008	(0.17)
Urban hinterland	5.795	0.13	0.00	1	0.337	0.082	(0.19)
Rural areas	5.795	0.14	0.00	1	0.343	-0.318	(0.20)
Firm age at panel entry 1 year	5.795	0.39	0.00	1	0.487	-0.341***	(0.10)
Firm age at panel entry 2 years	5.795	0.34	0.00	1	0.474	-1.452***	(0.13)
Cutting edge technology	5.795	0.06	0.00	1	0.243	-0.39	(0.27)
High-technology	5.795	0.04	0.00	1	0.206	0.603***	(0.22)
Software	5.795	0.08	0.00	1	0.273	0.424**	(0.17)
Non-tech manufacturing	5.795	0.12	0.00	1	0.328	0.119	(0.17)
Knowledge intensive services	5.795	0.07	0.00	1	0.257	-0.029	(0.19)
Industry related services	5.795	0.05	0.00	1	0.216	0.323	(0.20)
Consumer related services	5.795	0.12	0.00	1	0.328	0.071	(0.16)
Construction	5.795	0.11	0.00	1	0.317	0.255	(0.18)
Trade	5.795	0.13	0.00	1	0.341	0.226	(0.15)
Constant						-0.948	(0.61)
log likelihood						-1992.93	

Table A.1: Market exit - Descriptive statistics and probit results

Variable	Descriptive Statistics				Market Exit	
	N	Mean	Min	Max	Coefficient	S.E.
LR Chi2					301	

Source: KfW/ZEW Start-up Panel and MUP (ZEW) 2012, author's own calculations.

Figure A1: Receiver Operator Characteristics of predicted market exit probability



Note: Comparison of observed market exit with predicted probability of market exit based on a probit regression of newly established firms in Germany using the KfW/ZEW Start-up Panel. Predicted probability that firms established in the years 2005 to 2007 exit the market within 3 years.

Source: KfW/ZEW Start-up Panel and MUP (ZEW) 2012, author's own calculation.

Table A.2: Descriptive statistics for logit model

Variable	Mean	SD	Min	Max	Definition	Source
Prior personal bank relation	0.64	0.48	0	1	1 if at least one team member had private or business relation with the firms main bank	SuP
Multiple bank talks	0.54	0.50	0	1	1 if firm had multiple bank talks	SuP
Bank loan/service denied	0.13	0.34	0	1	1 if a bank denied account keeping, loans, provision of financial services	SuP
Criteria: Competence	0.10	0.29	0	1	1 if industry competence were considered as of utmost important for main bank selection	SuP
Criteria: Support in Crisis	0.36	0.48	0	1	1 if banks support in case of firm financial distress were considered as of utmost important for main bank selection.	SuP
Criteria: Specialized financial services	0.06	0.24	0	1	1 if spezialized financial services were considered as of utmost important for main bank selection.	SuP
Criteria: Favorable market conditions	0.29	0.46	0	1	1 if favorable market conditions were considered as vof utmost important for main bank selection	SuP
Criteria: Short distance to bank	0.43	0.50	0	1	1 if closeness to bank were considered as of utmost important for main bank selection	SuP
Market Exit Prob (3 years)	0.16	0.07	0.02	0.44	Predicted probability of market exit within 3 years	SuP/MUP
No. of bank relations	1.00	0.36	0	3	No of bank relations	MUP
Demand for bank finance	0.53	0.50	0	1	1 if firm either used and/or reported difficulties with bank finance	SuP
No demand for gov support	0.37	0.48	0	1	1 if firm either used and/or reported difficulties with governmental support	SuP
Demand for external equity	0.05	0.23	0	1	1 if firm either used and/or reported difficulties with external equity	SuP
Exporting	0.12	0.32	0	1	1 if firm sold products on foreign markets in its initial year	SuP
Sales	0.90	0.29	0	1	1 if firm with sales in intial year	SuP
Expected sales decline	0.15	0.35	0	1	1 if interview partner expected decline in sales for the second year	SuP
Proprietorship	0.43	0.50	0	1	1 if firm has a legal form of a limited liability	MUP
Firm size (employees)	2.74	6.64	1	242	Number of full-time equivalent employees including team members at startup	SuP
Management team	0.32	0.47	0	1	1 if firm was founded by a team.	SuP
Entrepreneurial record	0.17	0.38	0	1	1 if entrepreneur was a owner-manager of firms prior start-up of the observed firm	SuP
University degree	0.42	0.49	0	1	1 if at least one team member holds a university degree as highest level of education	SuP
Master craftsman	0.25	0.43	0	1	1 if at least one team member holds a certificate of master craftsman	SuP
Motivation: business idea	0.35	0.48	0	1	1 if implementation of a business idea was the main motivation of start-up	SuP
Motivation: higher expected salary	0.06	0.25	0	1	1 if implementation of a higher salary was the main motivation of start-up	SuP
Bank intensity (firm)	5.236	1.995	1.706	14.12	No of banks per 1,000 firms active in the district	MUP/BP
Bank intensity (employees)	0.52	0.30	0.0	2.0	No. Of banks per 1,000 people employed in the district	MUP/BP
Local banking market competition (district)	0.01	0.27	0.0	28.6	No of firms switched their main bank relation in proportion to the number of firms; per district	MUP/BP
Metropolises	0.08	0.26	0	1	District of cities $\geq 2,500$ inhabitants/km	MUP/BBR
Major city	0.22	0.41	0	1	District of cities $\geq 100,000$ inhabitants	MUP/BBR
Hinterland	0.12	0.33	0	1	Districts in urban area with population density of $< 150$ inhabitants/km	MUP/BBR
Urban area	0.45	0.50	0	1	Districts in urban area with population density of $\geq 150$ inhabitants/km	MUP/BBR
Rural area	0.14	0.34	0	1	Districts in rural areas	MUP/BBR
Year 2009	0.34	0.48	0	1	1 if Year of foundation is 2009	SuP
Year 2010	0.35	0.48	0	1	1 if Year of foundation is 2010	SuP
Year 2011	0.31	0.46	0	1	1 if Year of foundation is 2011	SuP
Cutting edge technology	0.08	0.27	0	1	1 if industry is Cutting edge technology	SuP
High-tech manufacturing	0.07	0.26	0	1	1 if industry is High-technology	SuP
Software	0.07	0.25	0	1	1 if industry is Software	SuP
Technology intensive services	0.21	0.41	0	1	1 if industry is technology intensive services	SuP
Low-tech manufacturing	0.11	0.32	0	1	1 if industry is Low-tech manufacturing	SuP
Knowledge intensive services	0.05	0.23	0	1	1 if industry is Knowledge intensive services	SuP
Business related services	0.06	0.24	0	1	1 if industry is Other business related services	SuP
Consumer related services	0.09	0.28	0	1	1 if industry is Consumer orientierted services	SuP
Construction	0.11	0.32	0	1	1 if industry is Construction	SuP
Trade	0.14	0.35	0	1	1 if industry is Trade	SuP

Definition of sources: SuP - KfW/ZEW Start-up Panel; MUP - Mannheim Enterprise Panel; BP - ZEW Bank Panel; BBR - Federal office for building and regional planing

Table A.3: Characteristics of chosen main bank – Sample distribution

Bank type	Min	P25	P50	P75	P90	Max
<b>Bank size (total)</b>						
Public Banks	2	17	36	71	143	601
Cooperative Banks	0	4	8	15	24	160
Private Banks	0	1,439	3,273	4,747	4,957	4,957
<b>Bank market share in district</b>						
Public Banks	0.00	0.13	0.27	0.39	0.49	0.71
Cooperative Banks	0.00	0.02	0.07	0.11	0.16	0.30
Private Banks	0.00	0.04	0.13	0.21	0.27	0.43
<b>Bank regional concentration</b>						
Public Banks	0.10	0.42	0.72	0.83	0.89	0.95
Cooperative Banks	0.01	0.41	0.56	0.78	0.86	0.96
Private Banks	0.01	0.02	0.03	0.04	0.04	0.41
<b>Bank industry specialization</b>						
Public Banks	0.00	0.01	0.02	0.05	0.09	0.40
Cooperative Banks	0.00	0.01	0.02	0.07	0.12	0.50
Private Banks	0.00	0.01	0.02	0.04	0.07	0.28
<b>Distance to bank branch in km</b>						
Public Banks	0	1	3	8	18	610
Cooperative Banks	0	1	4	11	23	571
Private Banks	0	2	6	19	150	740
<b>Distance to bank headquarter in km</b>						
Public Banks	0	3	9	17	29	553
Cooperative Banks	0	4	10	19	32	574
Private Banks	0	151	243	379	444	757

*Source:* KfW/ZEW Start-up Panel and MUP (ZEW) 2012, author's own calculations.

Table A.4: Descriptive statistics of the set of alternatives by sampling strategy

No. of observations			Closest Branch 13,992		Banks within 25 km 39,451		Client Structure 38,998	
	Min	Max	Mean	SD	Mean	SD	Mean	SD
Bank market share	0.000	0.697	0.069	0.108	0.027	0.072	0.020	0.063
Bank regional concentration	0.013	1	0.251	0.301	0.450	0.322	0.259	0.293
Bank size	0.000	11.271	7.263	1.731	6.414	1.886	6.403	1.492
Bank industry share	0	1	0.042	0.051	0.041	0.055	0.037	0.056
Distance to bank branch	0	757	16.0	28.3	32.7	73.1	102.2	130.1
Multiple bank talks	0	1	0.545	0.498	0.533	0.499	0.546	0.498
Prior personal bank relation	0	1	0.647	0.478	0.657	0.475	0.641	0.480
Bank loan/service denied	0	1	0.135	0.342	0.130	0.337	0.139	0.346
Criteria: Competence	0	1	0.091	0.288	0.074	0.262	0.087	0.282
Criteria: Support in Crisis	0	1	0.356	0.479	0.358	0.479	0.348	0.476
Criteria: Specialized financial services	0	1	0.056	0.230	0.055	0.227	0.057	0.231
Criteria: Favorable market conditions	0	1	0.291	0.454	0.278	0.448	0.285	0.451
Criteria: Short distance to bank	0	1	0.439	0.496	0.410	0.492	0.428	0.495
Sales	0	1	0.921	0.269	0.924	0.266	0.922	0.269
Demand for bank finance	0	1	0.527	0.499	0.527	0.499	0.518	0.500
No demand for gov support	0	1	0.355	0.479	0.365	0.481	0.362	0.481
Demand for external equity	0	1	0.054	0.227	0.059	0.236	0.055	0.227
Exporting	0	1	0.124	0.330	0.125	0.330	0.128	0.335
Market Exit Prob (3 years)	0.048	0.444	0.175	0.065	0.170	0.063	0.175	0.065
No. of bank relations	0	3	1.007	0.351	0.998	0.344	1.004	0.345
Proprietorship	0	1	0.425	0.494	0.444	0.497	0.431	0.495
Firm size (employees)	1	242	2.751	7.462	2.714	6.914	2.663	6.783
Management team	0	1	0.312	0.463	0.328	0.470	0.316	0.465
Entrepreneurial record	0	1	0.219	0.413	0.218	0.413	0.219	0.413
University degree	0	1	0.414	0.493	0.444	0.497	0.430	0.495
Master craftsman	0	1	0.248	0.432	0.244	0.430	0.240	0.427
Year 2009	0	1	0.270	0.444	0.251	0.433	0.263	0.440
Year 2010	0	1	0.333	0.471	0.320	0.466	0.330	0.470
Metropolises	0	1	0.072	0.259	0.053	0.224	0.116	0.321
Major city	0	1	0.211	0.408	0.290	0.454	0.214	0.410
Urban area	0	1	0.126	0.332	0.083	0.276	0.102	0.303
Rural area	0	1	0.131	0.338	0.080	0.272	0.105	0.307
Bank intensity (employees)	0.012	1.977	0.512	0.298	0.477	0.289	0.482	0.299
Local banking market competition (district)	0.002	0.022	0.007	0.003	0.007	0.003	0.007	0.003
Cutting edge technology	0	1	0.059	0.236	0.073	0.260	0.061	0.239
High-tech manufacturing	0	1	0.046	0.209	0.040	0.195	0.044	0.204
Software	0	1	0.079	0.269	0.075	0.264	0.080	0.271
Low-tech manufacturing	0	1	0.110	0.313	0.113	0.317	0.107	0.309
Knowledge intensive services	0	1	0.053	0.225	0.063	0.243	0.060	0.238
Business related services	0	1	0.064	0.244	0.060	0.238	0.064	0.244
Consumer related services	0	1	0.090	0.286	0.082	0.275	0.092	0.289
Construction	0	1	0.121	0.326	0.107	0.309	0.116	0.320
Trade	0	1	0.158	0.365	0.146	0.353	0.152	0.359

Source: KfW/ZEW Start-up Panel and MUP (ZEW) 2012, author's own calculations.

Table A.5: Results of control variables – chosen main-bank relationship (nested logit model)

	Sampling: Branch network			Sampling: Client Structure		
	Base risk and risk aversion (1)	Bank Char risk aversion (2)	Distance risk and risk aversion (3)	Base risk and risk aversion (4)	Bank Char risk aversion (5)	Distance risk and risk aversion (6)
<b>Further control variables</b>						
Demand for external equity	-0.551** (0.28)	-0.429 (0.28)	-0.513* (0.29)	-0.611** (0.29)	-0.489* (0.28)	-0.592** (0.29)
Competence important	0.065 (0.28)	0.199 (0.28)	0.116 (0.29)	0.04 (0.28)	0.214 (0.28)	0.075 (0.29)
Sales	0.229 (0.22)	0.065 (0.21)	0.064 (0.23)	0.293 (0.22)	0.231 (0.21)	0.382* (0.22)
Proprietorship	-0.225 (0.18)	-0.321** (0.16)	-0.374** (0.19)	-0.143 (0.18)	-0.263 (0.16)	-0.11 (0.19)
Firm size (employees)	0.053 (0.03)	0.037 (0.03)	0.048 (0.03)	0.058* (0.03)	0.044 (0.03)	0.058* (0.03)
Management team	0.094 (0.16)	0.105 (0.16)	0.081 (0.17)	0.075 (0.17)	0.066 (0.17)	0.067 (0.17)
Entrepreneurial record	-0.195 (0.17)	-0.261 (0.16)	-0.17 (0.18)	-0.183 (0.17)	-0.172 (0.16)	-0.2 (0.18)
University degree	-0.112 (0.18)	-0.147 (0.17)	-0.104 (0.18)	-0.136 (0.18)	-0.148 (0.17)	-0.121 (0.18)
Master craftsman	0.208 (0.21)	0.192 (0.21)	0.194 (0.22)	0.187 (0.22)	0.163 (0.21)	0.181 (0.22)
Local banking competition	-10.254 (24.12)	-12.668 (22.70)	-8.072 (24.66)	2.579 (24.75)	4.314 (23.09)	11.648 (25.35)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
jahr2009	0.109 (0.17)	0.109 (0.17)	0.147 (0.17)	0.128 (0.18)	0.136 (0.18)	0.145 (0.18)
jahr2010	0.016 (0.16)	0.016 (0.16)	0.03 (0.16)	0.037 (0.17)	0.038 (0.17)	0.048 (0.17)
Cutting Edge Technology	-0.033 (0.29)	-0.033 (0.29)	-0.047 (0.29)	0.105 (0.30)	0.095 (0.30)	0.154 (0.30)
High technology	0.315 (0.33)	0.315 (0.33)	0.362 (0.33)	0.412 (0.34)	0.404 (0.34)	0.444 (0.34)
Software	-0.123 (0.25)	-0.123 (0.25)	-0.112 (0.25)	-0.03 (0.25)	-0.029 (0.25)	0.009 (0.26)
Manufacturing	0.706** (0.30)	0.706** (0.30)	0.705** (0.30)	0.792** (0.31)	0.777** (0.31)	0.786** (0.31)
Knowledge intensive services	0.276 (0.29)	0.276 (0.29)	0.27 (0.29)	0.192 (0.29)	0.232 (0.29)	0.303 (0.29)
Business oriented services	0.376 (0.32)	0.376 (0.32)	0.382 (0.33)	0.367 (0.33)	0.358 (0.33)	0.373 (0.33)
Consumer oriented services	0.253 (0.29)	0.253 (0.29)	0.275 (0.29)	0.28 (0.29)	0.27 (0.29)	0.327 (0.29)
Construction	0.119 (0.30)	0.119 (0.30)	0.136 (0.30)	0.405 (0.30)	0.304 (0.30)	0.243 (0.30)
Trade	0.406* (0.24)	0.406* (0.24)	0.409* (0.24)	0.532** (0.24)	0.491** (0.24)	0.528** (0.25)

*Note:* This table presents the results of the Nested Logit model. The upper part presents estimated coefficients of the (bank) alternative varying variables. The lower part presents the figures of the individual specific variables that does not vary over alternatives. Previous estimation results suggested to use two nests: Public/cooperative vs. private banks. Private banks is used as base category in the lower part. Columns (1)-(3) refer to estimation results based on the sampling strategy "Bank branch structure". Each firm is assigned the nearest branch of each of the two nearest Sparkassen, cooperative banks and small private banks, as well as the nearest branch of the four large banks (Deutsche Bank, Commerzbank, Postbank, and HypoVereinsbank). Bank information is replaced with respect to bank type if the chosen bank is not initially sampled. Columns (4)-(6) refer to estimation results based on the sampling strategy "Bank client structure". A bank is assigned as an alternative of a firm if the bank is regional and active in the firms district, super-regional and active in the firms regional planing area, or national active. Regional (super-regional) banks are considered to be active in firms district (regional planing area) if the bank has a significant share of costumers (1 / count of districts (regional planing area)) in the firms district (regional planing area). Bank information is replaced with respect to bank type if the chosen bank is not initially sampled. Standard errors are presented in parentheses. \*, \*\*, and \*\*\* denote significance level on the 10, 5, and 1% levels of significance.

*Source:* KfW/ZEW Start-up Panel and MUP (ZEW) 2012, author's own calculations.

Table A.6: Industry classification used by the KfW/ZEW Start-up Panel

No.	Industry	NACE Code Rev. 1
<b>high-tech industries</b>		
1	cutting-edge technology manufacturing	23.30, 24.20, 24.41, 24.61, 29.11, 29.60, 30.02, 31.62, 32.10, 32.20, 33.20, 33.30, 35.30
2	high-technology manufacturing	22.33, 24.11, 24.12-4, 24.17, 24.30, 24.42, 24.62-4, 24.66, 29.12-4, 29.31-2, 29.40, 29.52-6, 30.01, 31.10, 31.40, 31.50, 32.30, 33.10, 33.40, 34.10, 34.30, 35.20
3	technology-intensive services	64.2, 72 (without 72.2), 73.1, 74.2, 74.3
4	software supply and consultancy	72.2
<b>non-high-tech industries</b>		
5	non-high-tech manufacturing	15 37 (without sectors 1 + 2)
6	skill-intensive services (non-technical consulting services)	73.2, 74.11-4, 74.4
7	other business-oriented services	71.1, 71.2, 71.3, 74.5 74.8 (without 74.84.7), 90, 64.1, 61, 62, 60.3, 63.1, 63.2, 63.4
8	consumer-oriented services	55, 70, 71.4, 92, 93, 80.4, 65-67, 60.1, 60.2, 63.3
9	construction	45
10	wholesale and retail trade (without trade agents)	50 52 (without 51.1)

*Note:* Cutting-edge manufacturing technology: manufacturing industries with average R&D expenditure  $\geq$  8.5% of total sales. High-technology manufacturing: manufacturing industries with average R&D expenditure 3.5–8.5% of total sales.

*Source:* Grupp and Legler (2000), classification KfW/ZEW start-up Panel Fryges et al. (2010).