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Friendship and money, oil and water? Credit constraints and “Family and Friends” finance[☆]

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Abstract

The use of informal finance is primarily discussed in the context of developing countries and start-up businesses. Survey data used in this study, however, shows that “Family and Friends” (F&F) finance is also remarkably widespread among established firms in Germany, a highly developed country. Establishing a causal link, Instrumental Variables estimations in this study show that firms use F&F finance in response to credit constraints. Considering that welfare gains from financial intermediation no longer materialize when firms go informal, this result is of utmost importance in the analysis of the consequences of a non-functioning financial system, even in developed economies.

Keywords: Alternative finance, banks, credit constraints

JEL classification: G21, G23

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1. Introduction

Facing credit constraints induces firms to seek other sources of funding. Recent empirical evidence shows that many firms used more public market finance¹ and trade credit² in response to the financial crisis of 2007-09. Alternatively, firms may seek capital from informal sources like “Family and Friends” (F&F) in response to bank credit constraints.³ When going informal, welfare gains from financial intermediation through banks no longer materialise. Djankov et al. (2003) argue that firms may then face higher borrowing costs and that “finance from friends and family is unreliable, untimely and can bear significant non-financial costs”.

Empirical evidence of the use of informal finance has been primarily provided in the context of the capital structure of start-up businesses in developed economies and financial systems in developing countries.⁴ However, not much attention has been paid to the question whether informal finance is also used by established firms in highly developed countries. Furthermore, previous studies analyse correlations, but do not estimate the causal effect of bank credit constraints on the use of informal finance.

This paper analyses the use of F&F finance by non-start-up firms in a highly developed economy and tests whether it is driven by unsuccessful bank credit negotiations. The analysis is based on data from the Ifo “Financing of the German Economy” survey, which was conducted among German manufacturing firms in September 2011. The data

¹See, for example, Adrian et al. (2012), Barraza et al. (2014), and Becker and Ivashina (2014)

²See, for example, Carbó-Valverde et al. (2013) and Coulibaly et al. (2013)

³Other informal sources such as moneylenders are widespread in developing countries, but are not common in developed economies.

⁴Allen and Qian (2010), Allen et al. (2011), and Allen et al. (2013) provide theories on the finance-and-growth-nexus arguing that informal finance may have advantages over formal finance in supporting economic growth in developing countries. This is supported by the analysis of data from India (Allen et al., 2012) and China (Allen et al., 2005). Also using Chinese data, Ayyagari et al. (2010), however, do not find a relationship between the use of informal finance and economic growth. Degryse et al. (2013) find a positive complementary effect of formal and informal finance on sales growth for small firms in China, but not for large firms.

distinguishes between F&F finance from sources connected to the business (“F&F Business”) and sources privately connected to the entrepreneur (“F&F Private”). Descriptive statistics show that 15.46 percent of the firms in the sample use at least one of the two kinds of F&F finance, which is surprisingly high. The data also contains detailed information on each firm’s last bank credit negotiations between 2008 and 2011. The causal effect of unsuccessful bank credit negotiations on the use of F&F finance is estimated using instrumental variables (IV) estimations to deal with endogeneity from a potential signalling effect of F&F finance on a firm’s likelihood of receiving bank credit.

IV estimations show that firms use both kinds of F&F finance in response to unsuccessful negotiations of bank loans. This effect, however, is not found for unsuccessful negotiations of lines of credit. Therefore, F&F finance seems to be especially relevant in financing particular investments (substituting loans), but not as much in financing working capital (substituting lines of credit). The comparison of OLS and IV estimators indicates that “F&F Business” serves as a positive signal of a firm’s creditworthiness in bank credit negotiations. This is in line with Berger and Udell (1998) who argue that different financial instruments are interconnected and initial insider finance often serves as a “predicament” for receiving external finance. For “F&F Private”, however, evidence of its signalling effect is ambiguous.

This study is most closely related to a strand of research on the use of F&F finance and other kinds of informal finance. The theoretical model by Myers and Majluf (1984) predicts that firms’ financing decisions follow a pecking order. Because of asymmetric information, firms preferably rely on internal funding (i.e. retained earnings). If they need external finance, they prefer debt over equity instruments. However, Myers and Majluf (1984) do not explicitly state the role of F&F finance in the pecking order. Filling this gap, Berger and Udell (1998) find that “insider finance” in the form of debt or equity from the start-up team, family, and friends plays a role in the early stages of development, but

is phased out as the firm matures. This has been supported by several empirical studies on the determinants of the use of different kinds of informal finance in start-up businesses and small firms.⁵ Altogether, these studies find that younger, smaller, less transparent, and less financially sound firms are more likely to use informal finance. However, these studies do not explicitly observe the presence of credit constraints.

In this regard, more direct evidence of the correlation between credit constraints and the use of informal finance is provided by Allen et al. (2012), who show that Indian firms use informal finance in response to “limited access to institutional finance”. Using data on a broad set of firms from 48 countries in the World Business Environment Survey (WBES), Beck et al. (2008) further find that there is a correlation between financing obstacles and the use of finance from informal lenders.⁶ Such correlations, however, do not allow a causal interpretation.

The following empirical analysis amends this literature by using an IV approach to estimate the causal effect of unsuccessful bank credit negotiations on the use of F&F finance. The comparison of OLS and IV estimators provides evidence of whether F&F finance is a positive or a negative signal of a firm’s creditworthiness in credit negotiations with banks. A particular contribution stems from the use of data on firms of all size and age groups in a highly developed economy without a focus on start-up businesses.

Since the use of F&F finance requires both demand and supply of this kind of funding, the following analysis can also be seen as a test of the theoretical predictions by Giannetti and Yu (2014). They develop a model to investigate lending and borrowing between connected sources, such as F&F finance. Their model predicts that “financiers allocate

⁵For analyses of start-up businesses, see, for example, Chavis et al. (2011), Sanyal and Mann (2010), Astebro and Bernhardt (2003), Basu and Parker (2001), Romano et al. (2001), and Fluck et al. (1998). For analyses of small firms, see, for example, Denis and Mihov (2003), Berger and Udell (2002), and Bitler et al. (2001).

⁶Beck et al. (2008) define informal finance as financing coming from “informal moneylenders and other traditional sources”. They categorise F&F finance as internal finance and do not provide further evidence of its use.

capital on the basis of prior connections, instead of collecting information on the [...] entrepreneur”, depending on the initial capital, transparency, and the quality of investment opportunities in an economy. They show that, even in advanced economies (i.e. those economies with a high level of initial capital), high costs of information acquisition and low average quality of potential borrowers can prompt financiers to “forfeit information acquisition” and lend to “connected entrepreneurs” only.

This prediction is applicable to Germany during the financial crisis of 2007-09, which is captured by the sample used in this analysis. When the German economy was hit by the slowdown of global economic activity, many firms faced a sharp drop in demand for their products and uncertainty about firms’ creditworthiness increased (International Monetary Fund, 2009). In the context of the model by Giannetti and Yu (2014) this can be interpreted as a deterioration of borrower quality and increasing information acquisition costs. The model predicts that depositors in Germany preferred to lend to “connected entrepreneurs” rather than acquiring information on potential borrowers. This is in line with data in this study providing evidence of a widespread supply of F&F finance in the German economy.

The remainder of the paper is structured as follows. In Section 2, two hypotheses are derived from existing literature. Section 3 provides a description of the data set as well as descriptive statistics on the use of F&F finance and unsuccessful bank credit negotiations. Section 4 provides estimation results for OLS and IV approaches. Section 6 addresses sample selection issues and the role of discouraged borrowers. Finally, Section 7 summarises the findings.

2. Hypotheses

Existing empirical literature shows that firms’ use of informal finance is correlated with credit constraints (e.g., Allen et al. (2012), Beck et al. (2008)). This is in line with

the pecking order theory predicting that firms first borrow from closely connected sources before moving towards arm's length finance. It also raises the question whether credit constraints actually drive firms into F&F finance or if the correlation can be explained by the signalling effect of F&F finance on a firm's probability of receiving bank credit. In particular, it is worth testing the significance of such a causal effect for established firms in a highly developed economy.

Hypothesis 1: Unsuccessful bank credit negotiations cause firms to use of F&F finance, even established firms in a highly developed country.

Resolving endogeneity issues raises the follow-up question whether the use of informal finance facilitates access to credit or if it makes it more difficult. A strand of literature provides evidence of the signalling effect of trade credit on access to bank credit because of trade partners' ability to assess a firm's creditworthiness (e.g., Giannetti et al. (2011), Engemann et al. (2011)). In a similar manner, such a signalling effect could exist for F&F finance due to the information that connected firms and individuals gather about a firm. Banks could take the fact that firms receive funding from closely related sources as a positive signal of creditworthiness. This may be particularly important when asymmetric information is high, for example, because firms are very young, face high entrepreneurial risk, or do not have a track record of repaid debt.

Hypothesis 2: Using F&F finance is a positive signal of a firm's creditworthiness.

Alternatively, a firm's use of F&F finance could prompt a bank to abstain from granting credit for two reasons. First, the use of F&F finance could be a result of previous unsuccessful credit negotiations, possibly with other financial institutions. Second, from a bank's point of view, the use of F&F finance might carry a whiff of opaqueness, which could threaten the success of bank credit negotiations.

3. Data

3.1. The Data Set

The following analysis is based on data concerning firms' use of F&F finance, their recent bank credit negotiations, and numerous firm characteristics from the Ifo "Financing of the German Economy" survey. The age structure of the firms in the sample is skewed towards older firms (see descriptive statistics in Section 3.4), which makes the data set particularly suited to analyse the use of F&F finance in a broad set of firms without a focus on start-up businesses.

Because the survey data contains only a small amount of information on firms' financial situations, it is complemented with 2011 firm balance sheet data from the Bureau van Dyk (BvD) Amadeus database and 2011 credit ratings from Creditreform, a German rating agency. A description of all variables is provided in Table 1.

3.2. The Use of F&F Finance in Germany

In the following, firms are divided into those that use F&F finance (*F&F firms*) and those that do not (*non-F&F firms*). Considering that Germany is a highly developed economy and that the sample does not focus on start-up businesses, the fraction of F&F firms in the sample is surprisingly high at 15.46 percent. In comparison, capital market finance is used by 3.6 percent and factoring by 10 percent of the firms.

The data distinguishes two kinds of F&F finance. "F&F Business" is defined as a firm receiving capital from a firm or person close to the business (e.g., customers, suppliers). "F&F Private" indicates that capital is received from a person privately connected to the entrepreneur. "F&F Business" is used by 5.79 percent of the firms in the sample. "F&F Private" is about twice as important with 11.81 percent of the firms using it. Analysing both kinds of F&F finance separately provides additional insights as they potentially differ in their degree of informality. While "F&F Business" can be expected to be widely based on formal contracts, informal procedures are more likely for "F&F Private".

Table 1: Variable descriptions

Variable	Description
“Family and Friends” finance	
<i>F&F</i>	Firm receives capital from “Family and Friends”
<i>F&F Business</i>	Firm receives capital from F&F close to the business (e.g., customers, suppliers)
<i>F&F Private</i>	Firm receives capital from F&F privately connected to the entrepreneur
Bank Credit Negotiations	
<i>Rejected (line)</i>	Last negotiated line of credit (since 2008) was rejected or only partially granted
<i>Rejected (loan)</i>	Last negotiated loan (since 2008) was rejected or only partially granted
<i>Discretion</i>	Loan officer had a larger impact on the credit granting decision than the bank-internal credit rating
Firm size and age	
<i>Empl</i>	Number of employees
<i>Assets</i>	Total assets
<i>Age</i>	Firm age in years, based on year of foundation
Transparency	
<i>Incorporated</i>	Firm is a corporation by its legal status
<i>Ext. rating</i>	Firm has external rating besides banks’ internal ones
<i>Customer</i>	Share of business that is conducted with the three most important customers
<i>Export</i>	Firm is exporting
Ownership	
<i>Group</i>	Firm is part of a group company
<i>Family</i>	Largest shareholder is a single person or family
<i>Control</i>	Percentage share held by largest shareholder
<i>Operating</i>	Largest shareholder active in operative management
Financial condition	
<i>Rating</i>	Score between 100 (sound) to 600 (risky)
<i>Equity</i>	Equity/Assets
<i>Long-term debt</i>	Long-term debt/Assets
<i>Cash</i>	Cash/Assets
<i>Return</i>	EBIT/Turnover
<i>Earlypay</i>	Cash discounts drawn/Cash discounts offered to firm

Sources: Ifo “Financing of the German Economy” survey, BvD Amadeus database, and Creditreform.

3.3. F&F Finance and Unsuccessful Bank Credit Negotiations

Data on the use of F&F finance can be linked to a firm’s most recent bank credit negotiations. In total, 496 firms negotiated a line of credit between 2008 and 2011 and 510 firms negotiated a bank loan.⁷ For this analysis, negotiations are defined as unsuccessful if credit is not granted or granted only at a smaller volume than demanded by the firm. It is important to note that this encompasses rejections of a credit application by the bank, as well as situations in which a firm decides to withdraw the application because of unfavourable terms of credit offered by the bank (e.g., when interest rates are too high). Either scenario can be interpreted as a situation in which a firm faces credit constraints.

Table 2: F&F finance and credit negotiations

	<i>Rejected (line)</i>			<i>Rejected (loan)</i>		
	Yes	No	$p > t$	Yes	No	$p > t$
N	71	425		64	446	
Perc.	14.31%	85.69%		12.55%	87.45%	
<i>F&F</i>	30.00%	18.75%	0.03**	35.48%	15.67%	0.000***
<i>F&F Business</i>	23.53%	14.56%	0.06*	30.65%	13.02%	0.000***
<i>F&F Private</i>	13.64%	6.47%	0.04**	13.56%	4.71%	0.006***

Notes: The table shows the fraction of F&F firms separately among firms that have successfully negotiated bank credit and among those that have negotiated unsuccessfully; p-values are reported for two-group mean comparison t-tests on whether the two groups of firms differ significantly with respect to the probability of using F&F finance; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2 shows that F&F finance is significantly more widespread among firms that have experienced unsuccessful bank credit negotiations. This holds for both “F&F Business” and “F&F Private”. The difference is more pronounced for unsuccessful negotiations of bank loans than for those of lines of credit, which suggests that F&F finance is more important in financing particular investments than for working capital financing.

⁷As firms reported negotiations of lines of credit and loans separately in the survey, each firm could report up to two bank credit negotiations between 2008 and 2011.

Table B.1 in the Appendix shows that 72.3 percent of the negotiated lines of credit in the sample were used for working capital finance, but only 57.1 percent served the financing of investments. In contrast, loans were primarily used for investments with enhancements being the most frequent purpose. Only 15.1 percent of the loans were used for “other” purposes, which includes working capital finance. The analysis of firms’ text-based specification of “other” purposes of loans show that only 1.5 percent of the loans were used for working capital finance. Debt restructuring and liquidity protection were the most prominent “other” purposes of loans.

3.4. F&F Finance and Firm Characteristics

A key challenge in the following estimations is to hold constant the firm characteristics which drive both the outcome of a firm’s credit negotiations and its use of F&F finance. The data provides a broad set of control variables for a firm’s creditworthiness, characteristics that are found in the empirical literature to determine a firm’s capital structure in general, and predictors of the use of bank debt and informal finance in particular. Table 3 shows how F&F firms differ from non-F&F firms in these variables.⁸ Altogether, they are significantly smaller and in a worse financial condition. They also differ in ownership variables. Evidence of differences in firm age and transparency, however, is less clear.

Firm size and age

Firm size and age are widely accepted as determinants of a firm’s capital structure. For example, small firms rarely use public market finance because they are less capable of dealing with high transaction costs (Titman and Wessels, 1988). In line with existing empirical literature on firm size and informal finance⁹, Table 3 shows that F&F firms are

⁸Table B.2 in the Appendix further provides descriptive statistics separately for firms that use “F&F Business” and for those that use “F&F Private”.

⁹See, for example, Allen et al. (2012), Chavis et al. (2011), Sanyal and Mann (2010), Denis and Mihov (2003), Berger and Udell (2002), Bitler et al. (2001), Romano et al. (2001), and Berger and Udell (1998).

Table 3: F&F finance and firm characteristics

	$F\&F=1$ (N=169)			$F\&F=0$ (N=924)			
	\bar{X}_{FF}	X_{FF}^{med}	σ_{FF}	\bar{X}_{noFF}	X_{noFF}^{med}	σ_{noFF}	$p > t$
<i>log(Empl)</i>	4.61	4.46	1.75	5.02	4.83	1.85	0.008***
<i>log(Assets)</i>	8.80	8.69	2.18	9.23	9.08	2.27	0.04**
<i>log(Age)</i>	3.95	4.17	1.04	4.05	4.36	0.96	0.22
<i>Incorporated</i>	63.69%	1	48.23%	62.01%	1	48.56%	0.68
<i>Ext. rating</i>	25.00%	0	43.43%	21.25%	0	40.93%	0.28
<i>Customer (< 10%)</i>	18.67%	0	39.09%	20.04%	0	40.06%	0.68
<i>Customer (10% to < 30%)</i>	40.36%	0	49.21%	45.26%	0	49.80%	0.24
<i>Customer (30% to < 50%)</i>	25.30%	0	43.61%	19.16%	0	39.38%	0.07*
<i>Customer (50% +)</i>	15.66%	0	36.45%	15.53%	0	36.24%	0.97
<i>Export</i>	82.63%	1	37.99%	88.46%	1	31.97%	0.04**
<i>Group</i>	26.63%	0	44.33%	39.65%	0	48.94%	0.001***
<i>Family</i>	82.25%	1	38.32%	74.59%	1	43.56%	0.03**
<i>Control</i>	70.36%	75%	26.46%	73.83%	88%	28.95%	0.15
<i>Operating owner</i>	68.64%	1	46.53%	59.50%	1	49.12%	0.03**
<i>Rating</i>	216.79	208	90.38	197.49	186	90.46	0.01**
<i>Equity</i>	22.78%	27.47%	47.84%	37.55%	38.08%	32.45%	0.000***
<i>Debt</i>	33.92%	22.73%	48.83%	22.82%	13.95%	29.15%	0.000***
<i>Cash</i>	9.21%	3.99%	12.81%	11.37%	5.32%	14.37%	0.11
<i>Return (< 3%)</i>	58.33%	1	49.46%	43.13%	0	49.55%	0.000***
<i>Return (3 to < 7%)</i>	28.21%	0	45.14%	33.18%	0	47.11%	0.22
<i>Return (7 to < 10%)</i>	7.69%	0	26.73%	14.69%	0	35.42%	0.02**
<i>Return (10% +)</i>	5.77%	0	23.39%	9.00%	0	28.64%	0.18
<i>Earlypay (0%)</i>	4.29%	0	20.34%	3.01%	0	17.11%	0.39
<i>Earlypay (< 25%)</i>	19.63%	0	39.84%	13.73%	0	34.43%	0.05*
<i>Earlypay (25 to < 50%)</i>	6.75%	0	25.16%	9.38%	0	29.16%	0.28
<i>Earlypay (50 to < 75%)</i>	16.56%	0	37.29%	9.38%	0	29.16%	0.006***
<i>Earlypay (75% +)</i>	52.76%	1	50.08%	64.51%	1	47.88%	0.004***

Notes: The table shows descriptive statistics for firm characteristics separately for F&F firms and non-F&F firms; p-values are reported for t-tests with $H_0: \bar{X}_{FF} = \bar{X}_{noFF}$; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

smaller in terms of the number of employees and total assets.

Firm age is another determinant of a firm's capital structure as older firms are more likely to have a track record of successful business activity and repaid debt. According to Table 3, F&F firms are younger than non-F&F firms, which confirms previous studies.¹⁰

Transparency

Furthermore, affects a firm's capital structure and the use of (informal) funding from personal sources (Berger and Udell, 1998). First, incorporation measures transparency because it determines a firm's publication obligations, which affect access to bank debt and public debt (Cassar, 2004; Ang, 1992) as well as informal finance (Chavis et al., 2011; Sanyal and Mann, 2010; Bitler et al., 2001). Second, having an external rating indicates transparency and affect a firm's capital structure (Crocì et al., 2011; Faulkender and Petersen, 2006; Denis and Mihov, 2003). Additionally, customer concentration is used as a proxy for transparency as firms with widespread customers have a higher interest in transparency. Finally, export business can increase uncertainty and thereby requires a firm to be transparent. The data in Table 3 shows that F&F firms do not differ significantly from non-F&F firms in these variables, except that they are significantly less likely to export.

Ownership

Empirical literature provides evidence that a firm's ownership status also affects its capital structure. First, belonging to a group company reduces the need to use external finance as more internal funds are available (Masulis et al., 2011). Second, family businesses and non-family businesses differ in their capital structures.¹¹ Furthermore, capital

¹⁰See, for example, Allen et al. (2012), Chavis et al. (2011), Berger and Udell (2002), Romano et al. (2001), Fluck et al. (1998), and Berger and Udell (1998).

¹¹See, for example, Chua et al. (2011), Crocì et al. (2011), Ellul (2010), Romano et al. (2001), and Coleman and Carsky (1999).

structure decisions can be affected by the owner's control rights (Croci et al., 2011; Stulz, 1988) and by whether the largest shareholder of the firm is a member of the operating board (Chavis et al., 2011).

As Table 3 shows, F&F firms are significantly less likely to belong to a group company. They are more likely to be family-owned and the largest shareholder is more likely to be part of a firm's operating board. The share of the largest shareholder is somewhat smaller among F&F firms, but the difference is not statistically significant.

Financial condition

Finally, a set of variables measured in 2011 is used to assess the impact of a firm's financial situation on its capital structure (Denis and Mihov, 2003; Lemmon and Zender, 2010). According to Table 3, F&F firms are more risky in terms of the Creditreform rating, have a lower equity ratio, more long-term debt, and less cash. Variables for a firm's return on sales and the fraction of early payment discounts that the firm was able to draw underline that F&F firms are in a worse financial condition than non-F&F firms.

4. Methodology and Results

4.1. Methodology

Ordinary least squares (OLS) estimations

In a first step, OLS estimations are applied to rule out that the correlation of unsuccessful bank credit negotiations and F&F finance is driven by firm heterogeneity. Although the dependent variables in the following estimations are binary, a linear probability model (LPM) is applied instead of a non-linear estimation to make the results comparable to the linear IV estimations below. Estimations are therefore based on the following linear model:

$$F\&F_i = 1 = \beta_0 + \beta_1 Rejected_i + \beta_2 X_i + \epsilon_i \quad (1)$$

where X_i contains control variables for firm characteristics listed in Table 3 and industry dummy variables based on the two-digit WZ 2008 industry classification. The latter rule out potential industry effects on the firms' capital structure and the use of F&F finance (Bitler et al., 2001; Romano et al., 2001). $Rejected_i$ stands either for *Rejected (line)* or *Rejected (loan)*.

The instrumental variable: Discretionary lending

OLS estimators of the effect of unsuccessful bank credit negotiations on the use of F&F finance do not allow a causal interpretation. As discussed in Section 2, receiving capital from a connected source could serve as a positive (or negative) signal of a firm's creditworthiness and increase (or decrease) its chances of receiving bank credit. In both cases, OLS estimations would be affected by endogeneity.

Identification of a causal effect can be achieved by applying an IV approach, which requires an instrumental variable that satisfies three conditions. First, it must be a relevant predictor of the outcome of bank credit negotiations. Second, it must not affect a firm's decision to use F&F finance, except through the outcome of bank credit negotiations. Finally, the instrumental variable has to be independent of the use of F&F finance conditional on the control variables.

In the following, a variable indicating that a bank applies discretionary lending in the decision about granting credit provides an instrumental variable that satisfies all three conditions. In practice, banks can decide about credit applications based on a rules-based and pre-codified lending process or leave the credit granting decision to the discretion of the loan officer. In the Ifo "Financing of the German Economy" survey, firms that have negotiated bank credit report whether the loan officer had a larger impact on the credit granting decision than a firm's credit rating. The variable $Discretion_i$ equals one if this was the case and therefore indicates that the bank applied discretionary lending.

There are two arguments why discretionary lending is a relevant predictor of bank credit negotiation outcomes in line with the first condition of an instrumental variable. First, in rules-based lending, banks decide whether to lend based on credit scores that are derived only from hard information about the firm (e.g., balance sheet information). If discretionary lending is applied, soft information is also considered in the credit granting decision. Therefore, a broader range of information is collected and taken into account,

which lowers uncertainty for the bank and improves its ability to price the credit contract. This increases the probability that the bank grants credit given a firm’s creditworthiness. Second, discretionary lending provides more room for credit decisions to be based on the flow of information from the personal relationship between the loan officer and the customer. This increases the probability of a firm receiving credit, in particular in times of constrained credit supply (e.g., Sharpe (1990); von Thadden (2004)). How discretionary lending predicts a bank’s credit granting decisions is further discussed by Puri et al. (2011). Their empirical analysis based on a large data set of loans to retail customers shows that discretion in the loan approval decision increases the number of customers that receive credit, which further supports the relevance of discretionary lending as an instrumental variable in the following estimations.

The second condition is also satisfied by discretionary lending as the decision process is deeply rooted in the organisational structure and operational culture of the bank. Therefore, the presence of discretionary lending in a bank affects a firm’s financing decisions (e.g., about F&F finance) only through the result of bank credit negotiations.

Whether discretionary lending is independent of F&F finance conditional on the control variables remains the key assumption in the following IV estimations. Gropp et al. (2013) show that certain firms select themselves into borrowing from discretionary lenders, for example, depending on their creditworthiness. Such selection behaviour can be ruled out as affecting the IV estimations in this study because firms’ credit risk and their financial situation is controlled for by a large set of control variables. Proving the validity of the instrumental variable beyond factors held constant by control variables, the discussion in Section 5 provides further evidence of F&F firms not selecting themselves into negotiations with banks that are likely to apply discretionary lending.

IV estimations: Avoiding the “forbidden” regression

Endogeneity enters the basic model in Equation 2.1 through $Rejected_i$, which is a

binary variable. This raises concerns about the “forbidden regression” in which predicted values from a non-linear first-stage estimation are used in an IV approach. Angrist and Pischke (2008), and Wooldridge (2010) suggest the following estimation approach to make use of potential non-linearity in the conditional expectations function.

The first step contains a binary probit estimation of the model

$$Pr(Rejected_i = 1) = \Phi(\alpha_0 + \alpha_1 X_i + \alpha_2 Discretion_i) \quad (2)$$

where $\Phi(\cdot)$ is the cumulative distribution function of a standard normal distribution. X_i contains all control variables and industry dummy variables, and $Discretion_i$ is the instrumental variable. Two separate estimations are run for *Rejected (line)* and *Rejected (loan)*.¹² Predicted values for the probability of unsuccessful bank credit negotiations are calculated from both estimations. Following Angrist and Pischke (2008), and Wooldridge (2010), these predicted values are used as instrumental variables for *Rejected (line)* and *Rejected (loan)*, respectively, in two-stage least squares estimations.

4.2. Results: Ordinary Least Squares Estimations

According to OLS estimations in Table 4, the use of F&F finance is not significantly affected by unsuccessful negotiations of a line of credit. The effect of unsuccessful negotiations of a loan, however, is substantially larger and statistically significant. Therefore, F&F finance is more important to firms that need to finance particular investments than to those that need working capital finance.

Table 4 further suggests that the effect is driven by “F&F Private”, which is a more important substitute for unsuccessfully negotiated bank credit than “F&F Business”. In Estimations (3) and (4), unsuccessful bank credit negotiations do not have a significant effect on “F&F Business”. Furthermore, unsuccessful negotiations of lines of credit do not affect the probability that a firm uses “F&F Private” in Estimation (5). Estimation (6), however, confirms that unsuccessful negotiations of a bank loan are associated with a significantly higher probability of using “F&F Private”.

¹²The results for the two estimations are presented in Table B.3 in the Appendix. The coefficients of the variable $Discretion_i$ are large and highly statistically significant in both estimations, which underlines the relevance of the instrumental variable in predicting the outcome of bank credit negotiations.

Table 4: OLS estimations

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>
			<i>Business</i>	<i>Business</i>	<i>Private</i>	<i>Private</i>
<i>Rejected (line)</i>	0.053 (0.09)		0.009 (0.07)		0.072 (0.08)	
<i>Rejected (loan)</i>		0.178* (0.09)		0.097 (0.06)		0.160* (0.08)
Firm char.	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1480	0.1116	0.1360	0.1306	0.1497	0.1354
N	289	308	279	303	284	304

Notes: The table shows results for six separate OLS estimations; firm characteristics comprise all control variables listed in Table 3; industry dummy variables are included based on the two-digit WZ 2008 industry classification; robust standard errors are reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.3. Results: Instrumental Variables Estimations

Table 5 provides results for IV estimations ruling out endogeneity. Estimation (1) shows that unsuccessful negotiations of a line of credit do not cause firms to use F&F finance. According to Estimation (2), however, firms use F&F finance as a substitute for unsuccessfully negotiated bank loans. Estimations (4) and (6) underline that this substitution effect is driven by both kinds of F&F finance. Therefore, Hypothesis 1 is confirmed for bank loans, but not for lines of credit. This underlines that F&F finance is used by firms as an alternative source of funding for particular investments, but not for working capital finance.

The summary statistics of the first-stage regression in Table 5 show that the F-statistic is above ten for all estimations.¹³ The test criteria suggested by Stock and Yogo (2005) are satisfied at the ten percent level in all estimations. Therefore, discretionary lending

¹³A critical value of ten is suggested as a rule of thumb by Staiger and Stock (1997).

provides a sufficiently strong instrument for unsuccessful bank credit negotiations. Comparing the different estimations, it seems to be a stronger instrument for unsuccessful negotiations of a line of credit than for unsuccessful negotiations of a loan.

Table 5: IV estimations

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>
			<i>Business</i>	<i>Business</i>	<i>Private</i>	<i>Private</i>
<i>Rejected (line)</i>	0.219 (0.21)		0.137 (0.16)		0.041 (0.17)	
<i>Rejected (loan)</i>		0.634** (0.31)		0.430** (0.21)		0.480* (0.27)
Firm char.	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
F	33.21***	15.16***	34.55***	12.89***	31.49***	15.91***
MES	35.81***	18.08***	35.94***	17.14***	35.34***	18.49***
N	234	225	225	220	230	222

Note: The table shows results of separate IV estimations; firm characteristics comprise all control variables listed in Table 3; industry dummy variables are included based on the two-digit WZ 2008 industry classification; robust standard errors are reported in parentheses; F is the F-statistic for the first-stage estimation testing for weak instruments; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; MES provides the minimum eigenvalue statistic for the Stock and Yogo (2005) test for weak instruments with *** indicating significance at the 10 percent level.

4.4. Signalling Effect of *F&F* Finance

The comparison of the estimated effects from IV estimations to those from OLS estimations sheds light on whether F&F finance is taken by banks as a positive or a negative signal of a firm's creditworthiness (see Hypothesis 2). If it was a positive signal, its use would be negatively correlated with the probability of unsuccessful credit negotiations, which would lead OLS estimators to underestimate the effect of unsuccessful credit negotiations of F&F finance. IV estimations would therefore lead to higher estimated effects

than OLS estimations. If F&F finance was a negative signal, the opposite would be the case and IV estimations would reduce estimated effects relative to OLS estimations.

Compared to OLS estimation, the impact of unsuccessful bank credit negotiations on the use of “F&F Business” increases in both IV estimations, which suggests that “F&F Business” is taken as a positive signal of a firm’s creditworthiness. This result supports Hypothesis 2. For “F&F Private”, however, the picture is mixed with estimated effects decreasing in IV estimations of the effect of unsuccessfully negotiated lines of credit, but increasing in estimations of the effect of unsuccessfully negotiated loans.

This shows that receiving capital from business-related sources (e.g., suppliers or customers) is a stronger positive signal of creditworthiness than receiving capital from privately connected sources. The latter could even be a negative signal. This is reasonable as business-related sources might be more motivated and better able to assess a firm’s business activity, and therefore its creditworthiness than persons who are only privately connected to the entrepreneur. In contrast, the latter may have the incentive to provide capital for altruistic reasons even if creditworthiness is low. Furthermore, the degree of informality could be higher for “F&F Private”, which could induce banks to abstain from lending to the firm.

5. Discussion of the Instrumental Variable

Using discretionary lending as an instrumental variable for unsuccessful bank credit negotiations is valid if discretionary lending and the use of F&F finance are independent conditional on the control variables included in the estimations. In the following, the data is used to test the satisfaction of this condition by analysing under which circumstances discretionary lending is applied by a bank and whether these are more likely to be prevalent for F&F firms.

First, the data allows to test whether F&F firms select themselves into negotiations

with banks that are particularly likely to apply discretionary lending. Whether banks do so depends primarily on their business model. As described by Hackethal (2004), the German banking system comprises several classifications of banks, which differ substantially in their business models. Private commercial banks are typically universal banks offering a wide range of financial products. Savings banks are publicly owned and focus on taking in deposits and providing credit to the economy within their region. Landesbanken serve as central banks to savings banks and provide large scale funding that cannot be offered by small savings banks. Cooperative banks have a business model comparable to the one of savings banks, but they are mutually owned by their members, whom they serve. Finally, the data contains a category of “Other banks” that comprises banks that do not fall into either of these categories (e.g., foreign banks).

To figure out whether different classifications of banks are differently inclined to apply discretionary lending, the firm-level data from the Ifo “Financing of the German Economy” survey can be transformed into a data set of the last bank credit negotiations of all firms. Each firm reports the last negotiations of a line of credit and the last negotiations of a bank loan so that up to two observations per firm are available. For every negotiation, firms could report with which classification of banks these negotiations were held. This information can be linked to whether the credit granting decision was made based on discretionary lending.

The application of discretionary lending may also be driven by certain firm-bank relationship characteristics, which are provided in the data. First, the relationship length and the geographical distance (measured by the travel distance in minutes) could drive discretionary lending because a long relationship and proximity might lead to close personal ties. Other factors could be the fraction of credit that the firm proceeds through the bank and whether a firm’s banker is met in person on a monthly basis or less frequently. In addition to these firm-bank relationship characteristics, the impact of negotiated credit

Table 6: Determinants of Discretionary Lending

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Commercial	0.0022 (0.04)						-0.0559 (-0.76)
Savings bank	0.0727 (1.15)						0.0177 (0.21)
Landesbank	0.1643* (1.84)						0.1460 (1.43)
Cooperative	0.0684 (0.96)						0.0074 (0.08)
log(Length)		-0.0204 (-1.06)					-0.0300 (-1.42)
log(Distance)			-0.0158 (-0.80)				-0.0132 (-0.55)
Credit (%)				0.0014*** (2.62)			0.0010* (1.72)
Meeting					0.0864 (1.35)		0.0811 (1.23)
Vol. (0.1 to < 0.25)						0.0955 (1.44)	0.0863 (1.18)
Vol. (1 to < 5)						0.0084 (0.14)	0.0256 (0.37)
Vol. (5 to < 50)						-0.0176 (-0.25)	0.0836 (1.04)
Vol. (50+)						-0.0472 (-0.57)	0.0155 (0.15)
N	1125	1099	1110	1073	1114	1340	982

Notes: The table shows results for OLS estimations in a sample of all credit negotiations of all firms since 2008; the dependent variable in all estimations is the dummy variable indicating that the bank decided about granting credit based on discretionary lending; the baseline category for the bank classification dummy variables is “Other banks”; relationship length is measured in years; distance is measured in travel minutes from the headquarter of the firm to the bank; the variable credit provides the share of credit a firm has with the bank; the dummy variable meeting indicates that the firm meets with the bank in person on a monthly basis rather than less frequently; “Vol.” denotes the volume of credit measured in million EUR with “Vol. (< 100)” being the baseline category; standard errors are clustered at the firm-level and reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: F&F firms, credit negotiations, and bank classifications

	(1)	(2)	(3)	(4)	(5)
	Commercial	Savings bank	Landesbank	Cooperative	Other bank
<i>F&F</i>	-0.056 (0.05)	0.019 (0.04)	0.028 (0.03)	0.071* (0.04)	-0.062*** (0.01)
N	1113	1113	1113	1113	1113

Notes: The table shows results for OLS estimations in a sample of all credit negotiations of all firms since 2008; standard errors are clustered at the firm-level and reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

volume on the likelihood of discretionary lending can be assessed.

Based on all credit negotiations of all firms, Estimation (1) in Table 6 shows that discretionary lending is significantly more likely for Landesbanken with “Other banks” being the baseline category. When including all variables in Estimation (7), the effect turns insignificant. Furthermore, there is no evidence that savings banks and cooperative banks are particularly likely to apply discretionary lending. For private commercial banks, the probability is somewhat lower, but the difference is not statistically significant. Among the firm-bank relationship characteristics, only the fraction of credit proceeded through the bank seems to drive discretionary lending. The effect of monthly meetings is insignificant, but very stable between Estimations (5) and (7).

Therefore, if F&F firms selected themselves into negotiations with discretionary lenders, they should be more likely to negotiate with Landesbanken, banks through which they proceed a large share of credit, and banks with which they meet on a monthly basis. Table 7 shows regressions of variables indicating the classification of the bank with which a firm negotiated on whether a firm uses F&F finance. The results show that F&F firms are not more likely to negotiate with Landesbanken. They tend to select themselves away from negotiations with “Other Banks” and towards cooperative banks, but these do not differ in their attitude towards discretionary lending.

Furthermore, Table 8 shows that the firm-bank relationships in which F&F firms

negotiate bank credit are not characterised by a particularly high share of credit held with the bank or a high likelihood of monthly meetings. Therefore, the circumstances under which discretionary lending is applied are not significantly more or less likely to be in place for F&F firms. Hence, neither bank classifications nor firm-bank relationship characteristics show any signs of F&F firms selecting themselves into negotiations with discretionary lenders, which strengthens the view that discretionary lending provides a valid instrumental variable for unsuccessful bank credit negotiations.

Table 8: F&F firms, credit negotiations, and bank-firm relationships

	(1) Credit (%)	(2) Meeting
<i>F&F</i>	-0.281 (3.22)	-0.004 (0.03)
N	1061	1097

Notes: The table shows results for OLS estimations in a sample of all credit negotiations of all firms since 2008; standard errors are clustered at the firm-level and reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

6. Robustness Checks

6.1. Controlling for Sample Selection Bias

So far, all estimations have been conducted in the sample of firms that have negotiated a line of credit or a loan, respectively, which raises concerns about sample selection bias. This is addressed by applying a two-step estimation procedure suggested by Heckman (1979). From estimations of a probit model for firms' decisions to enter bank credit negotiations, the inverse Mills ratio can be calculated for every observation. The ratio is then included as a control variable in the OLS and IV estimations analogue to Section 4. In a comparable setup, Brown et al. (2011) apply this procedure to control for selection effects when analysing the determinants of credit demand and credit access of firms

in Eastern Europe using data from the Business Environment and Enterprise Survey (BEEPS).

In this empirical analysis, however, the second step of such a selection model contains an IV estimation. To the best of my knowledge, there is no standard procedure to estimate the correct standard errors in such a setup. Unfortunately, bootstrapped standard errors are not available due to the small number of observations in the data set. Therefore, the following results can only be considered as a “back-of-the-envelope” analysis to control for sample selection bias. The selection process is modelled as

$$Pr(Negotiation_i) = \Phi(\beta_0 + \beta_1 X_i + \beta_2 Competition_i) \quad (3)$$

where $\Phi(\cdot)$ is the cumulative distribution function of a normal distribution, X_i is the set of control variables and industry dummy variables, and $Competition_i$ is a set of dummy variables measuring the level of competition a firm faces.¹⁴ The latter serve as exclusion restrictions in order to ensure identification of the two-step estimator. Hainz and Nabokin (2013) also use competition as an exclusion restriction when estimating how firms select themselves into having credit demand. They argue that “firms may invest more often in order to improve their position relative to other competitors” when facing high levels of competition and that this increases their probability of having credit demand. They further claim that the exogeneity with respect to the success of bank credit negotiations is ensured because banks assess the level of competition at the industry-level only. As industry dummy variables are included in all estimations in this study, any effects of competition on the outcome of credit negotiations should be ruled out.

The argument of Hainz and Nabokin (2013) is directly applicable to the estimation of a model for firms’ selection into negotiations of bank loans, which are used to finance

¹⁴The level of competition on a scale from 1 to 11 is reported by firms in the Ifo “Financing of the German Economy” survey.

investments. It is also applicable to negotiations of lines of credit because some firms use them to finance investments. When facing high levels of competition, firms may also increase their working capital to improve their competitiveness.

From the probit estimations, the inverse Mills ratio is calculated and used as a control variable in the OLS estimations as described in Section 4.1. The results in Table B.4 in the Appendix confirm previous OLS estimation results from Section 4.2: Unsuccessful negotiations of a bank loan are associated with a higher probability of using F&F finance. This effect is primarily driven by the significant effect of unsuccessful loan negotiations on the use of “F&F Private”. Even after controlling for selection bias, estimations do not show any signs of F&F finance being used as a substitute for unsuccessfully negotiated lines of credit.

As another robustness check, the inverse Mills ratio from the selection model is included as a control variable into IV estimations in comparison to estimations in Section 4.3. The results in Table B.5 in the Appendix confirm that firms use F&F finance in response to unsuccessfully negotiated loans, but not as a substitute for lines of credit. Unsuccessfully negotiated loans increase the probability of both “F&F Business” and “F&F Private” being used by a firm.

In both the OLS and IV estimations, the results suggest that the estimation of the effect of unsuccessful bank credit negotiations on the use of F&F finance are not affected by sample selection. The estimated coefficients hardly change compared to the estimations in which selection bias is not accounted for. Furthermore, the estimated coefficients of the inverse Mills ratio are statistically insignificant in all estimations.

6.2. The Role of Discouraged Borrowers

The extent to which F&F finance is used as a substitute for unsuccessfully negotiated bank credit could underestimate the true substitution effect in response to credit constraints if firms turn to F&F finance before even entering bank credit negotiations. They

could do so, for example, because they expect a rejection of their credit application. Such firms are generally referred to as *discouraged* borrowers.

Whether discouraged borrowers provide further evidence in support of the result that credit constraints drive firms into informal finance can be tested with data from the Ifo “Financing of the German Economy” survey. If firms did not negotiate about bank credit, they could report in the survey whether they did not do so because they expected negotiations with banks to be unsuccessful.

OLS estimations are used to test the significance of the effect of a firm being discouraged on the use of F&F finance. The results in Table B.6 in the Appendix suggest that no further substitution behaviour into informal finance is prevalent because of expected unsuccessful bank credit negotiations. IV estimations that would allow a causal interpretation are not available here because the data does not contain any suitable instrumental variables for a firm being discouraged.

7. Conclusion

Based on a novel data set from the Ifo “Financing of the German Economy” survey, this paper shows that F&F finance is surprisingly widespread among German firms. Considering that Germany is a highly developed country and that the sample does not focus on start-up businesses, this deserves special attention. In particular, it is important to analyse whether bank credit constraints are a cause of the widespread use of this particular kind of informal finance.

Descriptive statistics show that firms that unsuccessfully negotiate about bank credit are significantly more likely to use F&F finance. OLS estimations are used to control for a broad set of firm characteristics that previous literature found to determine a firm’s capital structure, its decision to use informal finance, and its risk of facing bank credit constraints. The results suggest that F&F finance is significantly more likely to be used

if a firm has unsuccessfully negotiated a bank loan. Such an effect is not found for unsuccessful negotiations of lines of credit.

Since OLS estimations are affected by endogeneity stemming from the fact that F&F finance may have a signalling effect on banks' decisions to grant or reject credit, an IV approach is applied to estimate the causal effect of unsuccessful bank credit negotiations. Thereby, the dummy variable indicating that a bank follows discretionary lending provides an instrumental variable for unsuccessful bank credit negotiations.

IV estimations show that unsuccessfully negotiated bank loans drive the use of F&F finance, which highlights its importance in financing specific investment projects. For working capital finance, however, F&F finance seems less important as there is no significant effect of unsuccessfully negotiated lines of credit on the use of F&F finance. The results show that the substitution effect exists for both "F&F Business" and "F&F Private". The comparison of OLS and IV estimators further indicate that "F&F Business" serves as a positive signal of a firm's creditworthiness in bank credit negotiations while evidence of the signalling effect of "F&F Private" is mixed. Robustness checks show that these findings are unaffected by accounting for sample selection bias. Furthermore, there is no evidence that discouraged borrowers use F&F finance in response to expectations of unsuccessful bank credit negotiations.

Since turning to informal sources of finance is associated with higher borrowing costs (Djankov et al., 2003) and welfare gains from financial intermediation no longer materialise, attention should be paid to the extent to which firms use informal finance in response to credit constraints. This study provides evidence that this phenomenon is not only occurring in developing countries or among start-up businesses, but that it is highly relevant even among established firms in a highly developed economy.

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Appendix

Table B.1: Purpose of negotiated credit

<i>Purpose (line)</i> (N=531)		<i>Purpose (loan)</i> (N=535)	
Working capital	72.32%	Substitution	47.57%
Investments	57.06%	Enhancement	64.74%
Others	12.24%	Rationalisation	28.17%
		R&D	10.09%
		Acquisitions	8.79%
		Foreign investment	6.92%
		Others	15.14%

Notes: The table provides the purposes of negotiated lines of credit and loans as reported by firms in the Ifo “Financing of the German Economy” survey. For every negotiated credit contract, firms could report more than one purpose.

Table B.2: F&F finance and firm characteristics

	<i>F&F Business</i>			<i>F&F Private</i>		
	Yes	No	$p > t$	Yes	No	$p > t$
N	128	956		62	1009	
Perc.	11.81%	88.19%		5.79%	94.21%	
<i>log(Empl)</i>	4.57	5.02	0.01**	4.62	4.97	0.14
<i>log(Assets)</i>	8.61	9.25	0.009***	9.12	9.16	0.90
<i>log(Age)</i>	3.96	4.05	0.32	3.82	4.06	0.06*
<i>Incorporated</i>	61.72%	62.41%	0.88	68.85%	61.74%	0.27
<i>Ext. rating</i>	25.00%	21.40%	0.36	25.00%	21.46%	0.52
<i>Customer (< 10%)</i>	20.00%	19.91%	0.98	11.48%	20.24%	0.10
<i>Customer (10% to < 30%)</i>	41.60%	45.05%	0.47	44.26%	45.02%	0.91
<i>Customer (30% to < 50%)</i>	26.40%	18.96%	0.05*	24.59%	19.44%	0.33
<i>Customer (50% +)</i>	12.00%	16.08%	0.24	19.67%	15.31%	0.36
<i>Export</i>	83.33%	88.22%	0.12	79.03%	88.04%	0.04**
<i>Group</i>	21.88%	39.79%	0.000***	32.26%	38.10%	0.36
<i>Family</i>	91.41%	74.18%	0.000***	62.90%	76.05%	0.02**
<i>Control</i>	70.22	73.69	0.21	70.26	73.85	0.34
<i>Operating owner</i>	72.66%	59.49%	0.004***	59.68%	61.14%	0.82
<i>Rating</i>	216.21	198.46	0.04**	224.79	197.87	0.02**
<i>Equity</i>	21.89%	36.84%	0.000***	16.47%	36.45%	0.000***
<i>Debt</i>	33.64%	23.14%	0.003***	41.43%	23.54%	0.000***
<i>Cash</i>	9.61%	11.19%	0.30	8.16%	11.39%	0.12
<i>Return (< 3%)</i>	54.31%	44.10%	0.04**	66.10%	44.05%	0.001***
<i>Return (3 to < 7%)</i>	31.90%	32.65%	0.87	20.34%	32.79%	0.05*
<i>Return (7 to < 10%)</i>	7.76%	14.32%	0.05*	8.47%	14.29%	0.21
<i>Return (10% +)</i>	6.03%	8.93%	0.30	5.08%	8.87%	0.32
<i>Earlypay (0%)</i>	4.10%	3.02%	0.52	6.56%	3.17%	0.16
<i>Earlypay (< 25%)</i>	16.39%	14.55%	0.59	29.51%	13.60%	0.001***
<i>Earlypay (25 to < 50%)</i>	7.38%	9.27%	0.49	6.56%	9.00%	0.52
<i>Earlypay (50 to < 75%)</i>	14.75%	9.70%	0.08*	14.75%	10.02%	0.24
<i>Earlypay (75% +)</i>	57.38%	63.47%	0.19	42.62%	64.21%	0.001***

Notes: The table shows descriptive statistics for firm characteristics separately for F&F firms and non-F&F firms; p-values are reported for t-tests of the significance of the difference between respective groups of firms with respect to the firm characteristics; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B.3: Probit estimations for IV approach

	(1) Rejected (line)	(2) Rejected (loan)
<i>Discretion</i>	-1.183*** (0.34)	-0.916*** (0.30)
<i>log(Empl)</i>	-0.305 (0.22)	-0.148 (0.14)
<i>log(Assets)</i>	0.147 (0.17)	0.141 (0.11)
<i>log(Age)</i>	-0.183 (0.14)	-0.133 (0.13)
<i>Incorporated</i>	1.048*** (0.35)	0.409 (0.27)
<i>Ext. rating</i>	-0.521 (0.34)	-0.292 (0.31)
<i>Customer (10% to <30%)</i>	0.514 (0.54)	-0.644* (0.35)
<i>Customer (30% to <50%)</i>	-0.288 (0.62)	0.236 (0.40)
<i>Customer (50% +)</i>	0.373 (0.66)	-0.478 (0.45)
<i>Group</i>	0.478 (0.36)	0.125 (0.34)
<i>Family</i>	0.037 (0.35)	-0.317 (0.40)
<i>Control</i>	0.007 (0.00)	0.002 (0.00)
<i>Export</i>	-0.067 (0.44)	0.347 (0.36)
<i>Operating</i>	1.086*** (0.37)	0.973** (0.40)
<i>Rating</i>	0.001 (0.00)	-0.000 (0.00)
<i>Equity</i>	-1.157* (0.61)	-1.493** (0.64)
<i>Long-term debt</i>	-1.355** (0.61)	0.056 (0.56)
<i>Cash</i>	5.849*** (1.82)	2.829** (1.22)
<i>Return (3% to <7%)</i>	-1.357*** (0.37)	-0.690** (0.28)
<i>Return (7% to <10%)</i>	0.279 (0.42)	0.187 (0.39)
<i>Return (10% +)</i>	-1.090 (1.12)	.
<i>Earlypay (0% to <25%)</i>	-0.014 (0.51)	-0.277 (0.51)
<i>Earlypay (25% to <50%)</i>	0.343 (0.58)	-0.316 (0.58)
<i>Earlypay (50% to <75%)</i>	-0.827 (0.63)	-0.856 (0.57)
<i>Earlypay (75% +)</i>	-1.232** (0.56)	-1.109** (0.49)
Industry	Yes	Yes
N	235	231

Notes: The table shows results for two separate probit estimations; firm characteristics comprise all variables listed in Table 3; industry dummy variables are included based on two-digit WZ 2008 industry classifications; robust standard errors are reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B.4: Sample selection in OLS estimations

	(1)	(2)	(3)	(4)	(5)	(6)
	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$
			<i>Business</i>	<i>Business</i>	<i>Private</i>	<i>Private</i>
<i>Rejected (line)</i>	0.053 (0.09)		0.007 (0.07)		0.073 (0.08)	
<i>Rejected (loan)</i>		0.176* (0.09)		0.093 (0.06)		0.161* (0.08)
λ_1	-0.059 (0.19)		0.219 (0.14)		-0.095 (0.17)	
λ_2		0.124 (0.34)		0.137 (0.22)		-0.044 (0.28)
Firm char.	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1472	0.1114	0.1439	0.1318	0.1511	0.1350
N	286	307	276	302	281	303

Notes: The table shows results for six separate OLS estimations; firm characteristics comprise all control variables listed in Table 3; industry dummy variables are included based on the two-digit WZ 2008 industry classification; robust standard errors are reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B.5: Sample selection in IV estimations

	(1)	(2)	(3)	(4)	(5)	(6)
	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$	$F\mathcal{E}F$
			<i>Business</i>	<i>Business</i>	<i>Private</i>	<i>Private</i>
<i>Rejected (line)</i>	0.236 (0.20)		0.097 (0.16)		0.077 (0.17)	
<i>Rejected (loan)</i>		0.682** (0.31)		0.495** (0.22)		0.472* (0.25)
λ_1	-0.149 (0.22)		0.187 (0.15)		-0.145 (0.18)	
λ_2		-0.292 (0.39)		-0.308 (0.27)		-0.282 (0.33)
Firm char.	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
F	35.16***	15.99***	34.85***	13.07***	32.47***	15.82***
MES	36.08***	19.43***	35.13***	17.03***	35.54***	18.43***
N	234	225	225	220	230	222

Note: The table shows results for separate IV estimations; λ is the inverse Mills ratio from probit estimations for the firms' decision to enter bank credit negotiations; firm characteristics comprise all control variables listed in Table 3; industry dummy variables are included based on the two-digit WZ 2008 industry classification; robust standard errors are reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; F is the F-statistic for the first-stage estimation testing the significance of the instrumental variable; MES provides the minimum eigenvalue statistic for the Stock and Yogo (2005) test with *** indicating the 10 percent confidence level and ** indicating the 15 percent confidence level.

Table B.6: OLS estimations for discouraged borrowers

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>	<i>F&F</i>
			<i>Business</i>	<i>Business</i>	<i>Private</i>	<i>Private</i>
Discouraged (line)	0.285 (0.22)		0.267 (0.19)		0.061 (0.12)	
Discouraged (loan)		0.126 (0.12)		0.104 (0.11)		0.049 (0.10)
λ_1	-0.162 (0.10)		-0.032 (0.04)		-0.147 (0.10)	
λ_2		0.151 (0.22)		0.119 (0.15)		-0.049 (0.18)
Firm char.	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.1707	0.1893	0.2441	0.3084	0.1391	0.1347
N	314	306	314	302	310	301

Notes: The table shows OLS estimation results for separate regressions; λ is the inverse Mills ratio from probit estimations for the firms' decision **not** to enter bank credit negotiations; firm characteristics comprise all control variables listed in Table 3; industry dummy variables are included based on the two-digit WZ 2008 industry classification; robust standard errors are reported in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.