Master Thesis

Does factoring improve SME access to finance?

An empirical study across developing countries

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Abstract

Factoring is a financing method enabling sellers to convert their accounts receivables to cash before the payment due date, effectively financing their working capital. Since the risk of factoring is with the accounts receivables and ultimately with the buyer this method allows risky and opaque sellers to attract external financing. In developing countries traditional forms of lending are problematic because of information asymmetries and weak legal systems. This leads to firms having problems accessing finance. Factoring is claimed to be a promising alternative financing method for SME sellers in these environments. This study empirically investigates the relationship between factoring, measured as factoring volume to GDP and access to finance, measured by the percentage of firms in a country listing access to external financing as a major or severe obstacle to operations or growth. A panel regression including various control variables is conducted on a uniquely constructed country-level dataset of 23 developing countries for the years 2009-2012. Regression results confirm expectations: a negative association between Factoring/GDP and the percentage of financially obstacled firms is found. This relationship is found to be stronger in countries with higher values of the Credit Information Index, representing to what extent information about obligors is available to providers of financing.

1. Introduction

Financing the SME production cycle: factoring

Small and Medium-size Enterprises (SMEs) around the world face challenges in finance. Particularly financing their production cycle is challenging because many buyers demand to pay only 30 to 60 days after delivery of goods (Klapper, 2006). Firms record their invoices as an asset: accounts receivable. Factoring is a form of supplier finance enabling sellers to convert their receivables directly to cash and finance their production cycle before the payment due date. The seller sells the accounts receivable to a financial institution called the factor. In exchange the seller immediately receives the largest part of the value in cash. The remainder of the sum, minus fees and interest rate for the factor, is transferred when the buyer pays the invoice. The basic mechanics of factoring are shown in Figure 1 on the next page. Although it provides sellers with working capital financing, factoring is not a loan. Under some circumstances factoring has advantages to financing working capital through a bank loan (Bakker et al., 2004). These advantages are theoretically more pronounced in environments where financiers are unable to overcome the information asymmetries between the supply and demand of external finance.

This study aims to investigate the relation between factoring and access to external finance in developing countries.

Financing SMEs: overcoming information asymmetries

Information asymmetries between firms and suppliers of external finance are larger for (private) SMEs than they are for large corporate firms. For instance SMEs do not report financial numbers on a regular basis and their creditworthiness is not represented by a public credit rating. The entrepreneur knows more about the quality of the firm than financial institutions. This can lead to low-quality firms acting like high-quality firms towards financiers to get better financing conditions (adverse selection) and firms behaving more risky if they are externally financed (moral hazard) (Bakker et al., 2004). Information asymmetries make it harder for financial institutions to assess the risks of lending and increase transaction costs (Beck, 2007). In developed countries financial institutions seem to be able to overcome these information asymmetries. Commercial bank loans, secured by accounts receivable, are the primary method of external working capital finance for SMEs in the United States (Klapper, 2006). The legal and technological infrastructure allow for effective collateralization of accounts receivable. The informational infrastructure enables financial institutions to obtain information about the quality of borrowers more easily. Opacity is dealt with using techniques like small business credit scoring (Bakker et al., 2004). SMEs in developing countries however, face difficulties obtaining credit (Ayyagari, et al., 2006). Access to finance has been shown to be their number one growth constraint: this makes it difficult for firms to grow to their

optimal size (Beck & Demirgüç-Kunt, 2006). The political situation in developing countries also makes preferential access to finance more likely. This implies that larger, politically better-connected firms are better able to access external financing compared to small firms (Claessens, 2006). Goedhuys (2002) shows small firms grow slower and large firms grow faster than in developed economies. This leads to the so-called missing middle: compared to developed economies, developing countries have a large amount of microenterprises and a small amount of large firms, but far fewer small and medium enterprises. This phenomenon is shown graphically in Figure 2. The missing middle is widely recognized as a problem since SMEs are the emerging private sector in developing countries and thus form the basis for growth (Hallberg, 1999). Beck et al. (2005) find a strong positive relationship between size of the SME sector and economic growth in a country: an SME sector like shown on the left of the graph below is a characteristic of flourishing economies. This might be an explanation for the low number of SMEs and the lack of SME's contribution to real economic growth in developing countries (Beck & Demirgüç-Kunt, 2006).
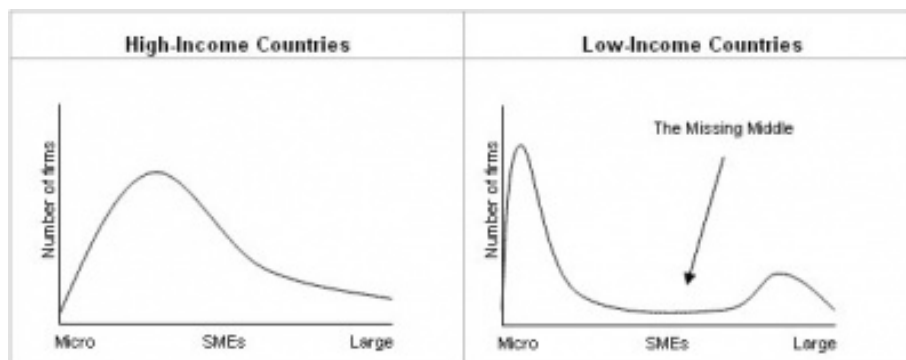
Figure 2: The missing middle (Harvard Kennedy School, 2014)

Financial infrastructure: informational and legal environment

Credit availability to SMEs depends on the infrastructure that supports financial transactions (Beck & Demirgüç-Kunt, 2006). This infrastructure determines the extent to which information asymmetries can be overcome. The first relevant aspect of this infrastructure concerns commercial laws and enforcement: for banks to issue loans the pledging of collateral needs to be regulated and bankruptcy laws must be effective. The second aspect concerns credit information: information about SMEs needs to be available for banks to assess risks. Authors like Love & Mylenko (2003) have shown credit information sharing significantly increases credit availability for SMEs. SMEs in

countries with weak legal and information environments have more problems obtaining bank loans (Beck & Demirgüç-Kunt, 2006). Financial institutions in these environments are not able to assess the risks of financing SMEs due to a lack of reliable information. Pledging collateral is problematic because of weak commercial laws.

Factoring as a solution in weak environments

Factoring appears to have an advantage to bank loans under the circumstances described above. Factoring depends less on a well-developed financial infrastructure. Firstly the SME sells its accounts receivables: as opposed to taken a loan, no collateral is required. Secondly factoring transfers credit risk from the selling SME to the underlying asset. The creditworthiness of this asset ultimately depends on the obligor, the buyer (Klapper, 2006). Credit information about the SME itself is therefore less important, the quality of the accounts receivable and ultimately the buyer is what matters (Bakker et al., 2004). This makes factoring particularly attractive when the buyer is a transparent, high quality firm for which more reliable information is available. Weak legal and informational infrastructures may not allow for SMEs to finance their working capital through traditional commercial bank loans. These environments may, however, allow for factoring. For SMEs operating in weak environments for which access to finance is a problem factoring is theoretically claimed to be a solution. For this reason the World Bank called for more research on the effectiveness of factoring, its suppliers and its role in increasing access to finance for SMEs in its 2014 Financial Inclusion Report. This study aims to empirically test whether factoring is really able to increase access to finance, allowing SMEs to grow and contribute to economic growth. This is investigated using a unique and recent dataset on access to finance and factoring in 23 developing countries in the period 2009-2012. The central research question is:

Does factoring increase access to finance for SMEs?

Factoring exists in a number of different types. Two main types are distinguished: factoring with and without recourse. Factoring on a recourse basis implies the factor can take recourse against the seller in case the accounts receivable default. When factoring is done on a non-recourse basis the default risk is completely transferred to the factor. Another type of factoring particularly interesting for SMEs operating in weak environments is reverse factoring: the factor purchases receivables from many suppliers

but only a few high-quality buyers. The factor only needs to gather information about the buyer. Also financial institutions could benefit from offering factoring services to SMEs. International factoring providers can facilitate international trade for SMEs because of their global reach. This enables them to collect information about foreign obligors. They are also capable to collect receivables abroad. Beck et al. (2008b) find that banks perceive the SME segment to be highly profitable. However, banks are underexposed to this segment because of the problems overcoming information asymmetries described above. Factoring therefore also offers an opportunity to financial institutions.

The origin and current state of factoring

Authors like Bakker et al. (2004) have extensively described the history of factoring. They claim it is one of the oldest forms of commercial finance, going back as far as the Hammurabi in Babylonia four thousand years ago. It is also claimed to have been used extensively in the Roman Empire. Factoring evolved in Europe in the English wool industry during the 14th century to bridge the challenges of large distances between customers and manufacturers. During these times factors also engaged in sales and credit advice. Still factoring comprises of a bundle of services: providing finance and collection of receivables. In the past decades worldwide factoring turnover has grown tremendously: from approximately €50 billion in 1980 to near €2,120 billion in 2012. The factoring industry has grown four times faster than the world economy in the last 30 years (International Factoring Group, 2014). This study investigates whether its use can also make a difference in addressing the problem of limited access to (working capital) finance for SMEs. In the following sections the main contribution, methodology and main findings of the study will be discussed.

Main contribution and insights

The main contribution to the literature of this study lies in its dataset, methodology and empirical approach. Theoretical studies have elaborated on how factoring is a promising technology to improve access to finance. For this study a unique cross-country panel dataset on access to finance and detailed information on factoring was constructed. This is done combining data from a wide range of sources including the multiple World Bank databases, IMF databases and unique data provided by the International Factoring Group. The dataset is used to investigate the relationship between factoring and access to finance to provide concrete empirical evidence, previously not available. The insights gained by

this study can be useful for policymakers, financial institutions and academia to confirm whether factoring works as a tool to address limited access to finance for SMEs. If it does the use of factoring for SMEs in weak informational and legal environments should be promoted by policies, for instance introducing laws recognizing and regulating factoring as a financing method. Empirical support on the claim that factoring is associated with better access to finance could also promote the motivation to gather more reliable and firm-level data on the various types of factoring, enabling academics to generate more specific insights on this topic.

Methodology and main findings: linking factoring to access to finance

The methodology of this study involves multiple steps. The first step is determining the access to finance level for each country for which detailed factoring data is available. Used as a gauge for access to finance the percentage of firms experiencing finance as a major obstacle to growth in a country from the World Bank Enterprise Surveys is used: a lower percentage is representing better financial access. A least squares panel regression is conducted of this percentage on the importance of factoring in a country and various control variables, aiming to capture total variation in access to finance. Also expectations on variables impacting the relationship between factoring and access to finance are tested, such as the legal and informational infrastructure and characteristics of the factoring industry in a country. The final dataset comprises of 23 developing countries of which the majority is situated in Eastern Europe and Middle/Latin America: Argentina, Bangladesh, Belarus, Bulgaria, Colombia, Croatia, Czech Republic, Ecuador, Estonia, Hungary, Latvia, Lithuania, Mexico, Moldova, Peru, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Turkey and Ukraine. The panel consists of unbalanced observations for these countries for the years 2009-2012.

From the analyses a strong negative association between the importance of factoring and the percentage of financially obstacled firms is found. More factoring to GDP is associated with lower percentages of firms indicating access to finance as a major obstacle. The analysis of moderation effects shows better availability of credit information is associated with a stronger relationship between factoring and access to finance.

Overview of chapters

In the following chapter the relevant literature for this study is reviewed and the hypotheses are formulated. In the methodology and data chapter the data is introduced and the various regressions conducted are explained. In the subsequent chapter results are discussed. Lastly a conclusion is formulated, limitations are discussed and possible directions for future research are elaborated upon.

2. Literature Review

Although the practice of factoring has been growing rapidly in the past decades the body of academic literature regarding this financing method is still limited. Theoretical papers have stressed the potential of factoring in addressing limited SME access to finance in certain circumstances and individual case studies have demonstrated its effectiveness. However, empirical evidence linking factoring to access to finance across countries has not yet been provided. Also evidence on the supply-side of factoring has not been provided yet. Although research has been done on financial institution landscape and access to finance, there are no empirical studies explicitly looking at factoring suppliers and access to finance. This part will review the most relevant papers for this study. Firstly papers concerning SME access to finance and where factoring fits will be discussed. Secondly papers concerning financial institutions and the type of institutions best suited to supply this type of financing will be reviewed. After this a summary of the literature is provided. Based on past literature and insights the conceptual framework of this study is drawn. Finally the hypotheses to be tested will be formulated.

SME access to finance, its determinants and factoring

Berger & Udell (1998) look at financing for small firms in the United States. These authors focus on size and age, a focusing on size and age, arguing that firms in different stages in the 'growth cycle' demand different financing approaches and capital structures. They state that the degree of informational opacity is key in determining the range of financing options available to small firms: financial intermediaries need to screen, contract and monitor borrowers to address these information problems. Schiffer and Weder (2001) investigate firm size and business environments around the world using unique cross-country survey data gathered by the World Bank. Using regression results of various firm characteristics and dummies for firm size they find a small-firm bias

concerning access to finance: smaller firms report more financing obstacles than their large counterparts. The paper by Beck et al. (2008a) finds similar results when comparing actual use of external financing by firms of different sizes across countries. They find that smaller firms use less external financing. This effect is more pronounced in countries with weaker institutional, financial and legal environments. Beck et al. (2007b) find the costs of screening, contracting and monitoring in these environments are significantly higher, leading to limited financing. The paper by Ayyagari et al. (2005) identifies access to finance as the major growth constraints for SMEs in developing countries. This study focuses on different business environments and institutions. The authors claim institutional development would be the best solution to address this issue. However, they claim that in the absence of effective institutions the use of innovative lending technologies (like factoring) should be able to increase SME access to finance. Beck & Demirgüç-Kunt (2006) study the drivers of limited access to finance for SMEs in weak institutional environments. They claim that credit availability ultimately depends on the financial infrastructure of a country: the two elements this comprises of are the so-called legal and informational environment.

With regard to the legal system these authors refer to Beck et al. (2005) and Demirgüç-Kunt & Levine (2005). The former investigates the influence of legal origin of a country on the operation of its financial system. Using panel regressions on firm-level survey data the authors find that if a legal system is more effective and more adaptable (case law and principles of equity are more accepted as foundations of legal decisions) firms report less financing obstacles. The latter studies financing obstacles and their impact on firm growth. These authors find that for small firms the effect of financing obstacles is smaller when the legal system is better developed. Because factoring depends less on laws regarding credit, lending and collateral, it is introduced as a solution in improving access to finance for SMEs in weak legal environments. Salinger (1999) is one of the first authors dedicate a book specifically to factoring. In "Salinger on Factoring: The Law and Practice of Invoice Finance" he argues that factoring as compared to ordinary bank loans should play a larger role in countries with weak creditor rights because it is least affected by it. Bakker et al. (2004) argue similarly when investigating factoring in Eastern Europe: weak rule of law may affect all lending products, but it might affect factoring less because factoring represents a property sale and purchase in commercial law and not a secured loan. They argue that in financial systems where commercial law, contract enforcement and bankruptcy systems are weak factoring can play an important role because risk is

allowed to be transferred to a counterparty with better creditworthiness. Klapper (2000) conducts an empirical analysis of the determinants of factoring worldwide and finds that higher bank credit to GDP is related to more factoring defined as factoring volume to GDP. This suggests that factoring is not a substitute for bank lending, rather a complementary enhancement. A substitute product would show a negative relationship. However, factoring might still address SMEs that face obstacles to bank lending. This author also finds factoring to be larger in countries with a strong judicial system supporting creditors. The effect of factoring on SME access to finance, however, is expected to be larger in countries with weaker legal systems.

The information environment has also empirically been demonstrated to be a determinant of credit availability. Pagano and Jappelli (2002), using a dataset on private credit bureaus and public credit registers, show that credit information sharing can effectively reduce the moral hazard an adverse selection, leading to more bank lending and lower credit risk. Love & Mylenko (2003) link the presence of these institutions directly to financing constraints faced by firms using firm-level data as well as observed bank lending in a country. They find that credit sharing, particularly through private credit bureaus, is associated with increased bank lending and reduced financing obstacles. Factoring can play an important role in countries where the credit information environment is not well developed. SMEs that are not included in the information environment because they are covered by neither a public credit registry nor a private credit bureau will find it harder to obtain a bank loan. Factoring does not rely on the creditworthiness of the SME but rather on the creditworthiness and transparency of its accounts receivable or ultimately the buyers of its products. Theoretically the information environment therefore only needs to include buyers. Factoring would therefore be expected to be more effective in increasing access to finance for SMEs in countries with a weak information environment. Klapper (2006), looking at the determinants of factoring across countries, finds the opposite. This author shows Factoring/GDP is higher in countries with a stronger credit information system. However, also in this case the effect on access to finance is not included in the analysis of this author. Factoring can also play a useful role in facilitating SMEs to engage in international trade, with factoring companies directly financing exporter's working capital and collecting receivables abroad through an international network of factors (Factors Chain International, 2014). Klapper (2006) also explicitly takes a look at reverse factoring. This form of factoring is named as specifically successful in weak environments because in ordinary factoring (especially without recourse) the factor takes

on a large credit risk – the risk of buyers not paying. In developing countries this risk is larger because of a lack of credit information and possible fraud (Klapper, 2006). Reverse factoring, also called supply chain financing, provides a solution. In this type of factoring only the accounts receivable owed by a usually high quality, low risk buyer are taken over. This buyer could be an internationally operating publicly rated company like Walmart or Unilever. The credit risk for the factor is equal to the default risk of this buyer. This effectively allows for factoring without recourse for risky SMEs. Klapper (2006) also conducted a case study of the Nafin bank reverse factoring program in Mexico, a successful example of a financial institution using technology to engage in reverse factoring, creating chains of small (risky and opaque) buyers and big (high quality, transparent) buyers: enabling small firms to finance their working capital in a weak informational environment. Although promising, reverse factoring still accounts for a small amount of factoring worldwide and unfortunately there is little data available. As suggested by Klapper (2006), Borgia et al. (2010) relate factoring to the quality of governance in a country. The author argues weak governance is the root of information asymmetry. The empirical evidence of this paper shows weak governance and therefore more information asymmetry is related to higher levels of factoring.

Factoring as an opportunity for financial institutions

The traditional approach of financial institutions to catering SMEs is relationship lending. De la Torre et al. (2010) indicate relationship lending is the "conventional wisdom" approach to addressing informational opaqueness in finance. Earlier literature confirms this claim. Berger & Udell (1995) state relationship lending is the suitable method in environments in which information about creditors is problematic. They define relationship lending as a long-term arrangement in which the lender collects soft information by observing the borrowers performance in credit contracts or other services. The authors look at lines of credit and relationship lending of small firms. They find evidence consistent with the claim that a longer relationship reduces the information asymmetry between lender and borrower: SMEs with a longer relationship pay lower interest rates and are less likely to pledge collateral. Kano et al. (2006) examine the bank-borrower relationship in Japan and show that firms without audited financial statements benefit the most from relationship lending. Uchida et al. (2009) investigate the role of loan officers in relationship banking. They find that loan officer activity is related to the production of soft information about SMEs and that small banks produce more soft

information. Soft information is defined as "not easily quantified and consists of information gathered over time through contact with the firm, the firm's management/entrepreneur, the firm's suppliers and customers, and other local sources". Beck et al. (2008b), using bank survey data, find evidence that the SME segment is perceived to be highly profitable. Nevertheless the authors also show that banks are still underexposed to this segment. This suggests relationship lending does not adequately address the problem SMEs face regarding access to finance. The authors find evidence for the new paradigm proposed by Berger & Udell (2006). Small and local banks were seen as the most important institutions overcoming information asymmetries based on local knowledge and network. However, technology and scale economies give large and foreign institutions an advantage in serving SMEs using so-called transactions-based lending technologies. These technologies are based on quantitative information and/or linked to the value of assets. Lending technologies are distinguished based on the primary foundations of the lending decisions. With so-called transactions lending this foundation is "hard" information: the decision by lenders to provide financing is based on collected and processed quantitative information. The authors first identify specific transactions lending technologies and discuss how these transactions technologies, as opposed to conventional wisdom can actually address SME access to finance. Factoring specifically is discussed as addressing the opacity problem by focusing primarily on the quality of the obligor, rather than the "borrower" or seller. This implies that international factoring providers have an advantage in financing SMEs engaged in international trade because of their international reach in collecting (credit) information about obligors. De la Torre et al. (2010) provide empirical evidence on formal institutions using transactions technologies in dealing with SMEs: they identify the different technologies across banks in various developing nations by using an anonymous bank survey conducted by the World Bank and the International Finance Corporation (IFC). Because of the interesting specific information on the use of various technologies (including factoring) by financial institutions across countries the original data collected by these authors would be useful for this study. This dataset was requested with the authors. Unfortunately the authors keep the original data confidential because it was collected from commercial institutions under a confidentiality agreement.

Berger et al. (2007) investigate the relation between banking market structure and small business lending. The authors find little differences in opacity between SMEs borrowing from small versus large banks. This supports the proposition that while small financial

institutions can bridge the information gap using relationship lending, large institutions can do so using transactions technologies. Berger & Udell (2006) indicate little empirical evidence on comparative advantages by size in using specific lending technologies (e.g. factoring) is available. They expect, however, large institutions to have an advantage due to economies of scale in processing hard information. Beck et al. (2011) conduct an empirical study of the financial institutional landscape across countries and its effect on access to finance. They find that although the dominance of banks is associated with lower use of financial services, low-end financial institutions and specialized lenders do promote access to finance. Especially larger specialized lenders (like large factoring companies) ease small firms' financing constraints in developing countries. Beck et al. (2008b) and De la Torre et al. (2010) show large institution's engagement in serving SMEs using arms-length lending technologies is growing. This body of literature suggests larger banks have an advantage in offering factoring services to SMEs due to scale advantages and risk management systems. Also larger banks tend to have better-developed international networks, which is especially useful in the case of offering factoring to SMEs engaging in international trade. International networks allow for information gathering (e.g. about obligors) and receivable collection across countries. This fits the framework proposed by Berger & Udell (2006): larger institutions providing transactions lending technologies have an advantage in serving opaque SMEs.

Summary of relevant literature

The literature reviewed indicates the need for an empirical analysis of factoring and SME access to finance. Recent academic papers show SME credit availability depends on the financial infrastructure: the legal and informational environment. The limited body of research explicitly studying factoring expects factoring not to be as dependent on these environments as traditional forms of financing. It is therefore expected that the use of factoring increases access to finance for SMEs operating in weak financial infrastructures. The traditional focus of SME financing has been on relationship lending by small, local banks. However, innovative transactions lending technologies like factoring enable large banks to address access to finance for SMEs because these institutions have scale advantages, more advanced risk management systems and an international network. It is therefore expected that factoring is better able to increase access to finance when offered by large, international financial institutions.

Conceptual framework and hypotheses

This study aims to take a closer look at the differences in access to finance for SMEs around the world. These differences are compared to the use of factoring, which is proposed as promising for increasing access by authors for various reasons discussed in the literature review. The approach proposed by Beck and Feyen (2013) is taken: combining demand-and supply side, aggregated, macro-and micro level data to assess financial development across countries. This author claims that financial development (of which financial access is an important indicator), apart from the financial infrastructure, depends on a wide range of structural country characteristics. These structural factors were included using the benchmarking model for financial development by De la Torre et al. (2007). The policies and institutions proven by Barajas et al. (2013) to be determinants of financial development and by Beck et al. (2006) to be determinants of financial access are included as control variables. Financial access is measured by the percentage of firms indicating access to finance as a major obstacle. This study primarily examines to what extent financial access can be explained by Factoring/GDP (the importance of factoring in the economy). In other words: does factoring improve access to finance? This leads to the following hypothesis:

H1: Higher Factoring/GDP is related to a lower percentage of firms indicating access to finance as a major obstacle.

This is the main relationship to be tested. Also various sub-hypotheses are formulated, concerning moderating effects on the relationship expected in the first hypothesis. Because factoring is expected to have more impact in countries with weak informational and legal environments, its effect is expected to be stronger in these environments. The second hypothesis is testing this proposition: H1.1: *The relationship proposed in H1 is stronger in weaker legal and informational environments*.

The second part of this study concerns the supply side of factoring: factoring company concentration and its effect on the relationship between factoring and access to finance (H1). Data is retrieved from the International Factoring Group, creating a unique dataset on factoring company market landscape across countries. Based on the literature it is expected that larger suppliers have an advantage in increasing access to finance for SMEs because of scale advantages in data processing (e.g. data on the various buyers in a

factoring agreement) and technology (e.g. risk management systems). The third hypothesis tests for this: H1.2*: The relationship proposed in H1 is stronger in when factoring company concentration is higher*.

Lastly unique data is retrieved from reports provided by the International Factoring Group, containing survey results filled out by factoring companies. This data concerns the country-level client and obligor risk perceived by factoring companies. If client risk is higher factoring can play a more important role: riskier clients have more difficulties in obtaining traditional forms of financing: H1.3: *The relationship proposed in H1 is stronger when client risk is higher.* Perceived obligor (or buyer) risk, however, increases risk for factoring companies. It is expected to decrease the effect of factoring in addressing access to finance for SMEs: H1.4: *The relationship proposed in H1 is weaker when obligor risk is higher.*

In the following section the methodology used to test for these hypotheses is described in detail. Each separate variable included is clarified and motivated.

3. Methodology and data

Introduction to methodology and data

This study uses a unique dataset, drawn from a wide range of sources and authors. New and recent information is used. This makes it possible to generate new insights into the relationship between financial access and various financial indicators such as factoring. Some variables are publicly available; some variables are constructed by previous studies. Some of these were exclusively requested from authors or institutions. Also variables are constructed by combining data. The relationship between variables is examined using panel regression analyses. In the following sections the methodology and data will be explained step by step.

Country and period selection

Country selection is based on (1) factoring information availability and (2) World Bank Enterprise Survey (WBES) information availability on the percentage of firms experiencing access to finance as a major obstacle. Detailed factoring information provided by the International Factoring Group is available for 2009, 2010, 2011 and 2012. Matching these country years to the WBES information leaves the 23 developing countries named in the introduction.

Dataset: dependent and key explanatory variables

The first step of the analysis is determining the central dependent variable. The proxy for financial access used in this study is the percentage of firms in a country indicating access to finance to be a major, severe or very severe obstacle (respectively a score of 4,5 or 6 in the World Bank Enterprise Surveys (WBES) question: to what extent to you experience access to finance as an obstacle for the operation and growth of your business?). This measure is also included in the Global Financial Development Database (GFDD). Since the WBES are not conducted on a yearly basis for every country, only country years with two or more survey observations are included. Missing country years are interpolated and extrapolated based on the assumption that financial access development is linear. This allows for an approximate measure of SME access to finance per country for every year. The second step is determining the central independent variable: Factoring/GDP as measured by the International Factoring Group (IFG). The central variables are shown in Table 1 below. The interaction between factoring and two explicit measures of the legal and information environment is used to test for the first sub-hypothesis. These measures are the Strength of Legal Rights Index and the Credit Information Index, constructed by the World Bank in the Doing Business Project. These variables are explained below. The expected moderation effect is tested using interaction variables between these two indices and Factoring/GDP.

Table 1: Central dependent variable and key explanatory variable

Variable	Representing	Measurement	Source	Literature
% Financially Obstacled	Access to finance	Percentage	World Bank Enterprise Surveys	-
Factoring/GDP	Importance of	Dollar per dollar	International Factoring Group (IFG)	Klapper (2006)

The second sub-hypothesis concerns the size of factoring companies. To gauge for this the concentration degree of factoring companies is used, measured by the Factoring Company Concentration Ratio. This variable is constructed using the total factoring revenue per country per year divided by the amount of factoring companies present (both from International Factoring Group country reports). To test for the moderation effect of factoring company concentration an interaction variable is included measuring the interaction between Factoring/GDP and the Factoring Company Concentration Ratio. To test the third and fourth sub-hypotheses additional independent variables have to be included in the model: perceived client risk and perceived obligor risk. All these variables are gathered on a country basis by surveying factoring companies. The organization

collecting the data used is the International Factoring Group (IFG), an international factoring association. The original variables are provided in Table 2 below, their interaction variables in Table 3.

Table 2: Factoring companies: concentration, and perceived client & obligor risk

Variable	Representing	Measurement	Database
Factoring Company Concentration	Dollars revenue per factoring company	Dollars per firm	IFG
Perceived Client Risk	Perceived risk of clients not meeting obligations	Score: 1-3	IFG
Perceived Obligor Risk	Perceived risk of obligors not meeting obligations	Score: 1-3	IFG

Table 3: Interaction coefficients on concentration and perceived client & obligor risk

Variable	Representing	Measurement
Interaction (Legal Rights Index ×Factoring/GDP)	Legal Rights Index × Factoring/GDP	Interaction
Interaction (Credit Info Index× Factoring/GDP)	Credit Information Index × Factoring/GDP	Interaction
Interaction (Concentration × Factoring/GDP)	Factoring Company Concentration × Factoring/GDP	Interaction
Interaction (Factoring Client Risk × Factoring/GDP)	Factoring Client Risk × Factoring/GDP	Interaction
Interaction (Factoring Obligor Risk × Factoring/GDP)	Factoring Obligor Risk ×Factoring/GDP	Interaction

Dataset: control variables

Since the state of financial access in a country depends on a wide range of factors, various categories of control variables are included. Initially a benchmarking model developed by De la Torre et al. (2007) was used to control for structural factors (e.g. GDP per capita, population) affecting financial development. After including these variables in the test the benchmarking variables were dropped from the model because of a lack of significant results. As Beck & Feyen (2013) claim the gap between predicted and actual financial indicators has to be explained by country-specific factors concerning financial development. Factors capturing these country specific policies and institutions have to be added to the structural benchmarking model to establish a model explaining financial access. Because structural benchmarking variables were dropped these country-specific factors explaining financial development are the variables controlled for. The macro-economic, market structure, regulatory and institutional variables as defined by Barajas et al. (2013) explaining the gap between actual and predicted private credit/GDP are included. Because in this case another indicator of financial development has to be explained, additional control variables proven by literature to have an effect on financing obstacles are added. The complete set of control variable is shown in Table 4 on the next page. The variables are drawn from databases provided by the International Monetary Fund and the World Bank. Macro-economic variables include Exchange Rate Regime and the globalization measure Gross FDI Inflows to GDP. Financial market structure variables

include Bank Asset Concentration (what percentage of assets is owned by the top-3 largest banks), Government Ownership Share, measuring to what extent banks are owned by the government and Foreign Bank Share, measuring the "openness" of the financial system in a country by the percentage of assets owned by foreign banks. Also the average Lerner Index is included, measuring the market power of banks in a country. Regulatory policy variables are limited to Geographical Diversity required for lending. The indicators of financial reform (Abiad et al., 2008): Credit Controls, Privatization, Bank Supervision quality and Financial Reform Index were dropped because of missing data for sample countries and years. The institutional variables concerning risk indicators from the International Country Risk Guide were not available and are not included in the final dataset. Lastly three indicators from the World Bank Doing Business Database concerning the legal and informational environment for financing, of which two have already been included because of their expected relationship with factoring, are added. The Strength of Legal Rights Index measures to what extent debt creditors are protected by collateral and bankruptcy laws, the Credit Information Index measures the extent to which information about borrowers is available to lenders and the Strength of Investor Protection Index measures to what extent minority equity investors are protected by law. Finally the importance of the 'traditional' method of financing or the widely used proxy for financial depth, Private Bank Credit to GDP, is controlled for.

Table 4: Macro, market structure, regulatory and institutional control variables

Variable	Representing	Measurement	Source	Literature
Private Bank Credit to GDP	Bank loans to GDP	Percentage	World Bank Fin Stats (WBFS)	Beck et al. (2005)
Exchange Rate Regime	Exchange rate regime	Score: 0-8 (hard to floating)	International Monetary Fund (IMF)	Barajas et al. (2013)
FDI Inflows	Globalization measure, to GDP	Percentage	World Development Indicators	Barajas et al. (2013)
Bank Asset Concentration	Top 3 bank asset concentration	Percentage	WBFS	Barajas et al. (2013)
Government Ownership Share	Share of government bank ownership	Percentage	Bank Regulation & Supervision Survey (BRSS)	Barajas et al. (2013)
Foreign Bank Share	Share of foreign bank ownership	Percentage	BRSS	Barajas et al. (2013)

Variable	Representing	Measurement	Source	Literature
Bank Lerner Index	Average market power of banks	Score betw. 0-1 (less to more)	Global Financial Development Database (GFDD)	Barajas et al. (2013)
Required Lending Diversity	Required diversity in lending	Dummy	BRSS	Barajas et al. (2013)
Strength of Legal Rights Index	Strength of collateral and bankruptcy laws protecting creditors	Score: 0-10 (weak to strong)	World Bank Doing Business (WBDB)	De la Torre et al. (2007)
Credit Information Index	Accessibility of borrower information by creditors	Score: 0-6 (weak to strong)	WBDB	De la Torre et al. (2007)
Strength of Investor Protection Index	Extent to which investors protected by law	Score: 0-10 (weak to strong)	WBDB	De la Torre et al. (2007)

The final model consists of the central dependent variable % Financially Obstacled Firms, the central independent variable Factoring/GDP as well as the introduced macro, market structure, regulatory and institutional control variables. The final dataset is an unbalanced panel consisting of observations for these variables.

Statistical issues

Statistical issues concerning the various variables are addressed in this section. For every variable the Jarque-Bera test for normality is conducted. For variables with a Jarque-Bera test probability of zero and variables showing high skewness or kurtosis outlier values (more than two standard deviations from the mean) are winsorized: replaced by the value of the mean plus two standard deviations. Also some countries are excluded from the sample because of outlier values. For instance country years for Chile and Kazakhstan are dropped because of the respectively high and low outlier values in Factoring/GDP, distorting the mean and standard deviation of the sample. Also country years in which factoring was not yet introduced in a country (zero Factoring/GDP) were dropped. Multicollinearity is checked for using a correlogram of all variables. No other serious multicollinearity issues were found besides high correlations between interaction- and original variables. High probabilities in a redundant fixed effects test confirm the assumption that period fixed effects have to be included in the model.

Descriptive statistics

The descriptive statistics provide an insight in the statistical features of the central variables of this study. Figure 3 shows the dependent variable, averaged (% of financially

obstacled firms) across years for all 23 countries included in the final sample, ranging from 6,7% in Hungary to 43,9% in Colombia. The mean of this variable is 24,2%, which means almost one quarter of the firms in the countries in the sample experience access to finance as a major obstacle. The standard deviation of this variable is 11,7%. A benchmark of developed countries is provided by the EU average of 15,5% from the European Commission Flash Eurobarometer surveys 2009 and 2011. Unfortunately no comparable statistics for the United States were available. The inclusion of the EU benchmark shows the large difference between developed and developing countries in terms of access to finance. Note that the EU average was calculated in a different way (the percentage of firms to which access to finance is a 'top concern') because there is no World Bank Enterprise Surveys data available for developed countries.

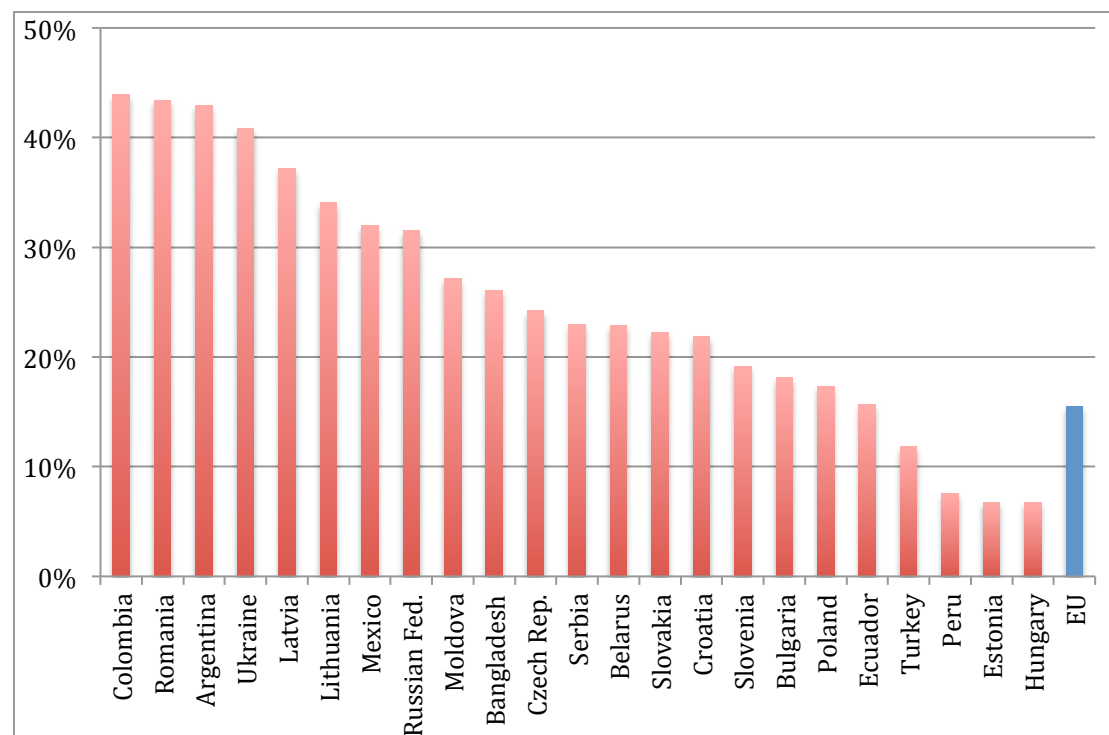**Figure 3: Dependent variable: the % of financially constrained firms**

Figure 4 on the next page shows the level of factoring/GDP per country, averaged over the sample years. A large variation across countries can be observed, ranging from only 0,15% in Moldova to 8,3% in Estonia. The mean of the total sample is 2,6%, with a standard deviation of 2,3%. More detailed descriptive statistics can be found in the Appendix.

Figure 4: Average Factoring/GDP across sample countries
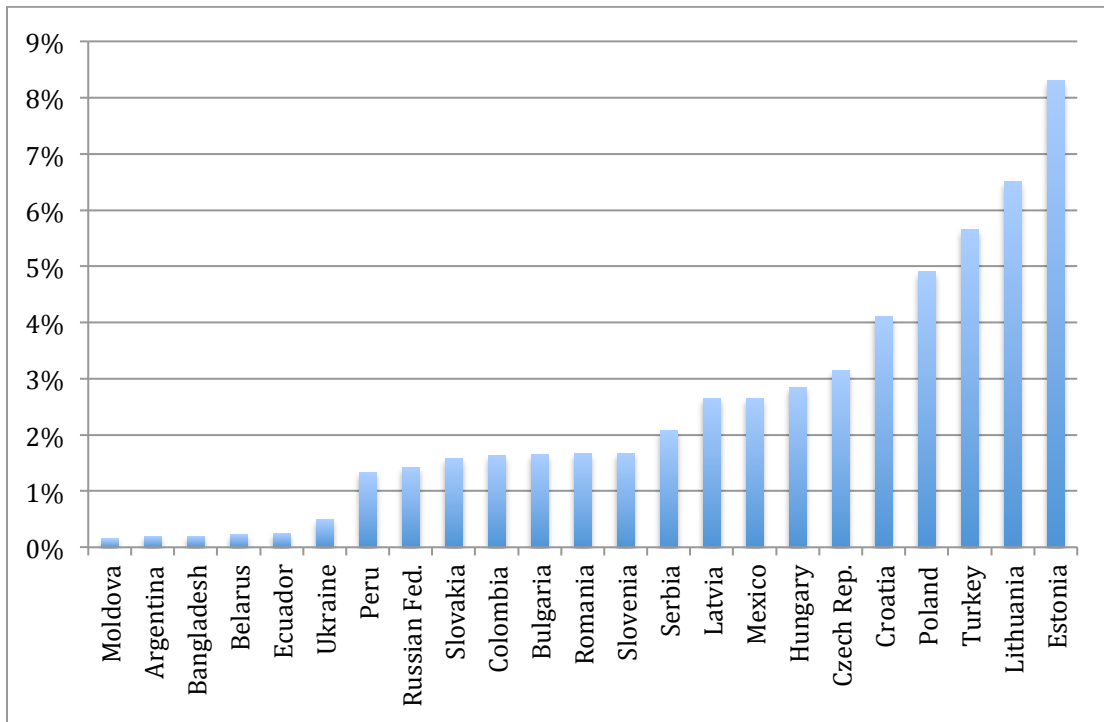
The initial relationship between the two variables described in the previous section is plotted in Figure 5 below. Note that control variables are not yet accounted for in this scatter diagram. Whether a linear relationship does actually exist will be tested, controlling for other factors.
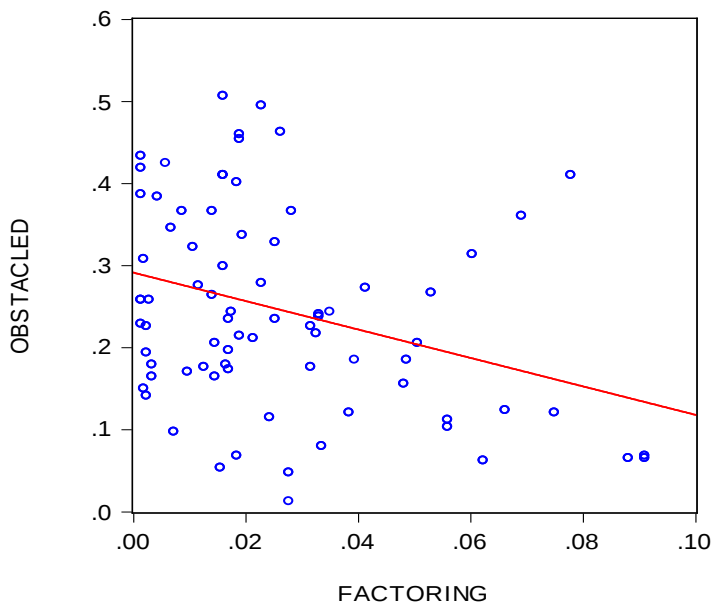

Figure 5: Initial relationship between % of Obstacled Firms and Factoring/GDP

Regressions conducted

To test for the central hypothesis of this study a panel data least squares (LS) regression is conducted on the panel dataset constructed with Factoring/GDP as the independent variable and the % of Financially Obstacled Firms as the dependent variable. The various control variables discussed above are included. The final model to be tested on a total of 23 countries, 4 periods and 78 (unbalanced) observations, is:

$FinanciallyObstacled_{i,t} = \alpha + \beta_1 Factoring/GDP_{i,t} + \beta_2 PrivateBankCreditGDP_{i,t} + \beta_3 ExchangeRateRegime_{i,t,} + \beta_4 FDIInflows_{i,t} + \beta_5 BankAssetConcentration_{i,t} + \beta_6 GovernmentBankShare_{i,t} + \beta_7 ForeignBankShare_{i,t} + \beta_8 BankLernerIndex_{i,t} + \beta_9 RequiredLendingDiversity_{i,t} + \beta_{10} LegalRightsIndex_{i,t} + \beta_{11} CreditInfoIndex_{i,t} + \beta_{12} InvestorProtectionIndex_{i,t} + \varepsilon_{i,t}$

With α representing the constant term, β representing the regression coefficients (slopes) for the respective variables and $\varepsilon_{i,t}$ representing the error term. The subscripts i and t represent cross sections (countries) and years. The analysis is conducted with time-fixed effects (assuming that countries convey characteristics that are time-invariant) as well as without time-fixed effects. After testing for the main hypothesis in the model specified above various interaction variables are added one-by-one with original variables to test for the moderation effects formulated in the sub-hypotheses. The results of the analyses are discussed in the following chapter.

4. Results and discussion

Results: factoring and control variables

The results of the least squares panel regression model described in the previous section are presented in Table 5 below. The regression coefficients are presented for analyses including (1) and excluding (2) time-fixed effects. The value between brackets represents the P-value of each regression coefficient. The results concerning the main hypothesis will be discussed, as will results with a significant regression coefficient (<10%).

Variable	(1)	(2)
Dependent variable: % of financially obstacled firms		
Period-fixed effects	No	Yes
Countries, periods, observations	23,4,78	23,4,78
Adjusted R^2 of the model	0.387	0.472
Constant	0.755***	0.557*
	(0.008)	(0.057)
Factoring/GDP	-1.548**	-1.540**
	(0.020)	(0.019)
Private Bank Credit to GDP	-0.239***	-0.219**
	(0.005)	(0.015)
Exchange Rate Regime	-0.012**	-0.012**
	(0.017)	(0.022)
FDI Inflows	-0.997*	-1.190**
	(0.074)	(0.036)
Bank Asset Concentration	-0.312***	-0.344***
	(0.000)	(0.000)
Government Ownership Share	-0.092	-0.047
	(0.430)	(0.684)
Foreign Bank Share	0.194**	0.279***
	(0.012)	(0.002)
Bank Lerner Index	-0.239*	-0.224*
	(0.054)	(0.068)
Required Lending Diversity	-0.075***	-0.087***
	(0.007)	(0.002)
Strength of Legal Rights Index	-0.007	-0.011
	(0.413)	(0.205)
Credit Information Index	-0.008	-0.009
	(0.602)	(0.523)
Strength of Investor Protec. Index	0.050***	0.051**
	(0.004)	(0.016)

*/**/*** *Significant at a 10%, 5% and 1% level*

The first interesting observation from Table 5 is the negative coefficient for Factoring to GPD, significant at a 5% level. This result implies that holding all other variables constant, a larger role of factoring in a country is significantly associated with a lower

percentage of firms reporting access to finance as an obstacle. Although we cannot establish causality, the main hypothesis of this study can be confirmed: higher factoring/GDP is related to better financial access. The second, not surprising result from the test is the significant (5%) and stronger negative coefficient of Private Bank Credit to GDP. Countries with more bank credit to GDP have lower percentages of firms reporting access to finance as a problem. A more liberal exchange rate regime is associated with lower levels of the percentage of obstacled firms (significant at a 5% level) and FDI inflows are negatively associated with the dependent variable: both measures suggest countries which score higher on taking part in globalization also score higher in access to finance. An important regulatory factor seems to be the requirement to diversify lending geographically or across sectors. A higher required diversity is associated with lower levels of financially obstacled firms, at a 1% significance level. A higher proportion of assets in the hands of Foreign Banks is related with higher percentages of financially obstacled firms. This suggests that foreign banks cater less to SMEs compared to domestic financial institutions. The regression analyses also show a number of counterintuitive results. An interesting and surprising result concerns Bank Asset Concentration: a higher concentration of assets owned by the top 3 banks of a country is associated with lower levels of obstacled firm percentages. A dispersed and diverse banking sector does not seem to be associated with better financial access. This result is consistent with the Bank Lerner Index (5% significant) coefficient, which says less competition among banks is associated with better access to finance. Interestingly the strength of legal rights index and credit information index both show insignificant results. The strength of investor protection index, however, shows a significant (1%) positive result, which implies better protection of minority equity investors is not necessarily associated with better access to finance. The Adjusted R^2 of the model is 0.387 without time-fixed effects and 0.472 with time-fixed effects: 38.7% and 47.2% of the observed variation in the percentage of financially obstacled firms is explained by the variables included in the respective model.

Results: moderation effects

To test for the various moderation effects proposed in the sub-hypotheses, variables and interaction variables concerning these effects are added to the baseline model. The results of the five additional regression analyses, (1) to (5), testing for the effect of these interaction variables are presented in Table 6 below, with the P-value of the regression

coefficients between brackets. If the interaction variable shows a significant coefficient a moderation effect is assumed to be present.

Table 6: regression results for moderation effects

Variable	(1)	(2)	(3)	(4)	(5)
Countries, periods, observations	23,4,78	23,4,78	23,4,78	21,3,55	21,3,55
Adjusted R^2 of the model	0.389	0.458	0.385	0.541	0.543
Interaction (Legal Rights Index × Factoring/GDP)	0.115 (0.710)				
Interaction (Credit Info Index × Factoring/GDP)		1.877*** (0.005)			
Interaction (Concentration × Factoring/GDP)			5.040 (0.389)		
Interaction (Factoring Client Risk × Factoring/GDP)				-0.475 (0.602)	
Interaction (Factoring Obligor Risk × Factoring/GDP)					-0.467 (0.588)

*/**/*** *Significant at a 10%, 5% and 1% level*

The separate analyses for interaction coefficients yield little significant results. The strength of legal rights index does not seem to have a significant moderating effect on the relationship between factoring and access to finance. Also the coefficient for Factoring Company Concentration is insignificant. Both perceived client risk and obligor risk show insignificant results. However: the interaction coefficient for credit information is highly significant at a 1% level. This positive coefficient indicates the (negative) relationship between factoring to GDP and the % of obstacled firms is stronger in countries scoring higher on the credit information index.

Discussion of results: factoring and access to finance

The main research hypothesis introduced in the literature review is: "higher Factoring/GDP is related to a lower percentage of firms indicating finance as a major obstacle". The significant negative coefficient of the Factoring/GDP variable confirms this hypothesis: controlling for other variables capturing macro-economic variables,

globalization measures, financial market structure, financial regulation, legal and informational environment (Barajas et al., 2013) and financial depth a significant, negative association is found. More factoring to GDP is related to better access to finance. Although the results of this analysis clearly indicate a (negative) association between the variables, causality cannot be established. The claim that more factoring/GDP *causes* a smaller percentage firms to be obstacled cannot be validated from this study. It could for instance be the case that less firms experiencing financing as an obstacle leads to more growth, leading to an increase in the demand for factoring (reverse causality). It cannot be observed that firms using more factoring experience less financing obstacles: no firm-level data is available on this topic. The central research question of this study: "*Does factoring improve SME access to finance?*" can therefore not be fully answered. The claim that could be made is that more factoring is associated with better access to finance. This is the first study to provide empirical support for the claim by Berger & Udell (2006) and the 2014 Financial Inclusion Report by the World Bank. They both propose factoring as a solution in addressing SME access to finance and call for empirical research on specific transactional financing techniques and their impact on the variation in access to finance. The results strengthen the suggestion for academia, policymakers and businesses to promote factoring as a financing method for SMEs, especially in countries where other, traditional lending methods have been proven to be problematic.

Discussion of results: control variables and access to finance

The variable capturing the traditional financing method, private bank credit, has also been proven to be associated with lower percentages of obstacled firms by this study. These insights combined with the research done by Klapper (2006), who found that private bank credit is positively associated with factoring, indicate private credit and factoring are not necessarily substitutes. They can both play a role in improving financial access for SMEs. Private Bank Credit to GDP, used as a proxy for both financial depth and the traditional financing method, shows a significant and negative relationship with the percentage of obstacled firms. The relative amount of credit available in a country does seem to be distributed to otherwise financially obstacled firms: more financial depth is related to better access to finance. Factoring therefore seems to be able to play a more important role especially in less 'financially deep' countries: countries where private bank credit is not effectively reaching constrained firms. The proxy for globalization FDI inflows shows a significant and negative relationship with the dependent variable of this study. This

implies that international trade seems to improve access to finance: An economic interpretation of these results could be that firms in internationally better-connected countries are better able to raise financing through these connections (e.g. through trade finance or international factoring). An interesting regulatory measure negatively related to the percentage of obstacled firms is the dummy variable stating whether or not there are requirements for financial institutions to diversify lending. Countries where lending is required to be diversified, for instance across geographical areas or across sectors, have smaller percentages of obstacled firms. This implies this financial regulation is associated with better access to finance

The results show that a larger share of foreign banks is associated with more obstacled firms. This confirms earlier studies suggesting foreign banks are focused on corporate clients and do not cater as much to SMEs (Beck et al., 2011), contributing less to an increase in access to finance. Although Berger & Udell (2006) suggest large, foreign institutions have an advantage in improving access to finance (through technologies, scale advantages and international network), the findings of this study show that dominance of foreign banks is not associated with better access to finance. Interestingly two other measures of the financial market structure point in the same direction. Both the top-3 bank asset concentration and the bank Lerner index for competition (only at a 10% significance level) show higher concentration and lower competition are associated with lower percentages of financially obstacled firms. This is contradictory to the results by Beck et al. (2004), who show that bank concentration increases obstacles to obtaining finance. Countries like Argentina and the Russian Federation show a highly dispersed banking sector but also high percentages of financially obstacled firms, while in Estonia and Slovakia almost 100% of the banking sector is in hands of the top 3 banks and access to finance is considerably higher. Unlike the result on foreign banks, this result does seem to confirm the suggestion by Berger & Udell (2006), namely large banks being better able to cater to SMEs due to scale advantages in employing transactions lending technologies. This would imply a higher bank concentration being associated with better access to finance. It is suggested to conduct further research on bank concentration and access to finance to generate better insights in this seemingly contradictory relationship, with scale advantages on one hand and lack-of-competition disadvantages on the other.

Of the variables capturing the lending environment only the strength of investor protection index shows a significant result. Its sign is surprising: more investor protection is associated with higher levels of percentages of obstacled firms. This indicator measures

how well minority (equity) investors are protected by law against misuse of company assets by managers for personal gain. The better protection the minority shareholders have, the higher the amount of obstacled firms. This is a puzzling result since literature (Himmelberg et al., 2002) suggests that minority investors are more willing to invest through equity when they are better protected by law, leading to lower percentages of obstacled firms. This result could be explained by the role of (public) equity financing versus debt financing in relation with access to finance. Beck & Feyen (2013) find that a higher investor protection index is associated with higher stock market turnover and stock market capitalization. SMEs in developing countries experiencing obstacles with respect to access to finance likely do not have access to these public capital markets. The state of these capital markets could even negatively affect these firms because financing in the country is channeled predominantly through these markets, not reaching the obstacled firms. This regression result could therefore suggests that firms in developing countries with a financial sector dominated by banks relative to financial markets have better access to finance. This is a possible explanation, which is suggested to be investigated in future research.

Discussion of results: moderating variables

The sub-hypotheses and their results will be discussed in this section. These hypotheses concern moderating effects: a variable impacting the (found significant negative) relationship between factoring and the percentage of financially obstacled firms. Firstly the effect of the legal environment was tested for using an interaction coefficient of factoring and the legal rights index. This interaction coefficient shows an insignificant result. Secondly the effect of the information environment was tested for using an interaction coefficient of factoring and the credit information index. The coefficient for credit information is significant but positive, contrary to the expectations formulated in the hypothesis. The hypothesis "*The relationship proposed in H1 is stronger in weaker legal and informational environments*" can therefore not be confirmed. The relationship proposed in H1 is actually found to be stronger in stronger informational environments. Klapper (2006) already found that factoring/GDP is larger when credit information is better developed. This new result suggests factoring is also better able to address financing constraints in better-developed credit information environments. An explanation could be that factoring companies are better able to assess SME clients (sellers) and their

accounts receivables (obligors) when more information is available, leading to factoring being better able to increase access to finance.

The second sub-hypothesis concerns factoring company size. Based on the literature (Beck et al., 2011, Berger & Udell, 2006) and previous insights one would expect larger factoring providers to have an advantage in increasing access to finance. Larger factoring providers, measured by the factoring company concentration ratio, are therefore expected to be associated with a stronger relationship between factoring and access to finance. This moderation effect was tested using an interaction variable of factoring company concentration and factoring. The regression coefficient for this effect is insignificant. The sub-hypothesis *"The relationship proposed in H1 is stronger when factoring company concentration is higher"* can therefore also not be confirmed.

The analyses for the last two sub-hypotheses, concerning client and obligor risk, both show negative but insignificant coefficients. This leads to no confirmation of the sub-hypotheses *"The relationship proposed in H1 is stronger when client risk is higher"* and *"The relationship proposed in H1 is weaker when obligor risk is higher"*.

In the next section this study will be concluded with a summary, limitations and suggestions for future research.

5. Conclusion

Summary

Factoring is a financing method enabling sellers to finance their working capital by selling their accounts receivables to a third party called the factor. Since the risk of factoring is with the accounts receivables and ultimately the obligor (buyer) this method allows risky and opaque sellers to attract external financing. Academia suggests this is a transactional financing method especially useful in the weak informational and legal environments found in developing countries. Factoring could therefore be a solution in addressing the problem of constrained SME growth because of obstacled access to finance. SMEs that are able to access finance are better able to grow and contribute to economic growth. This study investigates empirical evidence supporting the claim that factoring increases access to finance. The central research question is: *Does factoring increase access to finance for SMEs?* This is studied by explicitly linking factoring to access to finance on a country level basis. A unique dataset is constructed for 23 developing countries and the years

2009 to 2012 by drawing data on factoring, economic and financial development and access to finance from a wide range of sources. The research question is addressed by testing for the hypothesis whether higher factoring to GDP is associated with lower percentages of firms obstacled by limited access to finance. Also moderating variables are tested for: the informational and legal environment, factoring company concentration and perceived obligor and client risk by factoring providers. To test for these hypotheses least squares panel regression analyses are conducted with the percentage of obstacled firms as the dependent variable and factoring/GDP as the central explanatory variable. Control variables include macro-economic variables, globalization measures, financial regulatory variables, variables for the market of financial institutions, lending environment-variables and financial depth. The result of the analyses show, as expected, a significant negative association between factoring to GDP and the percentage of financially obstacled firms. Also a globalization measure, a regulatory measure, financial depth and a legal variable show significant results. Of the moderation effects tested the credit information index shows a significant positive result: the negative relationship between factoring to GDP and the percentage of obstacled firms is stronger when the credit information index is higher. This is the first study to provide empirical evidence on the association between factoring and access to finance.

Limitations

Although this study delivers a unique insight in the relation between factoring and access to finance based on a recent dataset, it is also subject to a number of limitations. The main limitations of this study concern data availability. The final sample to test for the main hypothesis is small (23 countries, 4 time periods, 78 observations) and even smaller for the samples used to test for the expected moderating effects. Also the type of countries is limited to developing countries of which the majority in Eastern Europe and Middle/Latin America. More country-level data on financial access in developed countries and more data on factoring in developing countries would enable researchers to enlarge the sample used for this study. Also a limited time-period was studied. Although recent, 2009-2012 only covers four years, of which some during a global financial crisis. This could result in biased data. The best way to investigate the research question of this study would be to use firm-level data on factoring and access to finance, The latter is available through the World Bank Enterprise Surveys, the former unfortunately not. It would be a suggestion for the World Bank Enterprise Surveys to add information on specific financing

technologies to make it possible to test their effectiveness (as suggested by Berger & Udell, 2006) more directly. The results from this study are based on aggregated results: it is not said that individual firms using factoring are less financially obstacled. The inter- and extrapolations from survey data to establish complete measures for financial access could also introduce inconsistency. Detailed information on factoring, the specific types of factoring (e.g. recourse, non-recourse, reverse factoring) could provide better insights in its association with access to finance, preferably on a firm level. Also detailed data on the factoring industry and risk in developing countries is not available. The factoring company concentration ratio used in this study was constructed using the available data: revenues and the number of factoring companies in a country. The 'factoring company concentration', assumes factoring revenue is evenly distributed across factoring companies. This is not the case and can lead to a blurred view on the relationship examined. Another potential limitation is omitted variable bias: financial access might be affected by a non-observable factor not included in the model. The aim is to avoid this using a large set of relevant control variables. These control variables were chosen based on past literature on financial development. Finally, to confidently answer the research question it is needed to establish causality. Although an association is found between the two key variables in the regression analyses, causality cannot be implied.

Suggestions for future research

To further ensure the association between factoring and access to finance found in this study the first suggestion would be to conduct another study on factoring and access to finance using a larger (more countries and years, preferably firm level) and more detailed (more factoring types, measures of financial access) dataset. The results of a study using more data and observations would increase generalizability. This study shows a relationship between factoring and access to finance. More research on factoring, its various types and determinants would create more insight in how factoring is actually connected to access to finance. This is of importance to ultimately answer the causality issue in the research question of this study discussed in the previous section. A study on industry-level instead of country-level would give a better and more detailed view. Factoring could for instance be more successful for firms operating in industries where working capital financing is more problematic. This effect could be measured when using industry-level data. Since a moderation effect was found for the informational environment a more detailed study on the lending environment and factoring on one side

and access to finance on the other side would create more insights in the role credit information and the rule of law actually play in the role of factoring in addressing access to finance for SMEs. This study failed to show an effect of factoring company size. Factoring suppliers in all forms (e.g. banks versus specialized factors) are suggested to be researched in more detail, since little literature is available on this subject. Berger & Udell (2006) also identify other financing technologies potentially increasing SME access to finance such as asset-based lending and leasing. A suggestion would be to do a similar study for these financing technologies and compare them with the effects found for factoring in this study. Other research designs would also shed another light on the research question of this study. A case study (such as conducted by Klapper, 2006) could provide more insight into the specific mechanics of factoring. Randomized control trials as used in microfinance literature using factoring versus traditional lending could show the advantages of factoring versus other financing methods in practice. For every suggestion made for further research the data availability issues described in the previous section play an important role. The most important suggestion for both practice and academia would therefore be to collect more detailed and reliable information on specific financing technologies such as factoring and SME access to finance. Other suggestions for future research, beyond the scope of factoring, would be investigating the counterintuitive relationships found in the results of this study: the relationship between bank concentration and access to finance as well as the relationship between equity investor protection and access to finance.

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Appendix

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
% Financially Obstacled	0.246	0.234	0.510	0.016	0.122
Factoring/GDP	0.026	0.019	0.091	0.001	0.023
Private Bank Credit/GDP	0.513	0.498	0.989	0.142	0.188
Exchange Rate Regime	5.744	7.000	8.000	1.000	2.540
FDI Inflows	0.030	0.025	0.109	-0.037	0.024
Bank Asset Concentration	0.599	0.554	1.000	0.106	0.185
Bank Government Share	0.157	0.102	0.541	0.000	0.165
Foreign Bank Share	0.585	0.690	0.990	0.027	0.298
Bank Lerner	0.228	0.238	0.487	0.024	0.110
Required Diversity in Lending	0.551	1.000	1.000	0.000	0.501
Strength of Legal Rights Index	6.397	7.000	10.000	2.000	2.158
Credit Information Index	4.833	5.000	6.000	2.000	1.025
Investor Protection Index	5.373	5.700	7.400	3.300	0.895

Series: Standardized Residuals	
Sample 2009 2012	
Observations 78	
Mean	0.000000
Median	0.009576
Maximum	0.172710
Minimum	-0.160165
Std. Dev.	0.072773
Skewness	-0.133280
Kurtosis	2.470863
Jarque-Bera	1.140882
Probability	0.565276
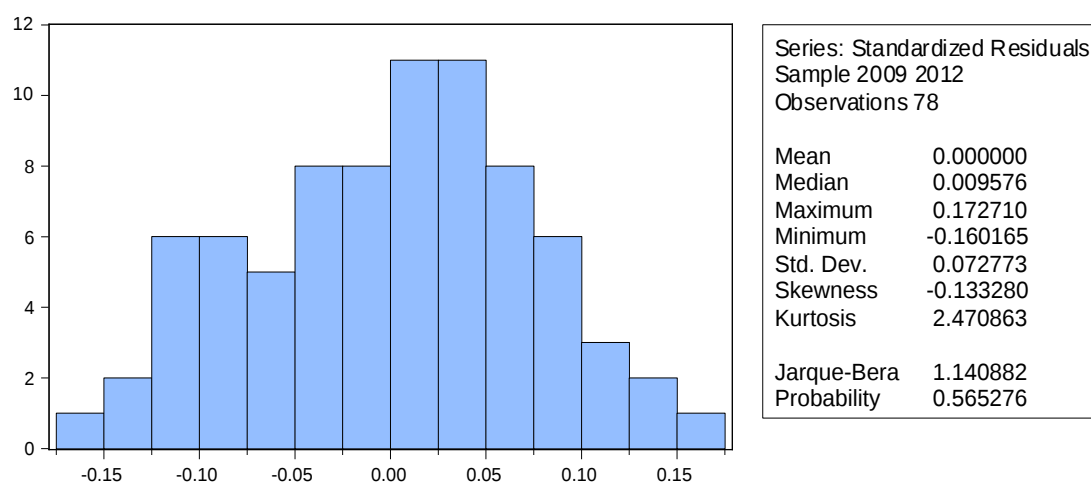
Figure 6: Standardized residuals for the baseline model

| Country	% Financially Obstacled	Factoring/GDP	Private Bank Credit/GDP
Hungary	6.70%	2.85%	60.78%
Estonia	6.78%	8.30%	77.23%
Peru	7.57%	1.33%	34.10%
Turkey	11.83%	5.65%	53.85%
Ecuador	15.65%	0.25%	28.00%
Poland	17.35%	4.90%	53.10%
Bulgaria	18.10%	1.65%	65.65%
Slovenia	19.15%	1.68%	82.03%
Croatia	21.85%	4.10%	59.10%
Slovakia	22.20%	1.58%	49.73%
Belarus	22.87%	0.23%	32.53%
Serbia	22.95%	2.08%	58.18%
Czech Rep.	24.20%	3.15%	55.43%
Bangladesh	26.10%	0.20%	49.30%
Moldova	27.15%	0.15%	32.20%
Russian Fed.	31.50%	1.43%	41.65%
Mexico	32.03%	2.65%	27.10%
Lithuania	34.05%	6.50%	49.68%
Latvia	37.15%	2.65%	73.65%
Ukraine	40.85%	0.50%	49.70%
Argentina	42.90%	0.20%	39.20%
Romania	43.40%	1.68%	40.48%
Colombia	43.90%	1.63%	34.98%
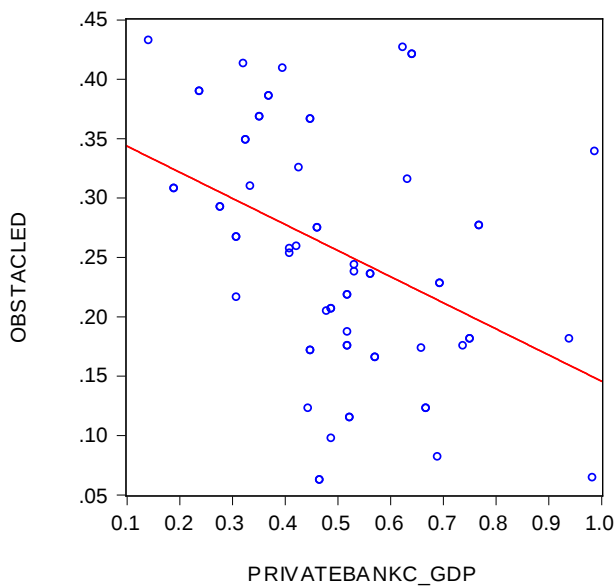
Figure 7: Initial relationship between % of Obstacled Firms and Private Bank Credit/GDP