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Financial Intermediation, Development, and Access to Finance in an Islamic Environment

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Abstract Micro survey data from 36,135 firms in 41 Islamic countries are used to address two questions: first, what are the firm-specific and country-level predictors of financing constraints of firms and, second, whether there are differences between low- and high-income Islamic countries. The firm-specific characteristics are shown to predict financing constraints of firms. Differences are documented between low- and high-income Islamic countries. Firm age, size, sector of activity, export and ownership status of firms appear to be robust predictors of access to finance in low-income countries, whereas only a few of these determinants are found to be significant in high-income Islamic countries. Finally, country-level indicators that measure economic development,

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income distribution, and financial infrastructure also affect the role of firm-specific characteristics on financial constraints.

Keywords Financial intermediation • Access to finance • Institutions Islamic countries

2.1 Introduction

Early development theory emphasized the role of wealth concentration and income inequality in the early stages of a country's economic development (Kuznets 1955; Kaldor 1957). Early empirical evidence from most OECD countries supported the Kuznets hypothesis. However, since the 1970s the view that income inequality is growth-enhancing was further challenged by new empirical evidence, which found a negative correlation between the average rate of growth and measures of inequality (Alesina and Rodrick 1994; Alesina and Perotti 1996; Persson and Tabellini 1994). New development theory turned its attention to finance and placed credit and capital market imperfections at its core (Aghion and Bolton 1997; Banerjee and Newman 1993; Galor and Zeira 1993, Rajan and Zingales 2003). Lack of access to finance was seen as a critical factor preventing the absorption of financial services that was necessary for firm growth and generating persistent income inequality or poverty traps.

The associated policy conclusion was simple: Given financial market imperfections, growth can be fostered by proper wealth redistribution that would result from the effective removal of financial market imperfections. This new approach to development finance was supported by new empirical evidence, which suggests a significant and robust relationship between financial depth and growth (Demirgüc-Kunt and Maksimovic 1998; Rajan and Zingales 1998; Beck et al. 2000; Levine 2005). Empirical evidence also suggests that financial depth is particularly beneficial for the poor, reducing income inequality (Beck et al. 2004; Honohan 2007).

While financial depth indicators have been variously identified (liquid liabilities to GDP, private credit to GDP, stock market capitalization to GDP, etc.), only recently, financial access indicators have been

developed. For example, Beck et al. (2007) collected data on branch and ATM penetration, the number of deposit and loan accounts, and the average size of these accounts relative to income per capita for up to 99 countries. They showed that these indicators are imperfectly correlated with financial depth indicators, suggesting that there is not a one-to-one relationship between depth and access. Indeed, firms in countries with broader access to such facilities reported lower barriers to credit, even after controlling for financial depth. These results suggest that access matters independently of financial depth.

In an effort to measure why large proportions of the population in many developing countries have inadequate access to financial services, Beck et al. (2007, 2006) surveyed the largest commercial banks for a large sample of countries to document price and non-price barriers associated with deposit, credit, and payment services. They showed large cross-country variations in hurdles associated with physical access (services being delivered in fewer and less convenient ways), eligibility (documents and other requirements to process services), and affordability (minimum balance requirements and fees). Further, in more competitive, open, and transparent economies characterized by improved contractual and informational frameworks and physical infrastructure, access to bank finance was higher. Moreover, domestic banking systems with a large share of foreign banks, access to finance, and associated costs were lower. On the other hand, in countries with predominantly government-owned banks, customers paid lower fees but also faced greater approval restrictions. Aggregate indicators on bank penetration were further used to predict the proportion of households that use financial services, thus highlighting the extent of financial inclusion. In a cross-country study, Peachey and Roe (2004) showed that the penetration of micro-financial institutions (MFIs) to financially needy people varied considerably. Combining data from different sources and household surveys, Honohan (2007) presented estimates of the share of households with access to financial services for over 150 countries, which showed substantial differences. As a result, Demirgüc-Kunt et al. (2008) argued that access to finance is not only pro-growth, but also pro-poor.

While these findings have important implications for policy reforms to expand access to financial services, they have also revealed the constraints posed by the lack of adequate data on access to financial

services. While theory focuses on the importance of broader access, i.e., financial inclusion, there is relatively little empirical evidence linking access to finance to investment behavior and development outcomes, and little guidance for policies on how best to promote access. Developing indicators of access to financial services have been a first step in filling this gap. Before access can be improved, it must be measured. Until recently, there has been little systematic information on who is served by the financial sector in developing countries, which financial institutions or services are the most effective in supporting access for the poor households and small enterprises, or what practical and policy barriers there may be to the expansion of access. Better data are important in advancing financial inclusion, and recently, there have been significant efforts in this direction.

Today, about 70% of the adult population in emerging economies still has no access to basic financial services (WBG Global Financial Development Report 2014). A large part of that comes from countries with predominantly Muslim population. About 700 million of the world's poor live in predominantly Muslim-populated countries; about 25% of the adults residing in the Organization of Islamic Cooperation (OIC) member countries have an account in formal financial institutions, which is below the global average of about 50%; and only 9% of Muslim adults have savings accounts as compared with 18% of non-Muslim adults in the world (Demirgüç-Kunt et al. 2013). In addition, financial intermediation in the Islamic world increases considerably. Islamic banking and financial institutions (IBFIs) are currently found in over 75 countries, comprising almost a third of IMF member countries, and controlling assets with an average annual growth of 15% since the 1990s. IBFIs are projected to reach US$4 trillion in economic activity by 2015, holding 40–50% of total Muslim savings—a population that is further projected to reach 1.5 billion over the next 10 years.

However, the financial activities of IBFIs are considerably bifurcated into two competing areas of content and form: the first represents a theoretical challenge to conventional economic thinking, particularly as it relates to the aversion of debt and the accrual of interest that binds monetary policy with social responsibility considerations; the second

corresponds to the conflicting activity of IBFIs as agents that reify and perpetuate existing capitalistic conventions toward a clientele with considerable non-capitalistic social values. In such environment, financial contracting is variably affected by the promotion of risk-sharing contracts that provide an alternative to conventional debt-based financing and the use of specific instruments for wealth redistribution among the members of society. Thus, the demand and possibly the supply of financial services in an Islamic environment are affected by the more complex, religion-based behavior toward different financial services and instruments.

Notwithstanding the importance of the common religious precepts underlying financial behavior, Islamic countries' attitudes toward finance diverge further due to considerable differences among themselves. While Shari'ah-compliance imposes obligations on various aspects of economic interactions, such compliance is permeated by both the strong conventional finance attitudes of a large part of the population and the divergent cultures and social structures of the various Islamic countries.

Given these growing trends in the Islamic world, it is very important to explore the latter's approach to financial inclusion and economic development. While Islamic finance focuses on historically developed financial instruments and services, the availability of financing vehicles available to the poor is still at very early stages (CGAP 2009). Islamic finance addresses the issue of financial inclusion, first, through the promotion of risk-sharing contracts which provide a viable alternative to conventional debt-based financing and, second, through specific instruments of redistribution of the wealth among the society.

The peculiarities of Islamic finance highlight the role of socioeconomic development in explaining the degree of financial access. Low levels of socioeconomic development are often associated with lower demand for and supply of financial services. Based on the indicators reported in Demirgüç-Kunt et al. (2008), Fig. 2.1 shows the constellation of the Islamic countries with respect to their access to finance. Substantial differences emerge regarding access to finance among Islamic countries. Further, Fig. 2.2 shows the correlation between access to finance and socioeconomic development as approximated by the

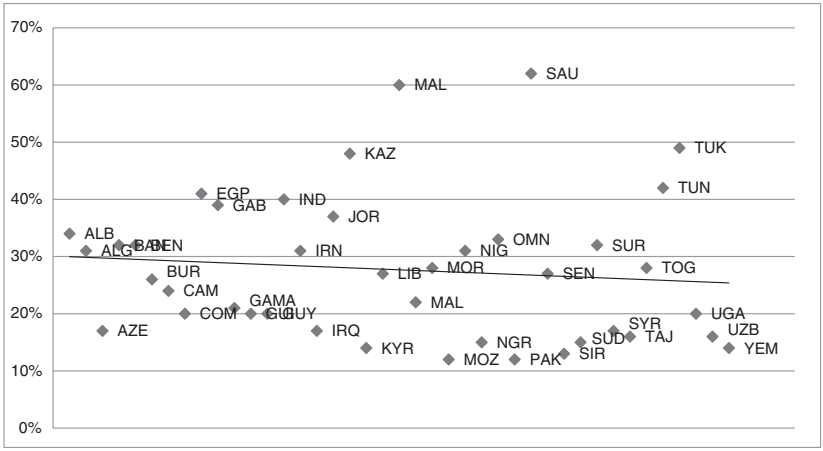

Fig. 2.1 Access to finance in Islamic countries (percent). *Source* World Bank, finance for all (2008)

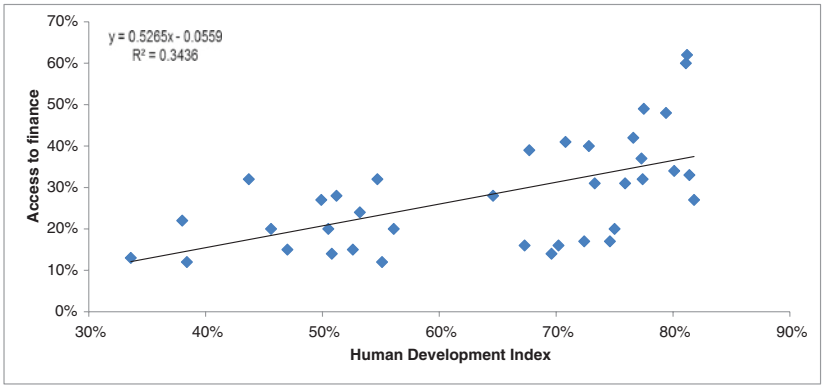

Fig. 2.2 Access to finance and human development of Islamic Countries (percent). *Source* World Bank, finance for all (2008); UN Human Development Report (2008)

United Nations' Human Development Index—HDI (UNDP 2014). The correlation coefficient between these two variables is 0.52 and is significant at the 1% level. In general, countries with greater access to social services and a better quality of life are countries that have also

developed a stronger financial culture in which the use of financial services through formal markets becomes indispensable. As expected, Fig. 2.2 shows that developed countries display the highest values of both the HDI and the indicator of access to finance. Most emerging markets are above the fitted line, suggesting that, ceteris paribus, there is potential for improving access given their degree of development.

In this chapter, the focus is on the extent to which firms in a sample of Islamic countries have access to finance. A firm-specific data survey, based on private-sector firm responses, is used to analyze the impact of firm-specific and country-specific factors on the extent to which firms in the sample of Islamic countries face constraints to finance. Further, the analysis examines the impact of those factors at different levels of economic, financial, institutional, and human development of the sample countries. The chapter contributes to the existing literature on financing constraints in several ways. First, it focuses specifically on Islamic countries and considers the impact of differences in their development level by dividing the sample countries into two subgroups of more-developed and less-developed ones. Second, it utilizes the most recent version of data collected by the microenterprise surveys conducted by the World Bank. Third, it contributes to the debate on the proper classification of firms as between financially constraint and unconstrained ones by taking into consideration the impact of economic and human development indicators, thereby introducing additional behavioral elements in the theory. Finally, it considers more explicitly the impact of financial development and the prevalent financial intermediation conditions.

The results broadly confirm relevant empirical evidence. However, occasionally and in some important respects, the results also differ from those in other countries. This calls for further analysis of the nature of financial intermediation in the Islamic world, as well as for the future inclusion of social and cultural factors in the analysis. The policy implications are that grouping of firms by age, size, and ownership structure is therefore a better choice when considering the effect of macroeconomic factors such as economic, financial, institutional, and human development on firms' financing constraints.

The chapter is organized as follows. Section 2.2 presents a review of the related literature and the background for the study. Section 2.3 describes the data and the empirical methodology used for the analysis. Section 2.4 explores the predictive power of firm-specific characteristics. Section 2.5 provides additional robustness checks by controlling for the impact of country-level factors reflecting the countries' level of economic, financial, and human development, as well as the prevalent financial intermediation structure in the whole sample and the subgroups of Islamic countries. Finally, Sect. 2.6 concludes the chapter.

2.2 Related Literature

Access to finance is found to be a key determinant of a firm's ability to operate and expand. The relevant literature analyzes financing constraints by focusing on the relation between financing availability and investment. For example, Levine (2005) shows that better access to financing enhances the firms' ability to finance their expansion projects and allocate resources efficiently. On the basis of between- and within-country regressions on firm perceptions regarding financing, Carlin et al. (2006) find that small firms complain about access to finance while large firms complain about everything else, raising the question of whether firm perceptions are in fact true indicators of actual access to finance. Kinda et al. (2011) use a sample of developing countries and show that satisfactory access to financing contributes significantly to the productive performance of firms.

The empirical analysis assumes that the availability of finance depends crucially on the characteristics of firms as well as on country-level factors. The characterization of a firm as financially constrained is complex. The theory assumes that the firm is considered to be financially constrained if it does not have sufficient internal resources to finance investment opportunities, and the cost of getting external financing is high. Fazzari et al. (1988) used the annual Value Line database of US manufacturing firms during 1969–1986 to identify the presence of financial constraints based on the differential sensitivity of corporate investment to cash flow. They argued that the higher the

dividend payout ratio, the less constrained the firm. Thus, information to test for financing constraints of firms can be obtained from those firms' financial statements. Along with this argument, Korajczyk and Levy (2003) studied the effect of macroeconomic conditions on capital structure and classified firms by their dividend level. However, Kaplan and Zingales (1997, 2000) question the validity of Fazzari et al. (1988) cash flow-based classification scheme. They offered a different classification based on the availability of and the demand for funds (especially debt) using quantitative and qualitative information from firms' annual reports. Their results are confirmed by Cleary (1999) who finds that firms with higher creditworthiness are extremely sensitive to internal funds availability than less creditworthy firms. Fazzari et al. (2000) reacted by pointing out that this approach confuses financially constrained with financially distressed firms, the latter being the result of the phase of the business cycle. Moyen (2004) contributes to this debate by investigating different classification schemes (dividends payout policy, firms' cash flow, investment, Cleary's index). She finds that depending on the chosen firm classification criterion, cash flow sensitivity of financially constrained firms could be either higher or lower than that of financially unconstrained ones. More generally, Bond et al. (2005) pointed out that investment-cash flow sensitivities could also indicate misspecification in the underlying investment models. Firms' financing constraints are studied by Vermeulen (2002) and Pal and Ferrando (2006) using financial statements information and profit and loss accounts. Vermeulen (2002) proposes the financial gap as a criterion of financially constrained firm classification. The firm is defined as credit constrained when its financing gap is positive, and the firm is not able to access external financing. Despite a positive financing gap, firms are considered relatively constrained if they can afford expensive external finance. Firms are considered unconstrained if they either have a negative financing gap or are able to attract relatively cheap external finance. Other classification criterial, based on asymmetry of information costs, include business-group affiliation (Hoshi et al. 1991), the presence of bond ratings (Whited 1992), the degree of shareholder concentration, or the pattern of insider trading (Oliner and Rudebusch 1992).

On the basis of review articles, Devereux and Schiantarelli (1990) and Schiantarelli (1995) argue that a single classification indicator is insufficient to decide whether a firm is credit constrained or not. Pal and Ferrando (2006) propose five criteria of classification of financially constrained firms: total investment, financing gap, financial debt, new shares issuance, and average interest payments on debt relative to interest rates charged in the local credit markets. They argue that the use of several interrelated variables allows for the placement of a firm into the constrained, relatively constrained or unconstrained group utilizing all available information. For example, negative total investment (reduction in fixed assets) signals that a firm has experienced financing constraints since it liquidates fixed assets. A positive financing gap indicates that the firms' total investment is higher than the current cash flow and that the firm needs external financing. If total investments and the financing gap are both positive, firms need external financing. Firms are sorted out into unconstrained and relatively constrained categories based on the price they pay to obtain necessary financing. Those firms, which are able to increase leverage at a lower price than the country-specific retail interest rate, are defined as unconstrained. If the price is higher, a firm falls into the relatively constrained category. Firms, which under these conditions are not attracting financing, are defined as absolutely constrained.

Focusing on multiple classification criteria, Devereux and Schiantarelli (1990), Oliner and Rudebusch (1992), and Schiffer and Weder (2001) have highlighted the role of firm age and size as significant predictors of financing constraints. They showed that perceived constraints to financing are higher for small firms than for large firms. Kuntchev et al. (2013) and Hallward-Driemeier and Aterido (2007) found that small-size firms have significantly less access to the financial system and tend to finance a smaller share of their investment through formal credit. Schiffer and Weder (2001) found that smaller firms hold more intense perceptions of financing constraints than do larger firms. Additional classification criteria include ownership structure, stakeholder relationships, legal status, sectoral origin, export-oriented production, etc. Sembenelli and Schiantarelli (1996) show that foreign-owned firms may have easier access to various external sources

of financing. Harrison and McMillan (2003) suggest that state-owned firms are expected to report lower financing constraints since in many countries they receive direct budgetary support. Hoshi et al. (1991) show that information and incentive problems among firms with different types of relationships and affiliations with banks affect financing and investment activity. Studies on venture capital suggest that younger firms are more financially constrained because of information asymmetries associated with financiers' access to relevant information, which could help build long-term relationships. Yet further, Oliner and Rudebusch (1992) show that firms that are listed on a stock exchange are facing lower financing constraints due to fewer information asymmetries as a result of increased transparency requirements. Finally, Dollar et al. (2006) show that in developing countries the link between access to finance and the likelihood of being an exporter is stronger, and they find a positive association between a firm's export status and its access to finance.

The main problem of the empirical literature is that the classification of firms as financially constrained is highly supply-side driven and dependent on the methodology used to identify whether a firm experiences financing constraints or not. All the studies considered above use an exogenous classification of firms and take a supply-side perspective. This makes the results highly sensitive to the point of sample separation because it could be problematic to decide which group a firm belongs to since the severity of financial constraints faced by the firm is not directly observable.

One approach to understand the extent of financing constraints is to take a demand-driven behavioral perspective. As Claessens (2006) points out, the analysis on financial inclusion seems to have reached a tipping point in terms of the extent to which provision of more and differentiated financial products can be used to stimulate access to and use of financial services. Thus, an understanding of the absorption of financial services must rest more squarely on such factors as the level of socioeconomic development of countries. The exclusion of people from finance is normally part of a wider social exclusion, which involves level of education, type of employment, training, etc.

This supply-side approach has focused on different aspects of accessibility that is making financial services both available and affordable and designing products in a reliable and flexible manner. Further, the supply-side approach focuses on the role of prescriptive regulation aiming at protecting consumers and ensuring that emerging financial markets and microfinance institutions integrate well into the traditional financial system. In spite of the ongoing conscious effort to improve access to finance, financial exclusion still remains high in developing economies. Thus, an increasing body of financial inclusion research has turned to demand-side factors. Bauer et al. (2012) and Kostov et al. (2012) study firms' perceptions regarding their access to finance by focusing on how self-discipline, based on present bias theory (current vs. future preference) and financial perceptions, behavior and attitudes, contribute to financial access and inclusion. Kon and Storey (2003) argue that whether a firm would find it prudent to apply for a loan or make use of financial services can be partly explained by the concept of 'discouraged borrower', based on the psychological component of application cost. The authors show that a good borrower—discouraged borrower—may not apply for a loan to a bank because of a possible rejection. The rejection may be the result of borrowers' lack of knowledge/information about their own capabilities and inadequacies, of negative perceptions, attitudes, and behavior which are largely premised on personal (known) adverse prior experience with a financial institution, of traditional idiosyncratic and covariate risk of poor people and, perhaps, and of insufficient financial or political connections. This means that the borrower's perception about the likely outcome of an application is imperative for achieving the targets of financial inclusion. Levenson and Willard (2000) argue that the implications of this discouragement to access to finance may be more important than Stiglitz and Weiss (1981) credit rationing hypothesis. Research of demand-side factors along with behavioral lines continues. Alternatively, Baddeley (2011) argues that unforeseen exogenous factors such as the ongoing social conflicts may be a determinant of financing constraints as those conflicts generate financial strains particularly if they are associated with an increase in military expenditure and arms imports.

Turning now into the country-level factors affecting financing constraints of firms, these focus on financial and developmental institutions and macroeconomic conditions. In the law and finance tradition, Demirgüç-Kunt and Maksimovic (1998) found that financing constraints are lower in countries with more efficient legal systems. After controlling for all other determinants, the efficiency of a country's legal system appeared to be important predictor of financing constraints of firms. Beck et al. (2005) suggest that country-level financial and other development institutions are instrumental in mitigating the constraining impact of financing constraints. Beck et al. (2006) argue that overall institutional development tends to be a prominent country-level predictor of a firm's constraints to financing. Further, Leaven (2003) argues that financial liberalization is a strong factor in reducing the financing constraints to firms. On the basis of firms' responses from 35 developing countries, Clarke et al. (2006) found that the participation of foreign banks improves accessibility of firms to external financing. Kuntchev et al. (2012) found that in countries with high private credit to GDP ratios, firms are less likely to be credit constrained. Love (2003) finds a strong negative relationship between the sensitivity of investment to the availability of internal funds and an indicator of financial market development, and concludes that financial development reduces the effect of financing constraints on investment. Laeven (2003) and Gelos and Werner (2002) find that financial liberalization relaxes financing constraints of firms, in particular for smaller firms. Finally, Love and Martinez Peria (2012) found that low market competition reduces firms' access to finance and that the impact of competition on access to finance depends on the operational environment of financial institutions.

This chapter provides an analysis of access to finance based on an account of both firm-specific and country-level factors. It adopts a multiple criteria approach to deciding between constrained and unconstrained forms. Thus, firm-specific characteristics, such as age, size, sector of activity, external audit, ownership structure, and internal fund financing, are explicitly considered. Moreover, country-level factors relating to economic, financial, institutional, and human development are also considered as control factors. Further, the chapter also explores

the role of firms' perceptions and behavior regarding their access to finance. The latter relationship underlies the choice of data used in the analysis. This data are obtained from the World Bank's Enterprise Surveys of firms. These carefully conducted surveys account for firms' perceptions on access to finance and provide in-depth information on access to different financial services and allow the evaluation of the impact of this access. A shortcoming of these enterprise surveys is that there are often doubts regarding their representativeness for a specific country. Indeed, the responses of firms are private unaudited information. These concerns that could only be addressed by using firm census data, which are not, however, available for most developing countries. In this chapter, financing constraints should be taken to represent self-reported perceptions of firms and not actual constraints.

2.3 Data and Methodology

The source of data for this study is the Enterprise Surveys (ESs) conducted by the World Bank. The ES is an ongoing World Bank project since 2005, which involves the collection of both objective data based on firms' experiences and enterprises' perception of the environment in which they operate. The data are based on firm-specific surveys and have evolved into a mature stage that uses a standardized methodology of implementation, sampling, and quality control in most client-countries of the World Bank. The Enterprise Surveys currently cover over 130,000 firms carried out during 2005–2013 in 125 countries, of which 113 have been surveyed following a standardized methodology, which allows comparisons across countries and over time. The ES represents a sample of the non-agricultural, formal, private economy with a strong emphasis on building panel data to make it possible to track changes in the business environment over time. The ES facilitates linking firm performance and other firm characteristics with the business environment while assessing the constraints to private-sector growth and job creation faced in a particular country. The ES has included some high-income countries as comparators mostly as an exception since the mandate of the World Bank Group focuses on the developing

world. The ES data are collected in several waves and contain repeated cross-sections for the countries in our sample. Because the goal is to isolate within-country variation in access to finance across time, all sample countries have survey data for at least two years.

The ES questionnaire covers the following topics: Firm characteristics (age, firm legal status, gender of the owner), quality and availability of infrastructure and related services, sales and supplies, competition, capacity utilization, land and permits, crime, finance (percentage of investments financed through bank loans, percentage of working capital financed through trade credit, the type of collateral used to secure a bank loan), business-government relations, and labor. It also provides a ranking of constraints, covering the most important of 15 potential constraints to conduct business, as well as performance, covering constraints such as cost of labor and cost of raw materials.

The ES is composed of representative random samples of firms from the manufacturing and service sectors, including retail, wholesale, IT, construction, transport, and communication. Samples have broad within-country coverage typically centralized in the major centers of economic activity of a country. Every ES is based on sampling frames that are evaluated at the onset of every project. Special attention is placed on questionnaire translation, and in every country, pretesting and pilot interviews are conducted prior to main field work to reduce measurement errors. Measurement error may be present regarding some sensitive questions, such as those regarding corruption and performance results. Also, some information may be intentionally underreported due to fears of repercussions and/or due to the sensitive nature of the questions. However, the ES questionnaire has been gradually adjusted to minimize this risk. Questions are simple and direct; respondents are specially assured of the confidentiality of their answers. Survey data in the developing world may suffer also a coverage bias. This bias emerges from dealing with outdated or unclean firm information. The ES uses the most updated and complete sampling frames for each economy, and efforts are undertaken to purge alien elements from the frame prior to the selection of the sample.

The basic data sample used in this analysis includes 36,135 firms from 41 Islamic countries covered by the ES between 2006 and 2014.

The survey does not cover some Islamic countries of the Middle East and North Africa, Africa, and Asia. Further, some important Islamic countries are omitted for either they were not covered by the ES or the relevant data were coded with a different methodology that is not compatible with the rest of the sample. An important strength of the data is its broad coverage of small and medium firms. The ES stratifies firm size consistently into: small (5–19 employees), medium (20–99), and large (100 and more) firms.

The dependent variable is ACCESS. Based on the ES explanations, the categorical variable ACCESS reflects the firms' perceptions of financing constraints during the fiscal year referenced in each survey. It is the answer of firms to the question: 'How problematic is financing for the operation and growth of your business?' The answer varies between 0 (no constraint), 1 (minor constraint), 2 (moderate constraint), 3 (major constraint), and 4 (very severe constraint). However, it is possible that these answers may not capture all reality as well as that some firms may report financing constraints while they are not actually constrained by them but only facing temporary liquidity distress. Therefore, one must be cautious of this behavioral bias and interpret the results carefully.

Average values of ACCESS per country are reported in Table 2.1. The data show large divergence. Firms operating in Burkina Faso (2.977) consider access to finance as the biggest obstacle to their operations, while firms operating in Kosovo (0.492) consider it as a least important obstacle among the whole sample of Islamic countries. The average value for the whole sample is 1.411, which shows that access to finance is a considerable obstacle for the firms operating in Islamic countries.

The independent variables include firm-specific characteristics that reflect the impact of the firm's nature and operation. They include: age, size, sector of business activity; legal status; the location of business operations; export status; and auditing of accounts. They also include ownership structure.

Moreover, country-level variables are used to control for the impact of national economic and non-economic factors. These control variables capture unobservable differences between countries and are included to account for any spurious relationships and better measure the impact

Table 2.1 Access to finance as an obstacle to business operations (mean value). *Source* World Bank Enterprise Surveys

Country	Number of Firms	Mean value	St.Dev.
Afghanistan	945	1.874	1.865
Albania	664	0.788	1.920
Azerbaijan	770	1.130	1.938
Bangladesh	2946	1.718	1.293
Benin	150	2.340	1.828
Bosnia & Herzegovina	721	1.405	1.342
Burkina Faso	394	2.977	1.186
Cameroon	363	2.402	1.335
Chad	150	2.073	1.806
Djibouti	266	0.996	1.511
Egypt	2897	1.480	1.813
Gabon	179	1.179	2.315
Gambia	174	1.793	1.448
Guinea	223	2.552	1.422
Guinea Bissau	159	2.912	1.384
Indonesia	1444	0.330	2.797
Iraq	756	2.022	1.717
Jordan	573	1.972	1.342
Kazakhstan	1144	0.946	2.232
Kosovo	472	−0.492	4.486
Kyrgyz Rep.	505	1.329	1.624
Lebanon	561	1.704	1.493
Mali	850	2.211	1.818
Mauritania	387	2.166	1.523
Morocco	407	1.189	1.672
Niger	150	1.893	2.060
Nigeria	4567	1.278	2.030
Pakistan	2182	1.102	1.816
Senegal	1107	2.204	1.564
Sierra Leone	150	1.953	1.095
Sudan	662	1.236	1.137
Suriname	152	1.993	1.182
Tajikistan	719	0.954	2.198
Tanzania	1232	1.798	2.312
Togo	155	2.148	1.858
Tunisia	592	1.144	1.368
Turkey	2496	0.671	1.695
Uganda	1325	1.807	1.985
Uzbekistan	756	0.893	1.467
West Bank & Gaza	434	1.954	1.548
Yemen	830	0.755	3.089
Total	36,135	1.411	2.014

of any single firm-specific variable beyond the effects of others. Thus, the regression estimates represent within-country variation in the relationship between the various exogenous indicators and financing constraints. In other words, each individual firm is not large enough to affect country-level measures of those development indicators. The control variables include quantitative measures of country economic development, financial development, and human development. The latter is captured by UNDP's human development index (HDI), which is a composite measure of social variables, i.e., schooling, life expectancy, inequality, etc. Further, control variables include measures of financial intermediation and structure. These country-level control variables capture unobservable differences between countries and are included to account for any spurious relationships and better measure the impact of any single firm-specific variable beyond the effects of others. Thus, the regression estimates represent within-country variation in the relationship between the various exogenous development indicators and financing constraints. In other words, each individual firm is not large enough to affect country-level measures of those development indicators. The Appendix describes in detail all the variables in the chapter.

Since the dependent variable is a categorical variable, an ordered probit model is used for estimating the regression (Greene 2012). The disturbance parameter is assumed to follow a normal distribution, and the standard maximum likelihood estimator is therefore used. Since omitted country characteristics might cause error terms to be correlated for firms within countries, clustered error terms are allowed. In a second step, economic, financial, institutional, and human development indicators are introduced in the analysis to obtain more robust results regarding the impact of firm-specific characteristics on firms' financing constraints. In general, the model assumes that the firm's underlying response can be described by the following Eq. 2.1:

$$\Upsilon_{ij} = \alpha + \mathrm{X}_1'\beta_1 + \mathrm{X}_2'\beta_2 + \varepsilon_{ij} \tag{2.1}$$

where $\Upsilon_{i,j}$ (ACCESS) is the underlying probability that firm i in country j perceives access to finance to be no, low, moderate, major, or severe constraint; $X_1'\beta_1$ is the vector of firm-specific variables; $X_2'\beta_2$ is the

vector of country-level control variables; and $\varepsilon_{i,j}$ is a disturbance parameter that is assumed to follow a normal distribution. Unobservable differences between countries are captured by including country fixed effects coefficient.

Note that when analyzing categorical data with a probit model, an equivalent statistic to the OLS R^2 does not exist to evaluate the goodness-of-fit. The model estimates are maximum likelihood estimates arrived at through an iterative process. They are not calculated to minimize variance, so the OLS approach to goodness-of-fit does not apply. The goodness-of-fit of probit models is therefore approximated by several 'pseudo' R^2 measures, which also range from 0 to 1, with higher values indicating better model fit. However, these measures cannot be interpreted as one would interpret an OLS R^2 given that the different pseudo R^2 can arrive at very different, often very low, values. Wooldridge (2002) suggests that, if the dependent variable in probit models involves only binary responses, McFadden's pseudo R^2 estimates could have an analogous interpretation with the R^2 estimates of the OLS regression.

2.4 Analysis of Results

Summary statistics of the variables are shown in Table 2.2. The responses show that a significant percentage of firms are facing financing constraints. On average, access to finance tends to be a very severe problem of business operation for 11.3% of firms, a major problem for 18.3% of firms, and a moderate problem for 20.6% of firms in the total sample, a total of 50.1%. About half of the firms in the whole sample of countries have indicated that access to finance is a problem. Further, in the sample of Islamic countries, about 54.2% of all firms are small firms, 30.6% are medium firms, and 15.2% are large firms. Moreover, 23.4% of total firms are in the retail and wholesale sector, about 8.1% are in construction and transport sector, about 10.2% are in the services sector, about 11.9% are in the food sector; and the remaining firms mostly belong to other manufacturing sectors. About half of the firms are limited-liability companies. Moreover, on average, private ownership

Table 2.2 Descriptive statistics of variables. *Source* World Bank Enterprise Surveys

VARIABLE	Firms	Mean	S.D.	Min	0.25%	Median	0.75%	Max
ACCESS	34134	1.41	2.01	0.00	0.00	2.00	3.00	4.00
AGE	36095	3.01	0.89	0.69	2.56	2.89	3.26	7.61
SIZE	36135	1.61	0.74	1.00	1.00	1.00	2.00	3.00
SECTOR	36072	15.06	9.54	1.00	5.00	16.00	22.00	100.00
LEGAL	35937	2.91	0.98	1.00	2.00	3.00	3.00	6.00
LOCATION	28910	2.64	1.24	1.00	2.00	2.00	3.00	5.00
EXPORT	36028	6.97	22.34	0.00	0.00	0.00	0.00	100.00
OWNPRV	36132	88.87	29.49	0.00	100.00	100.00	100.00	100.00
OWNFOR	36124	5.23	20.51	0.00	0.00	0.00	0.00	100.00
OWNGOV	36124	0.79	7.25	0.00	0.00	0.00	0.00	100.00
OWNOTH	36122	3.51	17.63	0.00	0.00	0.00	0.00	100.00
OWNDOM	36113	80.83	29.76	0.00	60.00	100.00	100.00	100.00
AUDIT	35937	1.36	1.58	0.00	1.00	2.00	2.00	2.00
GDPCAP	36135	3090.9	3196.2	299.2	929.6	1668.3	3314.5	13611.5
GINI	36135	36.76	6.34	27.80	30.80	36.20	39.80	52.90
HDI	36135	0.58	0.12	0.30	0.49	0.56	0.69	0.86
FINDEV	34819	28.98	19.86	2.05	14.61	27.66	34.93	98.64
FINDEP	32397	37.52	28.41	4.44	19.06	29.68	49.49	199.71
FORASS	11601	33.98	35.21	0.00	4.00	17.00	50.00	100.00
SPREAD	24577	6.79	3.29	1.52	4.61	6.65	7.21	19.16
BCONCN5	32571	71.25	16.69	17.73	60.54	71.07	85.78	99.99
ZSCORE	35504	15.00	12.91	−4.55	4.68	12.34	19.71	50.01
BOONE	34995	−0.05	0.04	−0.12	−0.08	−0.06	−0.03	0.15
HSTAT	11115	64.86	226.77	0.32	0.42	0.57	0.77	909.83
LERNER	29975	0.25	0.11	0.07	0.17	0.24	0.30	0.52
VOICACC	36135	−0.71	0.50	−2.08	−1.04	−0.74	−0.26	0.33
POLSTAB	36135	−1.21	0.84	−2.69	−2.01	−1.19	−0.50	0.75
GOVEFF	36135	−0.68	0.43	−1.53	−1.01	−0.69	−0.46	0.37
REGQUAL	36135	−0.54	0.45	−1.63	−0.86	−0.60	−0.32	0.42
RULLAW	36135	−0.73	0.45	−1.95	−1.07	−0.72	−0.44	0.39
CONTRCORR	36135	−0.79	0.41	−1.64	−1.05	−0.90	−0.60	0.11

Table 2.3 Correlation among firm-specific variables

PWCORR	ACCESS	AGE	SIZE	SECTOR	LEGAL	LOCATION	EXPORT	OWNPRV	OWNFOR	OWNGOV	OWNOTH	OWNDOM	AUDIT
ACCESS	1												
AGE	−0.059*	1											
SIZE	−0.064*	0.143*	1										
SECTOR	0.003	−0.070*	−0.144*	1									
LEGAL	0.049*	−0.024*	−0.155*	0.031*	1								
LOCATION	0.015*	−0.045*	0.011	−0.032*	−0.072*	1							
EXPORT	−0.022*	0.019*	0.309*	−0.164*	−0.079*	0.039*	1						
OWNPRV	0.065*	−0.051*	−0.096*	−0.038*	−0.008	0.055*	−0.074*	1					
OWNFOR	−0.027*	0.008	0.136*	−0.001	−0.023*	−0.059*	0.119*	−0.646*	1				
OWNGOV	−0.011*	0.039*	0.102*	0.026*	−0.024*	0.045*	0.019*	−0.210*	0.025*	1			
OWNOTH	−0.011	−0.021*	−0.041*	0.048*	0.030*	−0.020*	0.005	−0.546*	−0.031*	0.029*	1		
OWNDOM	0.054*	−0.084*	−0.293*	0.410*	−0.026*	−0.017*	−0.153*	0.124*	−0.085*	−0.054*	0.052*	1	
AUDIT	0.124*	−0.117*	−0.119*	−0.002	0.031*	0.016*	−0.048*	0.073*	−0.046*	0.003	0.007	0.093*	1

Note the symbol * indicates significant correlation at the 5% level

of firms is 88.9%, foreign ownership is 5.2%, government ownership is low at 0.79%, while the largest shareholder has an 80.8% stake. The data indicate that ownership structure is considerably concentrated in the sample of countries.

Further, Table 2.3 presents the pairwise correlations between the firm-specific variables. Prima facie evidence shows negative correlation between firm size, ownership and export status and access to finance, while it shows a positive correlation between firm sector of activity, legal status, and location of operation with access to finance. The results do not show severe multicollinearity between the firm-specific control variables. Therefore, all of these variables can be included in regression analysis.

Taking a multivariate analysis, a quantitative assessment is provided of the determinants of financing constraints through the application of probit analysis. Several series of maximum likelihood regression models (A.1–A.11) were estimated sequentially, and the regression results are reported in Table 2.4. In the benchmark model, the results are presented according to the order at which firm-specific characteristics are estimated individually and collectively for the entire sample of firms and for each one of the high-income and low-income Islamic countries. The results report the estimated probability that a firm describes access to finance as major obstacle for its business operation depending on its characteristics.

The results of the ordered probit regression models for the whole sample suggest that, taken individually, a firm's age, size, location of operations, and export status are negative significant predictors of firms' access to finance: Thus, higher values of those firm characteristics imply lower financing constraints of firms. Further, limited-liability companies and companies that their accounts audited are positively associated with financing constraints of firms. The sector of activity surprising is not a significant predictor of firms financing constraints. Moreover, private ownership, foreign ownership, and dominant owners are positive significant predictors of firms' financing constraints. Higher ownership stakes are associated with higher financing constraints. Government ownership appears to be a rather insignificant factor.

Table 2.4 Impact of firm-specific characteristics (by development level)

ACCESS	A.1	A.2	A.3	A.4	A.5	A.6	A.7	A.8	A.9	A.10	A.11
									All countries	High–income countries	Low–income countries
AGE	−0.049***								−0.026***	−0.064***	0.010
	(−7.56)								(−3.85)	(−6.73)	(0.96)
SIZE		−0.139***							−0.084***	−0.103***	−0.065***
		(18.73)							(−9.84)	(−7.97)	(−4.86)
SECTOR			0.00						−0.001	0.001	−0.002***
			(0.10)						(−1.03)	(0.07)	(−1.71)
LEGAL				0.081***					0.075***	0.030***	0.088***
				(14.17)					(12.02)	(3.49)	(9.67)
LOCATION					−0.010*				0.161	−0.066***	0.065***
					(−1.99)				(1.40)	(−8.21)	(9.52)
EXPORT						−0.002***			−0.001***	−0.001***	−0.001*
						(−9.38)			(−3.83)	(−3.06)	(−1.76)
OWNPRV							0.002***		0.002***	0.003***	0.001***
							(9.60)		(7.32)	(7.81)	(2.95)
OWNFOR							0.001***		0.001***	0.001***	0.001
							(2.81)		(2.92)	(2.45)	(1.22)
OWNGOV							−0.001		0.001	−0.003***	0.005***
							(1.32)		(0.38)	(−2.56)	(3.34)
OWNDOM							0.002***		0.002***	0.001***	0.001***
							(12.43)		(7.90)	(3.56)	(4.43)
AUDIT								0.055***	0.038***	0.045***	0.024***
								(13.10)	(8.37)	(7.45)	(3.52)
Obs	34134	34134	34071	33937	28886	34045	34102	33964	28464	14661	13803
Pseudo R^2	0.003	0.003	0.002	0.002	0.002	0.001	0.002	0.002	0.008	0.011	0.007

Note Dependent variable is ACCESS. An ordered probit model is used. Symbols ***, **, * indicate significant correlation at the 1%, 5%, and 10% level, respectively. Z values in parentheses

When all firm-specific characteristics are included in the analysis, the results remain about the same. Only the location of firms' operation turns out to be insignificant. Similar conclusions carry over when the analysis considers separately the effect in the high-income. However, in the low-income group of Islamic countries, the results present an expected shift: Firm age and foreign ownership turn insignificant, while government ownership turns out to be a significant predictor of financing constraints.

These findings are only partly in line with other relevant empirical findings. In general, firm-specific characteristics, such as age, ownership dispersion, export-oriented activity, are significant determinants of financing constraints of firms in the sample Islamic countries. These results are in line with those of Devereaux and Schiantarelli (1990) and Beck et al. (2006), who find that young firms are more sensitive to the cash flow-investment link, thus they are more financially constrained, and they go against those of Oliner and Rudebusch (1992), who find insignificant sensitivity. Also, these results are in line with those of Harrison and McMillan (2003) and Beck et al. (2006), who find that domestically, owned firms are more sensitive to the cash flow-investment link. However, in less-developed Islamic countries, firm age and foreign ownership do not appear to matter much in understanding firms' financing constraints. It appears that in the latter countries the problem of access to finance is not significantly related to the firms' reputation and history or to the presence of foreign shareholders. Local institutions financial structures are probably the main cause of it. On the other hand, government ownership does matter, reflecting presumably the considerably larger extent of state ownership and the more active role of government in decision-making.

In order to see the regional impact of firm-specific characteristics on firms' access to finance constraints, Eq. (2.1) is re-estimated for each of the UN-classified regions: Africa (AFR), Europe and Central Asia (ECA), Middle East and North Africa (MNA), East Asia and the Pacific (EAP), and other Special Arrangement Regions (SAR). Table 2.5 presents the results of the benchmark regression model. The results present considerable differences as regards the predictive power of firm-specific characteristics. It appears that the dominant owners, the auditing of

Table 2.5 Impact of firm-specific characteristics (by region)

	Africa	East Asia and the Pacific	Europe and Central Asia	Middle East and North Africa	Special arrangement regions
AGE	−0.035***	−0.023	0.056***	−0.007	−0.124***
	(−3.37)	(−0.61)	(3.27)	(−0.42)	(−6.46)
SIZE	−0.120***	0.054	0.025	−0.101***	−0.026
	(−6.71)	(1.29)	(1.37)	(−5.48)	(−0.95)
SECTOR	−0.006***	−0.009***	0.003*	−0.003**	0.002
	(−5.02)	(−2.30)	(1.77)	(−2.43)	(0.85)
LEGAL	0.005	0.050	−0.034***	0.053***	0.082***
	(0.43)	(1.58)	(−2.70)	94.34)	(3.20)
LOCATION	−0.063***	0.046	0.034***	0.081***	−0.082***
	(−4.99)	(1.31)	(3.56)	(9.65)	(−2.96)
EXPORT	−0.003***	−0.001	0.001	−0.001	−0.002***
	(−4.09)	(−0.55)	(0.48)	(−1.32)	(−3.06)
OWNPRV	0.004***	−0.001	0.001	0.004***	0.007***
	(12.92)	(−0.82)	(0.21)	(4.93)	(5.02)
OWNFOR	0.001**	0.001	0.001	0.002***	0.001
	(2.43)	(−0.03)	(−0.06)	(2.58)	(0.68)
OWNGOV	−0.001	−0.002	0.001	0.003	−0.002
	(−0.36)	(0.48)	(−0.28)	(1.19)	(−0.27)
OWNDOM	0.001***	0.002	0.001***	0.001***	0.001
	(3.35)	(0.07)	(2.77)	(3.010	(1.26)
AUDIT	0.045***	0.080***	0.029***	0.010	0.053***
	(5.42)	(3.02)	(3.56)	(0.88)	(4.90)
Obs	9021	1428	7120	7217	3526
Pseudo R^2	0.0166	0.0071	0.003	0.01	0.0186

Note Dependent variable is ACCESS. An ordered probit model is used. Symbols ***, **, * indicate significant correlation at the 1%, 5%, and 10% level, respectively. Z values in parentheses

accounts, sector of activity, location, and legal status remain significant predictors of firms' financing constraints in most international regions, but firms' age, size, export status, and ownership are significant only in few of the regions. Given that firms located within the Islamic countries of each region exhibit considerably different characteristics and that they are operating under considerably different economic, social, and cultural environments that interact with firm characteristics in various ways, then a richer picture of the impact of the firm-specific characteristics can only be obtained if the impact of broad economic and

Table 2.6 Marginal effects of firm-specific characteristics (by development level)

ACCESS	dy/dx		
	All countries	High-income countries	Low-income countries
AGE	0.001***	0.002***	0.001
	(3.77)	(6.46)	(−1.01)
SIZE	0.003***	0.004***	0.003***
	(8.78)	(7.03)	(4.69)
SECTOR	0.001	0.001	0.001*
	(1.03)	(0.07)	(1.70)
LEGAL	−0.003***	−0.001***	−0.004***
	(−11.12)	(−3.39)	(−8.43)
LOCATION	0.001	0.003***	−0.003***
	(1.40)	(7.54)	(−8.46)
EXPORT	0.002***	0.001***	0.001*
	(3.79)	(2.76)	(1.67)
OWNPRV	0.001***	0.001***	0.001***
	(−7.04)	(−7.06)	(−2.72)
OWNFOR	0.001***	0.002***	0.001
	(2.91)	(−2.47)	(−1.14)
OWNGOV	0.002	0.001***	0.001***
	(−0.37)	(2.28)	(−3.40)
OWNDOM	0.002***	0.001***	0.002***
	(−7.65)	(−3.35)	(−4.36)
AUDIT	−0.002***	−0.002***	−0.001***
	(−7.66)	(−7.87)	(−4.26)
Obs	28464	14661	13803

Note Dependent variable y is ACCESS. The delta method is used to calculate marginal effects, dy/dx. Symbols ***, **, * indicate significant correlation at the 1%, 5%, and 10% level, respectively. Z values in parentheses

financial conditions as well as social and cultural factors at the national level is properly accounted for. Economic and financial development along with national social and cultural factors, including religiosity and religion, affect decision-making and the nature of financial contracting which in turn affects the supply of and demand for finance and thereby firms' financing constraints.

In order to test for the economic significance of the results of the probit regression analysis and hence the expected policy intervention impact, the marginal effects of firm-specific characteristics are estimated. These effects show the marginal discrete change in the dependent variable (ACCESS) following a value change in each categorical or

numerical firm-specific characteristic (dy/dx). The marginal effects for the whole sample and for each of the two subgroups of countries are reported in Table 2.6. They show that a unit or category change in firm age, size, sector of activity, legal and export status, private domestic, and foreign ownership exert a meaningfully effect on firms' perceptions regarding obstacles to finance. For most of the latter characteristics, the impact is variously significant in the whole sample and each of the two subgroups of Islamic countries. Overall, only some of the firm-specific characteristics used in this analysis appear to have a meaningful economic impact.

2.5 Discussion and Robustness Checks

There may be concerns that the results obtained above depend on the firm-specific characteristics of the sample countries. After all, different countries have different, more- or less-developed institutions, different societal structures, and characterized by different cultural and behavioral norms. Therefore, it is possible that, by accounting for the impact of different country-level factors, the firms' characteristics become either more or less effective in easing firms' financing constraints. In order to test these conjectures, a series of additional robustness tests are taken into account for the impact of various national economic and non-economic conditions. Equation 2.1 is re-estimated to include the impact of a country's economic and human development as well as its financial development and financial intermediation conditions. The variables are described in the Appendix.

2.5.1 Impact of Economic and Human Development

The level of economic and human development of countries has an impact on the financing constraints of firms. In order to check for this conjecture, Eq. 2.1 is expanded to include regressors capturing the impact of economic and human development of the sample countries. Table 2.7 presents the results of the benchmark regression model after

Table 2.7 Impact of economic development (by development level)

ACCESS	All countries	High-income countries	Low-income countries
AGE	−0.036***	−0.058***	0.011
	(−5.23)	(−6.05)	(1.12)
SIZE	−0.072***	−0.078***	−0.052***
	(−7.78)	(−5.91)	(−3.92)
SECTOR	−0.001**	−0.002***	−0.002**
	(−2.15)	(−2.54)	(−2.14)
LEGAL	0.038***	0.028***	0.057***
	(5.88)	(3.14)	(6.09)
LOCATION	0.021***	−0.029***	0.080***
	(3.82)	(−3.35)	(11.20)
EXPORT	−0.001***	−0.001	0.001
	(−2.42)	(−1.41)	(0.29)
OWNPRV	0.003***	0.002***	0.002***
	(10.60)	(4.80)	(5.60)
OWNFOR	0.001***	−0.001**	0.001***
	(3.83)	(−2.16)	(2.40)
OWNGOV	−0.001	−0.005***	0.004***
	(−0.55)	(−4.46)	(2.71)
OWNDOM	0.001***	0.001***	0.001*
	(3.24)	(2.83)	(1.77)
AUDIT	0.034***	0.046***	0.020***
	(7.44)	(7.40)	(2.90)
GDPCAP	0.001***	0.001***	0.001***
	(−16.39)	(−21.34)	(−8.43)
GINI	0.004***	0.033***	−0.014***
	(4.01)	(15.93)	(−6.89)
HDI	−0.422***	0.281***	−1.261***
	(−5.19)	(2.78)	(−6.24)
Obs	28464	14661	13803
Pseudo R^2	0.0153	0.0267	0.014

Note Dependent variable is ACCESS. An ordered probit model is used. Symbols ***, **, * indicate significant correlation at the 1%, 5%, and 10% level, respectively. Z values in parentheses

controlling for economic development (GDPCAP), income inequality (GINI), and human development (HDI) for the whole sample and for each of the two groups of high-income and low-income Islamic countries. The results show that economic development, income inequality, and human development are significant predictors of firms' financing constraints. Higher levels of economic development as well as

inequality in the distribution of income imply higher financing constraints of firms. It seems that faster economic growth is associated with higher needs for finance of firms, which cannot be accommodated. Further, increasing income inequality tends to intensify financing constraints most likely by distorting the efficient allocation of finance. On the other hand, higher levels of human development imply lower financing constraints of firms. Human skill and knowledge matter for determining the extent to which firms face financing constraints. The Economist (2011) argued that higher levels of human development lead to improved financing by lowering corruption and bureaucracy. These results are in line with those of Beck et al. (2006) who found a significant role for economic development, and those of Reinhart et al. (2010) who stressed the significant role of human development, in a smaller sample of countries and subject to different model structures. After controlling for economic and human development levels, most firm-specific characteristics remain significant predictors of firms' financing constraints, except perhaps for the export status of firms and firm age, which remain significant according to the model used. However, the sign of some of the firm-specific characteristics changes in low-income countries. It seems that further analysis is needed to explain their influence under more complex economic and non-economic conditions prevalent in those countries.

2.5.2 Impact of Financial Development and Financial Intermediation Conditions

The financial conditions and the level of financial development of countries are also considered to have an impact on the financing constraints of firms. They represent important supply-side factors in the availability of finance. In order to check for this conjecture, Eq. 2.1 is expanded to include regressors capturing the impact of the overall level of financing liquidity and aspects of the financial intermediation environment. Table 2.8 presents the results of the benchmark regression model after controlling for the level of financial development (FINDEV), the size of the system's financing capacity (FINDEP), the extent of foreign

Table 2.8 Impact of financial conditions (by development level)

ACCESS	Panel A			Panel B		
	All countries	High-income countries	Low-income countries	All countries	High-income countries	Low-income countries
AGE	0.033	−0.013	0.100***	−0.030***	−0.061***	−0.015
	(1.27)	(−0.40)	(2.26)	(−2.91)	(−3.90)	(−1.06)
SIZE	−0.013	0.059	−0.114***	−0.106***	−0.070***	−0.102***
	(−0.44)	(1.62)	(−2.21)	(−6.45)	(−2.93)	(−4.30)
SECTOR	−0.009***	−0.010***	−0.005	−0.006***	−0.007***	−0.004***
	(−3.52)	(−3.20)	(−1.10)	(−5.61)	(−3.91)	(−2.71)
LEGAL	0.040*	0.072***	0.009	0.082***	0.107***	−0.027
	(1.67)	(2.62)	(0.19)	(6.40)	(5.09)	(−1.60)
LOCATION	0.103***	0.024	0.139***	−0.049***	0.008	0.051***
	(5.74)	(0.75)	(6.12)	(−4.51)	(0.34)	(3.55)
EXPORT	0.001	−0.001	0.005***	−0.002***	−0.002***	−0.001*
	(1.38)	(−1.12)	(3.08)	(−3.72)	(−3.24)	(−1.85)
OWNPRV	0.001	−0.001	0.001	0.000	0.003***	0.002***
	(−0.46)	(−0.58)	(−0.13)	(0.31)	(4.15)	(3.82)
OWNFOR	−0.001	0.001	−0.002	−0.002***	−0.001	−0.001
	(−0.92)	(0.28)	(−0.74)	(−3.13)	(−1.10)	(−0.89)
OWNGOV	0.002	−0.004	0.003	0.007***	0.001	0.007***
	(0.72)	(−1.23)	(0.80)	(3.27)	(0.27)	(3.15)
OWNDOM	−0.001	0.000	−0.002	0.003***	0.003***	0.001
	(−0.97)	(0.24)	(−1.60)	(6.80)	(6.41)	(0.45)
AUDIT	0.025*	0.067***	−0.015	0.042***	0.037***	0.030***
	(1.72)	(2.92)	(−0.88)	(5.71)	(3.83)	(2.51)
FINDEV	−0.003**	−0.007**	0.001*			
	(−1.92)	(−2.06)	(1.67)			
FINDEP	−0.027***	0.001*	0.00111			
	(−6.52)	(1.87)	(0.13)			
FORASS	0.013***	0.001	0.001			
	(5.24)	(1.15)	(01.4)			
SPREAD	0.102***	0.001	0.001			
	(5.03)	(0.17)	(0.98)			
BCONCN				0.005***	0.017***	0.036***
				(3.70)	(7.20)	(10.32)
ZSCORE				0.009***	−0.072***	0.007***
				(7.98)	(−9.65)	(3.08)
BOONE				−5.943***	9.75***	−1.455
				(−9.69)	(8.70)	(−1.01)
HSTAT				0.044	−15.822***	1.622***
				(0.40)	(−9.93)	(2.72)
LERNER				0.610***	0.001	−3.569***
				(6.28)	(0.15)	(−5.42)

(continued)

Table 2.8 (continued)

ACCESS	Panel A			Panel B		
	All countries	High-income countries	Low-income countries	All countries	High-income countries	Low-income countries
Obs	2933	1902	1031	9540	4659	4881
Pseudo R^2	0.0164	0.0065	0.0261	0.028	0.0504	0.026

Note Dependent variable is ACCESS. An ordered probit model is used. Symbols ***, **, * indicate significant correlation at the 1%, 5%, and 10% level, respectively. Z values in parentheses

ownership of domestic bank assets (FORASS), the concentration of the banking system (BCONCN), the competition within the banking system (LERNER, BOONE, HSTAT), and the cost of financial intermediation (SPREAD), for both the whole sample and each subgroup of Islamic countries. The results show that financial development and financial intermediation conditions are significant predictors of firms' financing constraints, except perhaps for the low-income countries. Higher levels of financial development and liquidity in the financial system imply lower financing constraints of firms. In contrast, foreign ownership of bank assets has the opposite effect.

On the other hand, the results show that financial intermediation conditions matter in alleviating firms' financing constraints. Higher bank concentration implies higher financing constraints of firms in the whole sample and the two subgroups. The same appears to hold in the case of bank competition, except for low-income countries. These results are partly only in line with other relevant empirical findings, such as Beck et al. (2006) who found a significant role for financial development, using a less homogeneous sample of countries. They are also in line with Love and Martinez Peria (2012) who found that low bank competition diminishes firms' access to finance. After the inclusion of financial system controls, firm size and sector of activity, legal status, audit, and location of operation remain in most models significant predictors of financing constraints. The predictive power of the other characteristics changes in accordance with the model used. It seems that the consideration of financial conditions has a significant impact on the financing of the different firms that awaits for more detailed analysis for

it to be better understood in the Islamic world. Again, the consideration of social and cultural factors is an obvious way to go.

2.6 Conclusions

Access to finance has been found to be one of the most binding constraints on firms' growth. In this chapter, drawing in the relevant literature and a data set based on World Bank's Economic Surveys, certain firm characteristics are identified and explored as determinants of firms' financing constraints in a sample of Islamic countries. The latter represent a large and growing portion of world population and output and in recent decades, a parallel mode of finance, Islamic finance, based on different values and contracting habits, has become a sizable economic activity. In order to test the predictive ability of firm characteristics on financing constraints under different socioeconomic environments, the sample of countries is split between high- and low-income ones. The main contribution of the chapter is to examine firms' access to finance in an Islamic environment drawing on a recent and comprehensive data set based on firms' Surveys and properly including the impact of national development factors. However, as this data represent firms' views and perceptions regarding their access to finance, the quantitative analysis is bound by the limitations of existing methods concerning categorical variables.

In line with most relevant empirical findings, firms' age, size, and ownership predict firms' financing constraints in most of the models used. In contrast, sectoral origin, external audit of accounts, government ownership, and investment funding through internal funds have less significant predictive power, and their prediction power is conditional upon the model specification. Islamic countries do occasionally deviate from the norm observed in the rest of the world. Further, the results show that national levels of economic, financial, and human development do affect the predictive power of firm-specific characteristics in the sample Islamic countries. Further analysis is needed to understand the nature of financial intermediation and disentangle the complex interaction between conventional and Islamic financing of

firms and the economy. Further analysis is also needed, along with the inclusion of social and cultural factors, to better understand the diversity in the severity of financing constraints facing firms operating in Islamic environments.

Appendix. Definition of Variables

See Table A.1

Table A.1 Definition of variables

Name	Description and source
AGE	Logarithm of the number of years since the year that the company was established, from the World Bank Enterprise Surveys
SIZE	Categorical variable is equal to 1 if the firm is small (5–19 employees), 2 if the firm is medium (20–99 employees), and 3 if the firm is large (> 99 employees), from the World Bank Enterprise Surveys
SECTOR	Categorical variable is equal to 1 if the firm is in manufacturing, 2 in retail-wholesale, 3 in services, and 4 in other sectors, from the World Bank Enterprise Surveys
EXPORT	Percent of the firm's total sales directly exported, from the World Bank Enterprise Surveys
LEGAL	Categorical variable is equal to 1 if the firm is publicly listed, 2 if it is private limited-liability one, 3 if it is sole proprietorship, 4 if it is partnership, 5 if it is limited partnership, and 6 if other, form the World Bank Enterprise Surveys
LOCATION	Categorical variable is equal to 1 if the firm is located at the capital city, 2 if it is in city with more than 1 million people, 3 in a city with 0.25–1 million people, 4 in a city with 0.05–0.25 million people, and 5 in a city with less than 0.05 million people, form the World Bank Enterprise Surveys
AUDIT	Percent of firms with annual financial statement reviewed by external auditor last year, from the World Bank Enterprise Surveys
OWNPRV	The percentage of the firm owned by domestic private individuals, companies, or organizations, from the World Bank Enterprise Surveys
OWNFOR	The percentage of the firm owned by foreign private individuals, companies, or organizations, from the World Bank Enterprise Surveys
OWNGOV	The percentage of the firm owned by the state, from the World Bank Enterprise Surveys

Table A.1 (continued)

Name	Description and source
OWNDOM	The percentage of the firm's largest owner, from the World Bank Enterprise Surveys
GDPCAP	Logarithm of GDP per capita (current USD), from the World Bank Development Indicators. It is generally considered a measure of a country's level of economic development
GINI	Gini coefficient, from the World Bank Development Indicators. It is a measure of a country's income distribution, and it is generally considered an indicator of income inequality
HDI	Index ranging from 0 to 1, with higher values corresponding to higher human development, form the UNDP indicators. It is a summary measure of average achievement in key dimensions of human development: a long and healthy life, knowledge, and decent standard of living
FINDEV	Domestic credit to the private sector (% GDP), from the World Bank Development Indicators. It is generally considered a measure of a country's level of financial development
FINDEP	Financial system deposits as a percent of GDP, from the IMF International Financial Statistics
FORASS	Foreign bank assets as a percent of total domestic assets, from the IMF International Financial Statistics
SPREAD	Difference between the banks' lending and deposit rate, from the IMF International Financial Statistics
BCONCN	It measures the value of assets of the three largest commercial banks as a share of total commercial banking assets, so it is effectively a measure of bank concentration (%). Raw data are from Bankscope, but the ratio is published by the World Bank Global Financial Development Indicators
LERNER	The variable is approximated by the Lerner Index which is a measure of market power in the banking market, from the World Bank Global Financial Development Indicators. It is defined as the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, whereas marginal costs are obtained from an estimated translog cost function with respect to output. Higher values of the Lerner index indicate less bank competition
ZSCORE	Index capturing the probability of default of a country's banking system, calculated as a weighted average of the z-scores of a country's individual banks (the weights are based on the individual banks' total assets). Z-score compares a bank's buffers (capitalization and returns) with the volatility of those returns

Table A.1 (continued)

Name	Description and source
BOONE	The Boone statistic is a measure of the degree of bank competition based on profit-efficiency in the banking market, from the World Bank Global Financial Development Indicators. It is calculated as the elasticity of profits to marginal costs. An increase in the indicator implies a deterioration of the competitive conduct of financial intermediation
HSTAT	The H-statistic is a measure of the degree of bank competition based on internal organization in the banking market, from the World Bank Global Financial Development Indicators. It measures the elasticity of banks revenues relative to input prices. Under perfect competition, the H-statistic equals 1. Under monopoly, the H-statistic is less than or equal to 0. Under monopolistic competition, the H-statistic is between 0 and 1

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