



National culture of secrecy and firms' access to credit

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ARTICLE INFO

JEL Codes:

G32
G21
D82

Keywords:

Transparency
Information Disclosure
Banking
Discouragement
Rationing

ABSTRACT

High secrecy cultures are characterized by a preference for confidentiality and non-disclosure of information. This study documents the impact of cultural differences in secrecy on firms' access to credit. We use data from the World Bank Enterprise Surveys for a large sample of firms operating in 35 countries from 2010 to 2019. We show that firms operating in countries with higher levels of secrecy are less likely to apply for credit when they need it—they are more discouraged—and also less likely to receive credit when they do apply—they are more rationed. The underlying economic channels are greater opacity and corruption in cultures with high secrecy. The effect of cultural secrecy on credit discouragement and credit rationing is moderated by trust in banks, interpersonal trust, and firms' financial dependence on external sources. We control for several potential alternative drivers and conduct several robustness tests. The results confirm that firms have better access to credit in cultures that promote transparency and information disclosure.

1. Introduction

Bank financing is a key source of funding for the economy and plays a major role in both firm and economic growth (Levine et al., 2000; Ullah and Wei, 2017). Its importance is especially acute for small and medium enterprises that have limited access to capital markets. However, information asymmetries in the credit market generate market imperfections that affect both firms' financing decisions (Lin et al., 2020) and banks' lending decisions (Agarwal and Hauswald, 2010). Adverse outcomes include turning down credit applications, rejecting part of a firm's loan amount request, offering a menu of contracts, or discouraging borrowers from applying (Gama et al., 2017). In this context, the dissemination of information plays a central role in firms' access to credit. While firms have incentives to provide more information to reduce asymmetries, information disclosure entails costs for the firm (e.g., Verrecchia, 1983). Thus far, the literature has explained the extent of information disclosure and the selective retention of information from a financial trade-off perspective (Suijs, 2007; Thakor, 2015). In this study, we show that different cultural tendencies to disclose or retain private information, referred to as cultural secretiveness, are key drivers of firms' access to credit.

The existence of different levels of corporate secretiveness across cultures was put forward in the seminal work of Gray (1988), who

stresses that in societies characterized by secrecy, there will be “a preference for confidentiality and the restriction of disclosure of information about the business only to those who are closely involved with its management and financing as opposed to a more transparent, open and publicly accountable approach” (p. 8). In these countries, firms might decide not to disclose information and remain opaque for cultural reasons. This is likely to exacerbate information asymmetries and discourage external funding relative to less secretive countries. A quick look at the responses to the World Bank's Enterprise Surveys (WBES) across different dimensions of external funding (Question K5) provides some support for this perspective. Fig. 1 shows the reported sources of funding, distinguishing between firms located in high and low cultural secrecy countries (the measurement of secrecy is explained in detail below). Firms located in countries with low levels of secrecy consistently secure more external sources of funding than firms located in countries with high levels of secrecy, which rather employ internal sources of funding.

In this study, we investigate this phenomenon and examine whether and to what extent a national culture of secrecy affects firms' access to credit. We argue that the culture of secrecy serves as an umbrella for deep-rooted observable and unobservable characteristics that define different preferences for disclosure, in particular, the willingness to provide hard, soft, and proprietary information when applying for credit, and lead to differences in access to credit across countries. That

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<https://doi.org/10.1016/j.jbankfin.2024.107277>

Received 13 September 2023; Accepted 5 August 2024

Available online 6 August 2024

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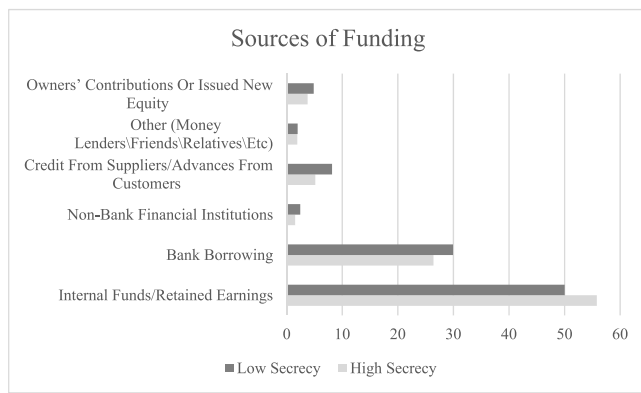


Fig. 1. – Sources of funding

This figure presents a histogram showing the different sources of funding reported by the firms in our sample. This corresponds to question K.5 of the World Bank's survey questionnaire. We distinguish between countries with high and low levels of cultural secrecy based on the sample median for *Secrecy*. The means of all categories except 'Other' are significantly different using a Student's *t*-test.

is, cultural secrecy frames preferences for opacity, makes information asymmetries and related adverse outcomes (e.g., moral hazard and adverse selection) more or less salient, and in turn affects firms' access to credit. Thus, we expect that firms located in countries with high levels of cultural secrecy will have more difficulty securing credit.

In the empirical part of our work, we build on the conceptual framework of Gray (1988) and the empirical study of Hope et al. (2008) and construct an index for the national culture of secrecy. This measure combines Hofstede's (1980) cultural dimensions into a distinct cultural trait that captures the cultural tendency to prefer secretiveness and the retention of information from others. We combine this with data from the WBES for a large sample of firms operating in 35 countries from 2010 to 2019. This sample includes a large proportion of emerging markets. Then, we examine the impact of the culture of secrecy on the following two stages of financing: (i) whether the firm decides (or not) to apply for credit, and (ii) the decision by the bank to allocate credit (or decline or partially grant it). Our results show that a positive and statistically significant association exists between secrecy and the probability that a firm needs credit but decides not to apply. We also find a positive relationship between secrecy and the probability that a firm applied for credit but did not get accepted or did not obtain the full amount it requested.

Additionally, we explore the potential channels explaining the effect of cultural secrecy on firms' access to credit, examining two potential channels: increased information asymmetries and increased corruption. Consistent with our hypotheses on the role of information disclosure on firms' access to credit and its interaction with cultural secrecy, we show that the effect of cultural secrecy on firms' access to credit can be largely attributed to its effect on information asymmetries. Using structural equation modeling (SEM), we show that a very large part of the effect is mediated by the degree of opacity of firms. The fact that the effect of cultural secrecy is channeled through the degree of opacity suggests that cultural secrecy hampers firms' access to credit mainly through its effect on information asymmetries and negative outcomes, such as adverse selection and moral hazard. Second, we follow previous literature showing how limited access to information encourages corrupt behavior and how corrupt behavior can in turn limit firms' access to credit. We confirm a similar relationship between cultural secrecy and firms' access to credit. Greater secrecy encourages both corruption by public officials and corruption by bank officials, which in turn increases discouragement and credit rationing.

We extend our analyses in several ways. First, we document the moderating role of trust. Trust, either interpersonal trust or trust in

banks, acts as a counterweight to cultural secrecy. Firms located in countries with more trust are less affected by cultural secrecy and have easier access to credit. Second, we also show that firms with a high degree of external financial dependence are less affected by cultural secrecy, although the main relationship persists. Finally, we disaggregate between the different motives that explain why firms are discouraged. Consistent with opacity and corruption channels, we find that a national culture of secrecy increases firms' discouragement mainly through non-emotional elements: higher loan processing costs, excessive collateral requirements, and anticipated rationing.

As our study is based on cross-sectional survey data, we devote an important part of our work to endogeneity issues. With respect to the presence of omitted variables, we saturate our model with time-varying dimensions at the firm and country levels, and we perform robustness tests using geographical sub-regional fixed effects. We employ Oster's (2019) test to assess the potential importance of omitted variable bias. On the causality front, we adopt an instrumental variable approach. Drawing on a large literature in anthropological studies, we instrument the national culture of secrecy with the historical proportion of cousin marriage. Cousin marriage and kinship strength have been shown to influence in-group and out-group behavior (e.g., Schulz et al. 2018), while the literature also suggests that family relationships can lead to a culture of secrecy (Jiang and Min, 2023). Historical ownership ensures instrumental exogeneity. A two-stage instrumental variable approach confirms the validity of the instrument as well as our main findings. We also account for potential selection bias by modeling the selection process that leads a firm to acknowledge its need for credit. All exercises confirm our main findings. On the measurement side, we propose three alternative measures of secrecy, in particular using (i) a slightly different definition of secrecy culture using Hofstede's indicators and (ii) two alternative indices of secrecy culture using data from the Global Leadership and Organizational Behaviour Effectiveness (GLOBE) project. Finally, the results are robust to a stricter measure of credit rationing, credit risk, creditworthiness through current access to a credit line, and the quality of survey responses.

Our study contributes to the literature that focuses on the provision of credit and the role of cultural factors. It extends studies on the role of cultural components in financial decisions, such as the provision of trade credit (El Ghoul and Zheng, 2016), the use of syndicated loans (Gianetti and Yafeh, 2012), the cost of debt (Chui et al., 2016), and the choice of debt maturity (Zheng et al., 2012). It complements the work of El Ghoul and Zheng (2016) by focusing on the provision of credit by financial institutions rather than by business counterparties. Finally, it extends earlier studies on national cultural secrecy that have thus far focused on issues related to corporate financial disclosures, auditing, and bank–firm relationships. The results complement each other and show that cultural factors also affect the relationship between the firm and the bank, especially through their impact on information asymmetries.

The remainder of the manuscript is as follows. Section 2 provides a background discussion on access to credit and the role of cultural factors. Section 3 outlines the data and methodology. Section 4 discusses the results, and Section 5 provides the conclusions.

2. Background discussion

2.1. Information disclosure and access to credit

Lenders, such as banks, demand reliable information to assess the creditworthiness of prospective borrowers. By disclosing this information, firms increase their probability of acceptance and the amount of available credit (Moro et al., 2015). Early studies suggest that there are

conditions (e.g., costless disclosures, credible disclosure of private information, and homogenous interpretation of disclosures by investors) under which firms voluntarily disclose their private information (Beyer et al., 2010).¹ In such an environment, firms would have no problem providing all information. However, in practice, firms spend time producing information to satisfy the requests of the banks, and the disclosures are not costless. Additionally, by sharing the firm's knowledge and know-how, there is always a risk that the lender will accidentally disclose the information to competitors, suppliers, or customers and compromise the future success of the firm (Moro et al., 2015).² Moreover, firm managers may withhold information under the fear that the loan managers may misinterpret or overreact to new information provided to them about the firm's performance or strategy with adverse effects on the firm's access to credit (Moro et al., 2015). Therefore, firms' managers and owners typically have more information about the firm; however, they are not always willing to provide all of the information to the bank, leading to information asymmetry between the two parties.

The presence of information asymmetries is likely to affect the functioning of the whole credit market and generate both discouragement and credit rationing. Information asymmetries lead to two negative outcomes: adverse selection and moral hazard. Adverse selection occurs on a market when the lack of information leads to the eviction of good-quality sellers with only poor-quality sellers remaining, which might threaten the very existence of the market (Akerlof, 1970). Pagano and Jappelli (1993) have documented the existence of such a mechanism on the credit market that might lead, in its dire form, to a credit crunch in periods of stress (Darmouni, 2020). A moral hazard occurs when information asymmetries entail the inability of a principal to perfectly observe the behavior of an agent (Stiglitz, 1983), which is usually the case in credit markets, where lenders cannot perfectly observe the behavior of borrowers (e.g., Sufi, 2007). This might lead to opportunistic behavior from borrowers, such as a lack of effort (Stoughton, 1993), strategic default (Guiso, Sapienza, and Zingales, 2013), and over-indebtedness (Maskin, 1999; Fernández de Guevara et al., 2021). Adverse selection and moral hazard alter the good functioning of credit markets and might lead banks to charge higher interest rates, ask for excessive collateral, and ration credit. A national culture of secrecy is likely to exacerbate both of these phenomena. A culture of secrecy that favors the retention of information by the firm and provides room for unreported opportunistic behavior is likely to be associated with lower access to credit due to its nurturing of moral hazard and adverse selection.

The literature on firms' access to credit has documented that the negative outcomes associated with information asymmetries play an important role in firms' access to credit—both in terms of application and rejection. This has been shown in theoretical (Jaffee and Russell, 1976; Stiglitz and Weiss, 1981; Chateau, 1983; Kon and Storey, 2003) and empirical studies. Some of the empirical studies focus on accounting disclosures of hard information, while others focus on soft information. For example, Brown et al. (2009) show that information sharing between banks is associated with improved availability and lower cost of credit to firms in transition countries. Additionally, their results indicate that a firm with an external auditor and international accounting

standards has a credit access indicator that is about 10% higher than the sample mean. Not surprisingly, they also find that opaque firms benefit more from information sharing. In a follow-up study of European firms, Brown et al. (2011) find that financially opaque firms are less likely to apply for credit; however, they conclude that in countries with strong credit information sharing, financially opaque firms are less likely to be discouraged from applying for loans. Similarly, Balsmeier and Vanhaverbeke (2018) show that private firms that voluntarily use IFRS are associated with a higher propensity to attract debt from foreign banks, although they do not finance similar evidence for domestic banks. Chakravarty and Xiang (2013) examine firms operating in 10 developing countries to confirm that firms with financial statements audited by external auditors have a lower likelihood of being discouraged. However, in a study of Eastern European transition economies, Drakos and Giannakopoulos (2011) report that applying international accounting standards or using external auditors has an insignificant impact on credit rationing. Cassar et al. (2015) also report that the use of accrual accounting has no impact on the likelihood of loan denial. Others attempt to capture the role of soft information, information provided by third parties, and other information with the use of proxies, such as whether firms operate in a large city (Gama et al., 2017), the use of third-party credit scores (Cassar et al., 2015), whether the firm holds an ISO certificate (Ullah, 2020), whether the bank offers a consultancy on strategic financial decisions, whether the bank has a long-lasting relationship with the firm (Ferri et al., 2019a), and the loan manager's satisfaction about the information they receive in terms of quantity, quality, completeness, and timeliness (Moro et al., 2015).

2.2. The role played by cultural factors

A common trend in the literature on firms' access to credit is that many cross-country studies conclude in favor of country heterogeneity and cross-country differences (Ferrando and Mulier, 2015; Drakos and Giannakopoulos, 2017; Kallandranis and Drakos, 2021). Although these studies consider country-level characteristics, such as macroeconomics (Drakos and Giannakopoulos, 2017; Gama et al., 2017), regulatory quality (Mac an Bhaird et al., 2016), banking sector characteristics (Mac an Bhaird et al., 2016), the existence of information sharing systems (Brown et al., 2009, 2011), and creditor rights (Brown et al., 2009) as drivers of credit outcomes, they do not account for the potential impact of the culture of secrecy. Therefore, existing studies point out differences across countries in terms of information asymmetries that explain different extents of discouragement and credit rationing, notably through adverse selection and moral hazard mechanisms. However, it seems that prior literature implicitly assumes homogeneity in people's willingness to temper information asymmetries and leaves cultural differences largely unexplored. In contrast, in this study we argue that firms may wish to remain opaque, not for financial but for cultural reasons.

Culture can be defined in various ways, as notably discussed in Alesina and Giuliano (2015). For example, Hofstede et al. (2010) define it as the collective programming of the mind that distinguishes the members of one group or category of people from others. Alternatively, Guiso et al. (2006) refer to culture as “those customary beliefs and values that ethnic, religions, and social groups transmit fairly unchanged from generation to generation” (p. 23). Regardless of the exact definition, there is agreement in the literature that culture has an impact on expectations, preferences, and economic behavior (Guiso et al., 2006; Beugelsdijk and Maseland, 2011), with implications for managerial and entrepreneurial characteristics, decisions, and practices (Newman and Nollen, 1996; Hayton et al., 2002; Hofstede et al., 2010; Kreiser et al., 2010).

Closer to our context, several studies have pointed to the role of culture on financial decisions, such as the provision of trade credit (El Ghoul and Zheng, 2016), syndicated loans (Giannetti and Yafeh, 2012), cost of debt (Chui et al., 2016), and debt maturity (Zheng et al., 2012). Notably, El Ghoul and Zheng (2016) reveal how firms located in

¹ Beyer et al. (2010) refer to early studies by Grossman and Hart (1980), Grossman (1981), Milgrom (1981), and Milgrom and Roberts (1986) as examples.

² Thakor (2015) discusses that there is a larger body of literature, especially early studies, that relaxes various conditions, showing that partial disclosure may occur in equilibrium (e.g., Jung and Kwon, 1988; Fishman and Hagerty, 2003; Hughes and Pae, 2004). This body of literature introduces either the exogenous costs (e.g., incapability of managers to communicate all dimensions of their private information and the existence of communication costs) or endogenous costs (i.e., proprietary) of disclosure.

countries with higher collectivism, power distance, uncertainty avoidance, and masculinity scores provide more trade credit to their buyers. On debt financing, Giannetti and Yafeh (2012) show how cultural distance impacts access to the syndicated loan market. Chui et al. (2016) employ Schwartz's (1994) embeddedness and mastery cultural dimensions and document their impact on the cost of debt. Zheng et al. (2012) employ Hofstede's (1980) four cultural dimensions and provide further evidence on the impact of culture on debt maturity choices. Beyond debt structure, Shao et al. (2010) show the role of Schwartz's cultural dimensions on dividend policies, and Boubakri et al. (2016) illuminate the role between preferences for collectivism and public ownership.

Our approach also leverages cultural differences to explain outcomes in the credit market. However, compared with previous studies, it relies on the concept of secretiveness. Secretiveness can be defined as the inclination of a society towards secrecy and the retention of information from others. This is likely to be an important cultural factor in firms' access to credit due to its impact on information asymmetries. Firms that evolve in countries with high secretiveness are likely to be more adversely impacted by the negative outcomes of information asymmetries (e.g., moral hazard and adverse selection), in turn, reducing their access to credit. Gray (1988) proposes a conceptual framework that relates the inclination of a society towards secrecy with the disclosures of corporations. In general, despite being based on the combination of Hofstede's (1980) cultural dimensions, secrecy is perceived as a distinct cultural trait, with empirical work in the field providing support to the arguments of Gray (1988) in various contexts.

First, a large body of literature documents the impact of the national culture of secrecy on accounting practices. Salter and Niswander (1995) use data from 29 countries to conclude that Gray's model has statistically significant explanatory power, especially in the case of financial reporting practices. Gray and Vint (1995) and Zarzeski (1996) provide further support for this, and Hooi (2007) reaches a similar conclusion while focusing on the banking industry. Additionally, the literature documents a relationship between the culture of secrecy and earnings management (Braun and Rodriguez, 2008), the decision to hire a Big 4 auditor (Hope et al., 2008), and the auditing outcome (Chen et al., 2017).

A second body of literature shows that the effect of the national culture of secrecy extends to various types of disclosure practices beyond financial statements. For example, Williams (1999) finds that cultural dimensions are significant determinants of the quantity of voluntary environmental and social disclosures supplied by listed companies in seven Asia-Pacific countries. Similarly, Lu and Wang (2021) find that various dimensions of culture influence the disclosure of corporate social responsibility information. Using a sample of firms from 33 countries, Luo and Tang (2016) show that the cultural dimensions of masculinity, power distance, and uncertainty avoidance are strongly and consistently related to carbon disclosure propensity. Finally, Gottsche et al. (2020) find an association between a culture of secrecy and discretionary disclosures that relate to segmental reporting. In more detail, using a sample of European firms, they conclude that despite incentives to reveal private information, managers' culturally determined preferences for secrecy lead them to provide a low quantity as well as a lower quality of disclosures within segmental reports.

A third body of literature focuses on the role of the national culture of secrecy in banking and finance. Among them, Makrychoriti and Pasiouras (2021) show that the culture of secrecy plays a role, even in the case of bureaucratic organizations, such as central banks, influencing their monetary policy transparency. Additionally, Pasiouras et al. (2021) find that the culture of secrecy influences the decisions of firms based on the number of bank-firm relationships they have established. Their results point to a positive association, and as they mention, "*firms may strategically establish many bank relationships that will provide sufficient financing, but they will not come with the costs of over-monitoring and requests for enhanced disclosures of soft information*" (p. 224). Therefore,

the issue of corporate information disclosures to the bank also plays a central role in their analysis.

However, to the best of our knowledge, no study has examined the association between a culture of secrecy and access to credit. As discussed earlier, the literature suggests that the disclosure of information has both benefits and costs. Moro et al. (2015) mention for example that the costs include the time to spend producing information to satisfy the banks' requests. Therefore, firms only reveal private information if the benefits exceed the disclosure-related costs. However, Gottsche et al. (2020) demonstrate that this cost-benefit analysis is affected by the culturally driven preferences of the managers.³ Consequently, even if there are anticipated benefits to disclosing information to outsiders, managers' cultural preferences might conflict with such incentives (Gotsche et al., 2020). As the same authors discuss, the preferences of the managers can lead to nonlinearity of the utility function, assigning a higher weight to the costs rather than the benefits. In our context, this means that managers may assign a higher weight to the costs of the disclosures compared to the benefits of obtaining finance; hence, they may decide not to apply for credit. Alternatively, they may withhold information during the application phase, an action that could eventually result in the decline or partial acceptance of their application, as the bank will not have access to all the necessary information. Both of these effects result from the potential adverse selection and moral hazard generated by higher information asymmetries within a culture that promotes secretiveness. This leads to the following two hypotheses:

H1: Firms operating in a country with high cultural secrecy will have a lower probability of applying for loans despite their financing needs.

H2: Firms operating in a country with high cultural secrecy will have a lower probability of having their loan application approved or of obtaining the full amount requested.

3. Empirical setting

3.1. The enterprise survey dataset

In this paper, we use data from the WBES. This survey has been conducted since the 1990s and is composed of firm-level data on the business environment from business owners and top managers. We focus on the surveys occurring from 2010 to 2019 in 35 countries, for a sample size of 30,239 firms.⁴ This dataset includes a large proportion of

³ Although in a difference context, Schneider and De Meyer (1991) also mention the following while discussing the study of Sullivan and Nonaka (1988), which compares Japanese and American managers: "*One could argue that Japanese managers would more likely interpret a strategic issue as a 'threat' and restrict information sharing as they prefer to avoid uncertainty (Hofstede, 1980) and perceive less control over their environments (Maruyama, 1984; Kagono et al., 1985)*" (p. 310).

⁴ We focus on the post-2006 period because data collection efforts were centralized within the Enterprise Analysis Unit, in which a Global Methodology was developed and thereafter applied. The creators of the WBES note that data users should exercise caution when comparing raw data and point estimates between surveys that did and did not adhere to the Enterprise Surveys Global Methodology. Therefore, we decided to focus on a period with more recent data collected with the Global Methodology. Due to some control variables, the sample is further reduced to 2010-2019. The list of countries is displayed in Table 1. Appendix B shows the list of countries and years.

Table 1
Countries, secrecy, and access to credit.

Country	Secrecy	Discouraged	Rationed
Argentina	89	0.322	0.196
Bangladesh	120	0.538	
Chile	126	0.087	
Colombia	134	0.129	0.129
Czech Republic	73	0.088	0.046
Ecuador	137	0.179	0.211
Egypt	125	0.658	0.329
Estonia	40	0.114	0.144
Ghana	130	0.624	
Greece	125	0.44	0.178
Guatemala	188	0.27	0.1
India	69	0.614	
Indonesia	112	0.691	0.279
Jordan	105	0.589	0.353
Kenya	95	0.362	0.2
Lebanon	85	0.224	0.116
Malaysia	110	0.355	0.397
Mexico	133	0.28	
Nigeria	105	0.717	
Pakistan	111	0.706	
Peru	135	0.089	0.125
Philippines	106	0.25	0.152
Poland	101	0.285	0.144
Romania	150	0.518	0.261
Russia	149	0.515	0.354
Serbia	153	0.236	0.07
Slovak Republic	99	0.347	0.2
Slovenia	132	0.081	0.045
Thailand	108	0.854	0.2
Trinidad and Tobago	86	0.543	
Turkey	114	0.346	0.102
Ukraine	162	0.683	0.394
Uruguay	124	0.158	0.19
Venezuela	145	0.133	
Vietnam	80	0.175	0.207

This table presents the list of countries that were included in the study and our measure of secrecy (*Secrecy*), the percentage of firms that were discouraged (*Discouraged*), and firms that were rationed (*Rationed*).

emerging economies. The list of countries is shown in Table 1. While there is a time dimension in the data, these are longitudinal (not panel) data, with different companies interviewed at every wave. This survey has been used in several academic studies (e.g., Barth et al., 2009; Dutta and Mallick, 2023; Reddy et al., 2020).⁵

WBES data provide a precise way to measure if a company needed, applied, and obtained credit. We are interested in these different phases and especially in: (i) companies that needed credit but decided not to apply (discouraged companies) and (ii) companies that applied for credit but were rationed, i.e., their application was either fully or partially rejected. Information on these two elements is obtained from questions K.16, K.17, and K.20 of the Finance section of the survey.

Question K.16, reproduced below, reveals whether the firm applied for credit over the last fiscal year or not. Percentages in parentheses indicate the proportion of answers for each item.

K.16 - Referring again to the last fiscal year [Insert last complete fiscal year], did this establishment apply for any lines of credit or loans?

- Yes (21.72%)
- No (75.21%)

⁵ An issue common to all studies using the WBES data is that variables are based on survey answers and there may be concerns about their reliability. The WBES dataset includes the interviewer's perception of the respondent's answers to the questions, providing one for each of the following characterizations: (i) truthful, (ii) somewhat truthful, or (iii) not truthful. In our original sample, 201 observations (less than 1% of the total) were characterized as not truthful. We conservatively restrict our sample to truthful and somewhat truthful respondents only. This has no material impact on our results.

- Don't know (spontaneous) (3.07%)

3.1.1. Measuring discouragement

In line with the literature, we define discouraged borrowers as creditworthy firms that did not apply for a loan when they needed credit (Kon and Storey, 2003; Cowling and Scip, 2023). Firms that did not apply for credit are firms that answer "No" to K.16. Question K.17 informs on the reasons a firm did not apply for a loan:

K.17 - What was the main reason why this establishment did not apply for any line of credit or loan?

- No need for a loan - establishment had sufficient capital (54.61%)
- Application procedures were complex (9.21%)
- Interest rates were not favorable (15.81%)
- Collateral requirements were too high (6.71%)
- Size of loan and maturity were insufficient (3.64%)
- Did not think it would be approved (3.69%)
- Other (6.09%)
- Don't know (spontaneous) (0.24%)

We construct the dummy variable *Discouraged* as follows. A firm is classified as discouraged (*Discouraged* = 1) if it needed credit but did not apply because: (i) the application procedures were too complex; (ii) interest rates were too high; (iii) collateral requirements were too high; or (iv) rationing was anticipated (*Size of loan and maturity were insufficient*, or *Did not think it would be approved*). Firms that did apply for a loan ("Yes" to K.16) are classified as non-discouraged (*Discouraged* = 0). Companies that answer *No Need for a Loan* or *Don't Know* to K.17 are not considered discouraged and are not part of the main dataset. This classification closely mimics that adopted by Chakravarty and Xiang (2013) and Dutta and Mallick (2023) with WBES data. This is consistent with the definition of a discouraged borrower adopted by Chakravarty and Yilmazer (2009) and Han et al. (2009).⁶ We also include the "Other" category, following the more recent approaches of Rostamkalaei et al. (2020) and Mol-Gómez-Vázquez et al. (2020) and the qualitative evidence of Naegels et al. (2021), who show through interviews that discouragement stems from a variety of reasons not necessarily captured by constrained answers.

Finally, a stricter theoretical definition of discouragement requires firms that do not apply for credit while needing one to be *creditworthy* (Kon and Storey, 2003). Previous empirical literature assumed the creditworthiness of firms that did not apply for a credit out of the fear to be turned down, or out of the conviction to be rationed (e.g., Chakravarty and Yilmazer, 2009; Han et al., 2009; Chakravarty and Xiang, 2013). We follow this approach in our main analysis and perform a robustness analysis in which we discuss this assumption, previous methodologies, and a test that controls for the creditworthiness of discouraged borrowers through current access to credit lines.

3.1.2. Measuring rationing

In line with the literature on rationing (e.g., Jaffee and Russell, 1976; Jaffee and Stiglitz, 1989; Levenson and Willard, 2000; Brown et al., 2011), we define rationed firms as firms that applied for credit but did not obtain it *either partially or fully*. This means that our measure of rationing includes both partially and fully rationed firms.

⁶ Chakravarty and Xiang (2013) also include firms that did not apply due to "corruption in allocation" (p. 67). This information is not consistently available across countries and over the different waves of our larger sample. Chakravarty and Yilmazer (2009, p. 790) define discouraged borrowers as firms that did not apply to credit over the past three years "because [they] thought the application would be turned down". Han et al. (2009) classify a firm as discouraged if it did not apply for credit over the last three years "because of fear of rejection" (p. 416).

From companies that applied for a loan (Yes to K.16), we obtain information on the outcome of the application from the answer to question K.20:

K.20 - Referring only to this most recent application for a line of credit or loan, what was the outcome of that application?

- Application was approved in full (76.15%)
- Application was approved in part (12.45%)
- Application was rejected (5.85%)
- Application was withdrawn (1.08%)
- Application still in process (3.12%)
- Don't know (spontaneous) (1.35%)

We construct the dummy variable *Rationed* as follows. Firms that answer “Application was approved in full” are classified as not rationed (*Rationed* = 0). Firms that answer either “in part” or “rejected” are classified as rationed (*Rationed* = 1). Finally, withdrawn applications, applications still in process, and “Don't know” are not considered in the analysis.⁷

In total, of firms in the original WBES dataset, 21.72% (6872) applied for credit and 75.21% (22,743) did not apply for credit. Among firms that did not apply for credit, 45.10% (13,638) are classified as discouraged, while 54.61% (16,514) did not need credit. Among firms that applied for credit, 76.15% (5148) obtained credit in full, while 18.30% (1237) were rationed.

3.2. Measuring secrecy

Our measure of secrecy (*Secrecy*) follows the earlier empirical literature and is based on the seminal work of Gray (1988). In his conceptual model, he proposed that secrecy is closely associated with the following three dimensions of national culture by Hofstede (1980): uncertainty avoidance, power distance, and individualism. First, Gray (1988) argues in favor of a positive association between a culture of uncertainty avoidance in society and a culture of secrecy. The underlying idea is that in countries characterized by a culture of high uncertainty avoidance, there is a tendency to restrict information disclosures to avoid conflict and competition and preserve security. Second, he asserts that there is a positive association between a culture of high power distance and secrecy because high power distance societies are likely to favor the restriction of information to preserve power inequalities. Third, he suggests that there is a negative relationship between a culture of individualism and secrecy because secrecy is consistent with a preference for collectivism, as opposed to individualism, with its concern for those closely involved with the organization rather than external parties.

Based on this conceptual framework, Hope et al. (2008) propose the estimation of a country-level indicator of a national culture of secrecy, which can be calculated as: National Culture of Secrecy = UAI + PDI – INDIV, where UAI, PDI, and INDIV are the scores from the individual dimensions of uncertainty avoidance, power distance, and individualism, respectively. We follow this approach to calculate the indicator of secrecy used in our study, which is consistent with earlier work by Chen et al. (2017), Mazboudi and Hasan (2018), Kanagaretnam et al. (2019), Gottsche et al. (2020), Makrychoriti and Pasiouras (2021), and Pasiou-

ras et al. (2021). In our sample, UAI takes values from 30 to 100, PDI takes values from 40 to 100, and INDIV takes values from 6 to 60. *Secrecy* takes values from 40 to 188, with a median at 114, a mean at 109.70, and a standard deviation of 32.39.⁸ *Secrecy* essentially ranks culture in terms of secretiveness. The higher the value of *Secrecy*, the more the national culture favors secretiveness.

Table 1 provides an overview of the variables by displaying the value of *Secrecy*, along with the percentage of firms that were discouraged (*Discouraged*), applied for credit, and either obtained it in full or were rationed (*Rationed*), for each country in the study. Fig. 2 plots these country averages and reports the linear relationship between the national culture of secrecy and firms' discouragement in Panel A and credit rationing in Panel B. The positive slope suggests that, in a univariate setting, more cultural secrecy is associated with more discouragement and more credit rationing.

3.3. Model

To test our hypothesis that the national environment of secrecy impacts the probability of being discouraged, we use the following probit model:

$$\Pr(\text{Discouraged} = 1 | \text{Secrecy}, \text{Controls}) = \Phi(\beta \times \text{Secrecy} + \text{Control}^T \gamma)$$

Discouraged is measured at the firm level, while *Secrecy* is measured at the country level.

Controls is composed of a vector of control variables from the previous literature on the determinants of access to credit. It includes firm-level variables that control for managerial characteristics (experience, gender) and firm characteristics (size, age, ownership structure, use of research and development (R&D), legal status, quality certificate). Moreover, we include three variables that relate to obstacles to the current operations of the firm and the auditing of its financial statement. The first, *Access to financing obstacle*, is a dummy variable that equals 1 if the firm considers that access to financing is a major or very severe obstacle to the current operations of the establishment, and 0 otherwise. The second, *Public corruption obstacle*, is a dummy variable that equals 1 if the firm considers that public corruption (for instance, of government officials) is a major or very severe obstacle to the current operations of the establishment, and 0 otherwise.⁹ Thus, these two questions reflect the firm's own perceptions on matters related to financing and corruption of public officials. We also consider the quality of the disclosed financial information with the variable *F.S. Certified*, which is a dummy that takes the value of 1 if the firm has a certified financial statement, and 0 otherwise.

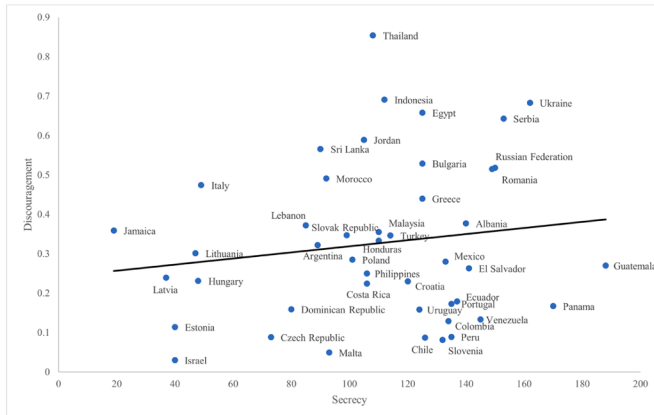
To mitigate the lack of country fixed effects, we also saturate the model with several country-level characteristics from various sources. We obtain information about the strength of auditing and financial reporting standards from the World Economic Forum's global competitiveness report and information about the credit-related legal rights and

⁸ Data for the cultural indicators are from Hofstede Insights, a data source frequently used in past studies. Hofstede Insights includes information not only on the original set of countries by Hofstede (1980) but also estimated scores that were added through research projects of other researchers or internal projects of Hofstede Insights. In theory each one of the individual components (UAI, PDI, INDIV) may take values between 0 and 100. Therefore, in theory, *Secrecy* may take values between -100 (i.e., assuming UAI and PDI are both equal to 0 and INDIV is equal to 100 for a given country) and 200 (i.e., assuming UAI and PDI are both equal to 100 and INDIV is equal to 0 for a given country).

⁹ As clarified in the World Bank's document “Enterprise Survey: Understanding the Questionnaire”, this question about corruption (J30f) corresponds to public corruption only. It refers to the lack of transparency in government decisions, the extent to which government officials ask and are willing to accept informal payments, and the extent to which government contracts are offered to those with political connections.

⁷ A sizeable number of the firms that applied for credit (Yes to K.16) did not answer question K.20, leading to a reduction in sample size.

A – Discouragement



B – Rationing

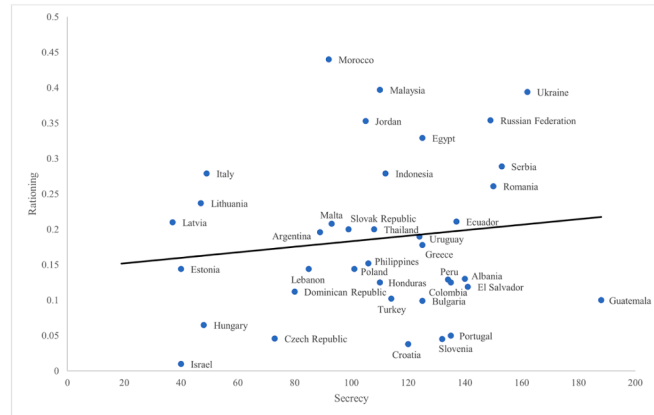


Fig. 2. – Country averages

This figure presents the average of the extent of national cultural secrecy (*Secrecy*), firms' discouragement (*Discouragement*), and firms' credit rationing (*Rationing*) among countries. The solid line reports the linear relationship between *Secrecy* and either *Discouragement* (A) or *Rationing* (B).

availability of credit information from the Doing Business database. We rely on the Worldwide Governance Indicators (WGI) dataset for information on government effectiveness, political stability, voice and accountability, rule of law, regulatory quality, and control of corruption. From the World Bank database, we add GDP/capita growth, inflation and financial development (bank lending as a percentage of GDP). We collect data on economic freedom from the Heritage Foundation. We also obtain an index of financial literacy from Klapper and Lusardi (2020) and a country-level measure of trust in banks from the World Value Survey (WVS). Finally, we control for sector and year effects using dummy variables. For the sectoral dummies we follow the classification in the WBES dataset and use the 2-digit code of the International Standard Industrial Classification of All Economic Activities (ISIC). Φ is the cumulative distribution function (CDF) of the standard normal distribution. The list and definitions of the variables used in the study can be found in the Appendix A. Standard errors are robust to heteroscedasticity and subsection 5.8 in the robustness section proposes different types of standard-errors clustering.

We next investigate the impact of secrecy on the likelihood of being rationed using a model similar to the one presented above:

$$\Pr(\text{Rationed} = 1 | \text{Secrecy}, \text{Controls}) = \Phi(\beta \times \text{Secrecy} + \text{Control}^T \gamma)$$

Rationed is measured at the firm level. We employ the same set of control variables as in the previous model. Again, standard errors are robust to heteroscedasticity and subsection 5.8 in the robustness section proposes different types of clustering.

Table 2 provides the descriptive statistics of the variables employed in the analysis. We provide the mean difference *t*-statistic between firms that applied and firms that were discouraged, as well as between firms that were rationed and firms that fully obtained their credit. In general, these two groups present significant differences, supporting the use of these variables as controls in the models.

4. Secrecy and access to credit

4.1. Discouragement and Rationing

We first focus on the impact of the national culture of secrecy on the probability of a firm being discouraged. The first column of Table 3 reports the results. The coefficient of *Secrecy* is positive and significant, suggesting that firms operating in countries characterized by a higher degree of secrecy are less likely to apply for credit when needing it. This provides support to our working hypothesis that a culture of secrecy amplifies information asymmetries, with implications for access to

credit. Firms may prefer not to apply for credit in the first place, possibly assigning more value to the preservation of their secrecy and the non-disclosure of information to lenders than the approval of their application. The adverse impact of less information disclosure on firms' access to credit is in line with the discouragement model of Kon and Storey (2003). In their approach, a higher cost of information disclosure leads to more discouragement from firms. Our study reveals that this situation can notably be attributed to differences in cultural attitudes towards secrecy.

In terms of economic significance, a marginal increase in the culture of secrecy increases the probability of being discouraged by 0.2%.¹⁰ For illustrative purposes we perform some further calculations of the predicted probability of being discouraged for different levels of cultural secrecy. These estimates show that, holding all other regressors at their sample means, if a firm from a country with a culture of secrecy approximately one standard deviation below the average secrecy in our sample (e.g. Vietnam with a secrecy score of 80) were to operate in a country with the average score (e.g. Malaysia with a secrecy score of 110), the predicted probability of being discouraged would increase from 0.4018 to 0.4527.

Second, we focus on the national culture of secrecy in credit rationing, as reported in the second column of Table 3. It appears that firms that operate in a country characterized by a higher culture of secrecy are more rationed. Accordingly, the information asymmetries associated with a culture of secrecy seem to result in a higher probability of rationing. The most likely explanation for this is that the culture of secrecy results in fewer disclosures of both financial and non-financial information (Gray and Vint, 1995; Gottsche et al., 2020), while it may also raise concerns about audit quality (Hope et al., 2008; Chen et al., 2017) and earnings management (Braun and Rodriguez, 2008). Therefore, lenders operating in countries with a higher culture of secrecy are more cautious, as they may not have all the necessary creditable information needed to form an opinion about the creditworthiness of the prospective borrowers. This results in a higher probability of either rejected applications or approvals that only partially meet the requests concerning the amount of credit.

In terms of economic significance, a marginal increase in the culture of secrecy leads to a marginal increase in the probability of being rationed by 0.5%. Returning to the case of Vietnam and Malaysia and repeating the same exercise, the predicted probability of being rationed

¹⁰ This is based on the estimation of marginal effects using partial derivatives. When computing the partial derivative, all regressors are set at their observed value. Setting them at their mean yields similar results.

would increase from 0.1349 to 0.1909. Importantly, these results hold when we saturate the model and include other sources of information at the country level, such as the strength of auditing and financial reporting, the coverage, scope, and accessibility of credit information available through credit bureaus (i.e., part of the credit-related legal rights and credit information availability indicator), as well as for economic freedom, the level of financial development, the quality of the institutional environment, the average level of financial literacy, the level of trust in banking institutions, the growth of GDP per capita, and inflation.^{11,12}

In general, the results for the control variables are in line with expectations. Female CEOs are more discouraged (e.g., Perrin and Bertrand, 2022), and managerial experience reduces both discouragement and rationing. Larger and older firms have easier access to credit. Perceptions of credit barriers are reflected in both discouragement and rationing, and perceptions of higher public corruption imply higher discouragement. In addition, unaudited financial statements, the absence of a quality certificate, and lower research and development expenditure increase discouragement. At the country level, higher credit-related legal rights and availability of credit information, lower inflation, a better institutional environment, and a culture of long-term orientation are associated with a lower probability of discouragement. In addition, better perceptions of the strength of auditing and reporting at the country level and higher financial development are associated with lower levels of rationing. Finally, higher levels of economic freedom, GDP growth, financial literacy, trust in banks, and a culture of indulgence are associated with lower levels of both discouragement and rationing.

4.2. Potential channels

4.2.1. The opacity channel

Our results show that firms that develop in a culture that values secrecy have less access to credit, either through self-discouragement or credit rationing. We explain this result by the negative effect of additional information asymmetries on firms' access to credit, which has been widely documented in banking and finance literature (e.g., Pagano and Jappelli, 1993; Darmouni, 2020). Our narrative argues that the national culture of secrecy affects firms' opacity and disclosure, which in turn affects their access to credit. We now strengthen this perspective. We use a cross-section of firms and countries in our sample to isolate firms for which information asymmetries are reduced. We then estimate the extent to which opacity mediates the effect of the national culture of secrecy.

We propose two measures of a firm's opacity at the firm level. We identify less opaque firms as: (i) firms that have their books externally

audited (e.g., Drakos and Giannakopoulos, 2011) and (ii) firms that possess an international public accreditation (such as ISOs or HAAS). We use the dummy variables *F.S. Certified* and *Quality Certification*, as defined earlier in our analysis. To test the mediating effect of opacity levels on firms' access to credit, we use structural equation modelling (SEM) and compute the associated mediating effects. Mediation analysis "considers an intermediate variable, called the mediator, that helps explain how or why an independent variable influences an outcome [...]. It is often of great interest to identify and study the mechanisms by which an intervention achieves its effect" (Gunzler et al., 2013, p. 390). It allows the decomposition of the total effect of one variable on another into a direct and indirect effect (Bollen, 1987) and has been widely adopted in social sciences and, more recently, in economics (see, for instance, Blundell, 2017).

In our case, we propose to mediate the effect *Secrecy* exerts on either *Discouragement* or *Rationed* with these two mediators (i.e., *F.S. Certified* and *Quality Certification*). We set different paths in each case and compute the direct, indirect, and total effects (Table 4).

Focusing first on the total effect confirms that higher cultural secrecy significantly increases the likelihood of firms being discouraged or rationed. Decomposing this effect into the indirect and direct effects shows that it is mostly transmitted through the mediator. About two-thirds of the effect of the national culture of secrecy on discouragement is mediated by the level of opacity of the firm. This figure rises to 93% when firm rationing is explained. Therefore, firm opacity mediates the effect of the national culture of secrecy. This is consistent with our hypotheses and suggests that firm opacity serves as the economic channel for the negative effects of cultural secrecy on access to the credit market. This finding highlights the link between cultural secrecy, information asymmetries, and access to credit, both by discouraging firms in need of credit from applying and by rationing those that do apply.

We also consider two country-level indicators of disclosure intensity from Bushman et al. (2004).¹³ The first is CIFAR, a broad index based on the examination and rating of companies' 1995 annual reports on their inclusion or omission of 90 items. These items fall into seven categories: (i) general information, (ii) income statements, (iii) balance sheets, (iv) funds flow statements, (v) accounting standards, (vi) stock data, and (vii) special items. The second is DISCL, another disclosure intensity measure constructed by Bushman et al. (2004), based on the prevalence of disclosures concerning: (i) R&D expenses, (ii) capital expenditures, (iii) product and geographic segment data, (iv) subsidiary information, and (v) accounting methods. We also consider the country-level variable "Auditing and Reporting Strength," which corresponds to the country aggregate of executives' responses to the World Economic Forum's Executive Opinion Survey question: "In your country, how strong are financial auditing and reporting standards?" (1 = extremely weak; 7 =

¹¹ The Economic Freedom from the Heritage Foundation is an aggregate index based on the following indicators: (i) property rights, (ii) government integrity, (iii) judicial effectiveness, (iv) government spending, (v) tax burden, (vi) fiscal health; (vii) business freedom, (viii) labor freedom, (ix) monetary freedom, (x) trade freedom, (xi) investment freedom, and (xii) financial freedom. In general, these indicators are assumed to reflect the conditions across four broad categories: (1) Rule of Law, (2) Government Size, (3) Regulatory Efficiency, and (4) Open Markets. Thus, the overall Economic Freedom index captures many diverse country-specific attributes.

¹² Following earlier studies (e.g., Challe et al., 2019; Adusei and Sarpong-Danquah, 2021; Gaganis et al., 2021), we proxy for the quality of the institutional environment with the average score of the following six variables from the Worldwide Governance Indicators: (i) Voice and accountability, (ii) Political stability and absence of violence/terrorism, (iii) Government effectiveness, (iv) Regulatory quality, (v) Rule of law, and (vi) Control of corruption. All of the individual indicators are distributed with a mean of 0, a standard deviation of 1, and they range from -2.5 to 2.5 with higher values indicating better outcomes (Kaufmann et al., 2004). Hence, higher values for the aggregate index indicate better institutional environment.

¹³ As outlined in Bushman et al. (2004), CIFAR extracted the data directly from the annual reports of approximately 1000 industrial firms across several countries from various industry groups. The data in Bushman et al. (2004) represent CIFAR's aggregation at the country level of disclosure practices observed in the annual reports of domestic firms sampled within a country. Bushman et al. (2004) mention that the computation of the CIFAR index in a given country is designed to be unaffected by the lack of disclosure of items that are not applicable (CIFAR, 1995). Given data unavailability, this indicator remains time constant throughout the period of our analysis. While we acknowledge the potential drawback of this approach, it is consistent with other recent studies that employ a panel dataset and use CIFAR (1995) data (e.g., Chen et al., 2020; Chui et al., 2021).

Table 2
Descriptive statistics.

	Panel A: Discouraged Analysis Sample					Panel B: Rationed Analysis Sample				
	Mean	Std. Dev	Applied	Discouraged	Diff.	Mean	Std. Dev	Fully Obtained	Rationed	Diff.
Main variables										
Discouraged	0.451	0.498								
Rationed						0.183	0.387			
Secrecy	109.700	32.387	108.376	110.789	−2.413***	110.189	32.994	109.462	113.434	−3.972***
Control variables										
Manager Experience	19.154	11.373	20.784	17.172	3.613***	22.353	11.472	22.91	19.864	3.046***
CEO Female	0.14	0.347	0.134	0.149	−0.015***	0.155	0.362	0.15	0.174	−0.023*
Log(Size)	3.495	1.41	3.776	3.153	0.623***	3.865	1.452	3.934	3.556	0.378***
Log(Age)	2.899	0.945	2.981	2.799	0.182***	3.046	0.954	3.053	3.015	0.038
Sole Ownership	0.443	0.497	0.365	0.538	−0.173***	0.32	0.467	0.316	0.338	−0.021
Limited Corp.	0.116	0.321	0.119	0.113	0.006	0.168	0.374	0.165	0.182	−0.017
Access to financing obstacle	0.273	0.446	0.237	0.318	−0.080***	0.215	0.411	0.174	0.399	−0.225***
Public corruption obstacle	0.081	0.273	0.073	0.091	−0.018***	0.058	0.234	0.059	0.057	0.002
F.S. Certified	0.538	0.499	0.601	0.461	0.141***	0.587	0.492	0.599	0.534	0.065***
Quality Certification	0.282	0.45	0.334	0.22	0.114***	0.332	0.471	0.349	0.259	0.089***
R&D	0.236	0.425	0.297	0.162	0.135***	0.244	0.43	0.247	0.233	0.014
Auditing and Reporting Strength	4.716	0.513	4.777	4.642	0.136***	4.794	0.567	4.817	4.689	0.128***
Getting Credit score	72.789	13.936	72.027	73.717	−1.690***	70.305	15.014	69.976	71.778	−1.803***
Inflation	6.255	7.476	6.002	6.562	−0.560***	5.031	5.771	4.993	5.199	−0.206
Growth GDP/capita	3.39	2.519	3.364	3.422	−0.058*	2.192	2.306	2.187	2.215	−0.028
Financial Development	46.085	25.77	47.277	44.635	2.642***	52.392	28.058	52.19	53.295	−1.105
Economic Freedom	6.654	0.716	6.807	6.467	0.340***	6.932	0.751	6.973	6.75	0.223***
Institutional Environment	−0.153	0.507	−0.042	−0.288	0.246***	0.07	0.499	0.091	−0.021	0.112***
Financial Literacy	0.316	0.088	0.328	0.302	0.025***	0.345	0.11	0.35	0.327	0.023***
Financial Dependence	60.649	35.842	53.186	69.727	−16.542***	51.602	34.042	50.521	56.429	−5.909***
Trust in Banks	1.788	0.082	1.8	1.773	0.027***	1.807	0.096	1.808	1.799	0.009**
Bank officials' corruption	1.878	0.367	1.832	1.931	−0.099***	1.891	0.405	1.88	1.937	−0.057***
Alternative measures										
Fully rationed						0.109	0.311	0.368	1.000	−0.632***
Secrecy 2	60.854	39.389	60.122	61.456	−1.334**	61.013	39.162	59.854	66.187	−6.332***
GLOBE Secrecy (practices)	13.463	0.583	13.328	13.609	−0.282***	13.16	0.621	13.109	13.388	−0.279***
GLOBE Secrecy (values)	12.435	0.636	12.38	12.493	−0.113***	12.504	0.633	12.465	12.674	−0.209***
Long-Term Orientation	42.995	23.597	41.811	44.395	−2.583***	39.573	23.007	39.49	39.943	−0.454
Indulgence	37.741	24.1	41.641	33.187	8.454***	40.756	22.261	41.707	36.659	5.048***
Instrumental Variables										
Cousin Index	1.761	0.327	1.819	1.692	0.127***	1.817	0.358	1.827	1.775	0.052***
Observations	30,239					6,760				

This table presents descriptive statistics of the variables employed in the analysis. The *Diff.* columns provide the *t*-statistic of mean differences across groups. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% levels, respectively.

extremely strong).¹⁴ These country-level variables confirm the significance of the total, direct, and indirect effects. In the case of DISCL, the proportion of the indirect to the total effect is around 45% in the case of both discouragement and rationing. In the case of CIFAR, the corresponding figures are 44.72% and 18%, respectively. For Auditing and Reporting Strength, they are 75.01% and 47.08% of the total effect that is mediated, respectively.

4.2.2. Corruption Channel

Different levels of cultural secrecy are also likely to determine the level of corruption in the lending process, which, in turn, may explain differences in firms' access to credit. In a seminal study, Beck et al. (2006) find that institutions and rules that promote information disclosure by banks lead to a reduction in bank official corruption being perceived as an obstacle to firms obtaining external finance. Along the same lines, Barth et al. (2009) find that information sharing via credit bureaus/registries reduces bank official corruption. Furthermore, Houston et al. (2011) conclude that ownership and media concentration

influence bank official corruption. Finally, Akins et al. (2017) find that timely information about loan loss recognition constrains bank official corruption. These findings suggest that greater transparency and access to information can lead to a reduction in bank official corruption, which in turn affects access to credit. In our case, we can expect the national culture of secrecy to affect the level of corruption by reducing transparency and limiting knowledge of those who accept bribes.

A number of studies have documented a similar mechanism while looking at public corruption. Amin and Motta (2023) show that countries with more credit bureaus have less bureaucratic corruption related to government services, which facilitates firms' access to credit.¹⁵ Cooray and Schneider (2018) also find that public corruption reduces financial development and leads to higher interest rates.¹⁶ However, there is some evidence that more corruption may facilitate lending, especially when institutions are weaker in a second-best equilibrium. Such a "grease the wheel" effect (as opposed to a "sand the wheel" effect) has been found in the credit market, notably by Weill (2011), Chen et al. (2013), Fungáčová et al. (2015), Jiang et al. (2018), and Statnik

¹⁴ These indicators may reflect different aspects of the financial reporting environment. CIFAR and DISCL are based on the inclusion or emission of certain information in the annual reports of large companies, whereas the "Auditing and Reporting Strength" indicator is more subjective, reflecting the perceptions of the executives that responded to the WEF survey. Another difference is that CIFAR and DISCL reflect the situation in 1995 and are time-invariant over the period of our analysis. In contrast, the Auditing and Reporting Strength indicator changes over time.

¹⁵ Binhadab et al. (2021) provide further evidence on the role of information dissemination. They conclude that countries with greater press freedom have significantly fewer incidences of bribery involving public officials.

¹⁶ Cooray and Schneider (2018) use two indicators of corruption. The first is from Transparency International revealing how corrupt a country's public sector is perceived to be by experts and business executives. The second is by the International Country Risk Guide and is a measure of corruption within the political system (Cooray and Schneider, 2018, p. 116).

Table 3
Main results.

	<i>Discouraged</i>	<i>Rationed</i>
Secrecy	0.003*** (0.001)	0.002** (0.023)
Manager Experience	−0.007*** (0.000)	−0.011*** (0.000)
CEO Female	0.117*** (0.000)	0.044 (0.394)
Log(Size)	−0.123*** (0.000)	−0.087*** (0.000)
Log(Age)	−0.016* (0.082)	−0.052** (0.012)
Sole Ownership	0.057*** (0.001)	−0.040 (0.387)
Limited Corp.	0.046* (0.073)	0.036 (0.504)
Access to financing obstacle	0.201*** (0.000)	0.640*** (0.000)
Public corruption obstacle	0.028** (0.042)	−0.036 (0.656)
F.S. Certified	−0.311*** (0.000)	−0.065 (0.133)
Quality Certification	−0.085*** (0.000)	−0.059 (0.211)
R&D	−0.209*** (0.000)	0.073 (0.122)
Auditing and Reporting Strength	−0.019 (0.588)	−0.097*** (0.009)
Getting Credit score	−0.002** (0.016)	−0.000 (0.961)
Inflation	0.017*** (0.000)	−0.007 (0.252)
Financial Development	0.001 (0.112)	−0.003** (0.023)
Economic Freedom	−0.042* (0.090)	−0.117** (0.036)
Institutional Environment	−0.494*** (0.000)	0.011 (0.905)
Growth GDP/capita	−0.037*** (0.000)	−0.068*** (0.000)
Financial Literacy	−0.132** (0.046)	−0.523*** (0.003)
Financial Dependence	0.005*** (0.000)	0.002*** (0.000)
Trust in Banks	−1.494*** (0.000)	−1.407*** (0.002)
Long-Term Orientation	−0.006*** (0.000)	−0.008 (0.106)
Indulgence	−0.010*** (0.000)	−0.023*** (0.000)
Sector dummies	Yes	Yes
Year dummies	Yes	Yes
Constant	2.449*** (0.000)	2.188** (0.012)
Observations	30,239	6,760
Pseudo R ²	0.182	0.094

This table presents the results of probit regressions with p-values in parenthesis. The dependent variables are *Discouraged* and *Rationed*. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply. *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount requested. The key independent variable is *Secrecy* which is a country-level measure of the degree of a country to maintain a high level of secrecy in social interactions. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% level, respectively.

and Vu (2020), in countries with weak institutions.

We investigate the extent to which either public or bank official corruption plays a mediating role in the effect of national cultures of secrecy on lending. We again use a SEM framework with corruption as the main mediator. We use two measures of corruption. First, we consider the corruption of public officials (e.g., Bermpei et al., 2021; Amin and Motta, 2023). Following Liu et al. (2021) and Brancati et al. (2024), we use the firm-level answers to question J30f from the WBES,

indicating whether corruption is no obstacle (=0), a minor obstacle (=1), a moderate obstacle (=2), a major obstacle (=3), or a very severe obstacle (=4), to the current operations of the establishment. Second, following Beck et al. (2006) and the follow-up studies on bank official corruption (e.g., Zheng et al., 2013; El Ghouli et al., 2016; Akins et al., 2017; Gaganis et al., 2023), we employ the responses to the WBES survey question 29f “Is corruption of bank officials an obstacle to the operation and growth of your business?”. This has been used as a key measure of corruption in bank lending (e.g., Houston et al., 2011), with responses ranging from 1 (no obstacle) to 4 (major obstacle). Unfortunately, this question was only included in an earlier version of the WBES conducted between 1998 and 2000, making it impossible to match the firm-level responses to this question with the responses from 2010–2019 waves, which is the period we use in our analysis. To overcome this problem, we aggregate the 1998–2000 firm-level responses on bank official corruption to the country level and use them over our time period, assuming that such practices do not change much over time (Jiang and Wang, 2024).

The results are presented in the second panel of Table 4. In general, a national culture of secrecy favors both public and bank official corruption, confirming the importance of transparency and access to information to ensure accountability and reduce corrupt behavior. In turn, the SEM model shows that more corruption also affects access to credit by increasing borrower discouragement, leading to more credit rationing. The direct, indirect, and total effects are all significant. The indirect effect of corruption on lending accounts for a substantial part of the total effect - up to 57% in the case of discouragement, a finding that holds regardless of whether we consider corruption by public officials or corruption by bank officials. Taken together, these results suggest that increased corruption is one of the channels through which a national culture of secrecy limits firms' access to credit.

4.3. Additional Analyses

4.3.1. The Moderating Role of Trust

Our study highlights the importance of cultural secrecy in firms' access to credit. Cultural secrecy can be viewed as a broad informal institutional setting that captures deep-rooted observable and unobservable characteristics that define different preferences for information disclosure. It is likely to interact with other institutional settings that also affect firms' access to credit. A closely related informal institution to secrecy is trust, which is an essential mechanism that underpins economic transactions and contributes to positive economic outcomes (e.g., Guiso et al., 2006; Algan and Cahuc, 2010; Massa et al., 2022). The available evidence suggests that trust determines the development of credit markets (Becchetti and Conzo, 2011), access to credit (Moro and Fink, 2013; Tang et al., 2017), loan provision (Chen et al., 2016), loan terms (Kim et al., 2014), and liquidity creation by banks (Bertrand et al., 2021).

One might expect trust and secrecy to work in opposite directions. While trust facilitates access to credit by fostering solid reciprocal relationships, thus far we have shown that secrecy hinders firms' access to credit and tends to create more opacity and more room for corruption. To some extent, one might expect trust to act as a counterweight to secrecy. Countries with high levels of trust may be less affected by a preference for secrecy. For example, Pasiouras et al. (2021) hypothesize that the willingness of a firm to disclose sensitive information to its lenders and subsequently maintain single or multiple banking relationships depends on both the culture of secrecy and trust. Their results show that the national culture of secrecy increases the number of banking relationships, while trust has the opposite effect. Of course, these two dimensions are likely to be highly negatively correlated; thus, there are limited cases in which a country has both high levels of trust and high levels of secrecy.

We examine the role of both interpersonal trust and trust in banks. Following Fungáčová et al. (2019), we measure trust in banks based on

Table 4

Channels: disclosures and corruption.

Path	Direct effect (1)	Indirect effect (2)	Total effect (3)	% Indirect effect to Total effect (4)
<i>Panel A: Opacity Channel</i>				
Secrecy → F.S. Certified → Discouraged	0.007*** (0.000)	0.012*** (0.000)	0.018*** (0.000)	66.67%
Secrecy → Quality Certification → Discouraged	0.027*** (0.000)	0.062*** (0.000)	0.089*** (0.000)	69.66%
Secrecy → CIFAR → Discouraged	0.089*** (0.000)	0.072*** (0.000)	0.161*** (0.000)	44.72%
Secrecy → DISCL → Discouraged	0.116*** (0.000)	0.135*** (0.000)	0.301*** (0.000)	44.85%
Secrecy → Auditing & Reporting Strength → Discouraged	0.001 (0.834)	0.003 (0.682)	0.004 (0.865)	75.01%
Secrecy → F.S. Certified → Rationed	0.002*** (0.000)	0.028*** (0.000)	0.030*** (0.000)	93.33%
Secrecy → Quality Certification → Rationed	0.003*** (0.000)	0.031*** (0.000)	0.033*** (0.000)	93.93%
Secrecy → CIFAR → Rationed	0.009*** (0.000)	0.002*** (0.000)	0.011*** (0.000)	18%
Secrecy → DISCL → Rationed	0.006*** (0.000)	0.005*** (0.000)	0.011*** (0.000)	45.01%
Secrecy → Auditing & Reporting Strength → Rationed	0.008*** (0.000)	0.009*** (0.000)	0.017 (0.000)	47.08%
<i>Panel B: Corruption Channel</i>				
Secrecy → Public corruption obstacle → Discouraged	0.034*** (0.000)	0.041*** (0.000)	0.075*** (0.000)	57.75%
Secrecy → Corruption of bank officials → Discouraged	0.032*** (0.000)	0.043*** (0.000)	0.075*** (0.000)	57.33%
Secrecy → Public corruption obstacle → Rationed	0.011*** (0.000)	0.005*** (0.000)	0.016*** (0.000)	31.25%
Secrecy → Corruption of bank officials → Rationed	0.015*** (0.000)	0.004*** (0.000)	0.019*** (0.000)	21.02%

This table presents the results of a structural equation model (SEM). The outcome variables are *Discouraged* and *Rationed*. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply. *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount requested. The key independent variable is *Secrecy* which is a country-level measure of the degree of a country to maintain a high level of secrecy in social interactions. Panel A focuses on the mediating role of firm's opacity. It employs two firm-level measures of opacity: whether the firm is externally audited or not (dummy variable *F.S. Certified*) and whether it possesses an international certification or not (*Quality Certification*). These two mediators are dummy variables equal to one when there is less opacity. Panel A also employs three country-level variables of opacity. Two are obtained from Bushman et al. (2004): *CIFAR* and *DISCL*. *Auditing & Reporting Strength* is obtained from the World Economic forum. Higher values imply higher country-level transparency. Panel B focuses on a corruption channel. It employs the firm-level question on how corruption of public official is an obstacle to business (*Public corruption obstacle*) and the country average importance of bank lending official as an obstacle to business (*Corruption of bank officials*). Both are obtained from the WBES. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% level, respectively.

the answers to the following WVS question: "Could you tell me how much confidence you have in banks: Is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?". To construct the country aggregate index, we assign the values of 3, 2, 1, and 0 to the potential answers and weight them with the corresponding proportion of responses in each country.¹⁷ Furthermore, we measure interpersonal trust based on the answer to the following WVS question: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" We use the proportion of respondents from each country that replied "most people can be trusted" as a measure of country-level interpersonal trust (e.g., Zak and Knack, 2001; Johnson and Mislin, 2012).

As expected, there is a large negative correlation between country levels of trust in banks and a cultural preference for secrecy (−36%), which is also the case when trust is measured as interpersonal trust (−28%). We reproduce our main model, this time including the role of trust in the estimation and its interaction with the national culture of secrecy. We use a low trust dummy variable, which equals one for

countries with trust levels below the cross-country median. We do this for both trust in banks and interpersonal trust. The results are shown in columns 1 to 4 of Table 5. In general, low levels of trust reduce firms' access to credit by increasing borrowers' discouragement. In the case of interpersonal trust, it also increases rationing. Importantly, there is a strong interaction of trust with cultural secrecy. Firms in countries with high levels of cultural secrecy and low levels of trust experience higher levels of discouragement and are more often rationed when seeking credit, suggesting that higher trust offsets the negative effect of cultural secrecy. In the case of trust in banks, when trust is above the cross-country median (i.e., Low Bank Trust = 0), there is no significant effect of cultural secrecy.

These findings suggest that the negative effect of cultural secrecy can be offset by developing institutions that foster trust. However, the two dimensions remain closely (inversely) related, and it may be challenging from a policy perspective to promote trusting institutions in a culture that favors secrecy.

4.3.2. External Financial Dependence

Firms face different degrees of dependence on credit depending on the availability of internal financing, which is notably determined by their idiosyncratic choices, the sector in which they operate, and their country of domicile (Manova, 2013). In our context, we expect the degree of financial dependence to moderate the relationship between a national culture of secrecy and firms' access to credit. Specifically, firms

¹⁷ For example, in the case of Argentina, the responses for the trust in banks in the 2010–2014 wave of the WVS are as follows: A great deal = 4.7%, Quite a lot = 29%, Not very much = 41.7%, None at all = 24.6%. Thus, the score for trust in banks for Argentina equals 1.138, calculated as: $(0.047 \times 3) + (0.29 \times 2) + (0.417 \times 1) + (0.246 \times 0)$.

Table 5
Moderating effects of Trust and Financial Dependence.

	<i>Discouraged</i> (1)	<i>Rationed</i> (2)	<i>Discouraged</i> (3)	<i>Rationed</i> (4)	<i>Discouraged</i> (5)	<i>Rationed</i> (6)	<i>Discouraged</i> (7)	<i>Rationed</i> (8)
Secrecy	0.001 (0.453)	0.004 (0.308)	0.002*** (0.005)	0.004** (0.049)	0.003*** (0.000)	0.006*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Low Trust in Banks	0.614*** (0.000)	0.624 (0.132)						
Low Trust in Banks × Secrecy	0.004*** (0.000)	0.006*** (0.000)						
Low Interpersonal Trust			0.473*** (0.000)	0.291* (0.092)				
Low Interpersonal Trust × Secrecy			0.004*** (0.000)	0.004*** (0.000)				
Financial Dependence (50%)					−0.161** (0.032)	0.249* (0.068)		
Financial Dependence × Secrecy					−0.002*** (0.000)	−0.004** (0.016)		
High Financial Dependence (25%)							−0.098*** (0.000)	0.101*** (0.000)
High Financial Dependence × Secrecy							−0.001*** (0.000)	−0.001*** (0.000)
Control variables	All	All	All	All	All	All	All	All
Constant	1.024*** (0.005)	5.641*** (0.005)	1.273*** (0.005)	6.734*** (0.000)	1.237*** (0.000)	7.128*** (0.000)	1.844*** (0.000)	5.731*** (0.000)
Observations	30,239	6,760	30,239	6,760	30,239	6,760	30,239	6,760
Pseudo R ²	0.181	0.093	0.181	0.092	0.180	0.092	0.181	0.094

This table presents the results of probit regressions with p-values in parentheses. The dependent variables are *Discouraged* and *Rationed*. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply; *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount requested. The key independent variable is *Secrecy*, which is a country-level measure of the extent to which a country maintains a high degree of secrecy in social interactions. It is interacted with measures of trust and measures of financial dependence. *Low Trust in Banks* and *Low Interpersonal Trust* are dummy variables based on country-average obtained from the World Value Surveys (WVS). *Financial Dependence* is obtained from the WBES. We define a firm as financially dependent if less than 50% (or 25% for *High Financial Dependence*) of its working capital is financed by internal funds. The control variables are as in the main model, including fixed effects (Table 3). *, ** and *** denote estimates significantly different from zero at the 10%, 5% and 1% levels, respectively.

that are highly dependent on external financing would be more likely to apply for credit, ignoring the role of cultural secrecy. Therefore, at this stage, we examine whether the results differ based on the level of external funding dependence.

To measure external financial dependence, [Rajan and Zingales \(1998\)](#) suggest using the share of production costs not financed by internal cash flow. This measure is also used by [Ferri et al. \(2019b\)](#). We construct a closely related measure based on responses to question K3 of the WBES: “Over [the last] fiscal year, please estimate the proportion of this establishment’s working capital, that is the funds available for day-to-day operations, that were financed from each of the following sources?”. We define a firm as financially dependent if less than half of its working capital is financed by internal funds. This corresponds to the *Financial Dependence* dummy variable. We also construct the *High Financial Dependence* variable, for which the threshold is having less than 25% of working capital financed by internal funds. Both variables interact with our measure of the national culture of secrecy. The results are shown in columns 5 to 8 of Table 5.

First, controlling for external financial dependence and its interaction with cultural secrecy does not affect the main relationship between a national culture of secrecy and firms’ access to credit. Firms with no financial dependence (i.e., financial dependence dummy = 0) located in countries with a more secretive culture still face more difficulties in accessing credit, whereas financially dependent firms are less discouraged in countries that do not have a culture of secrecy (culture of secrecy = 0).¹⁸

At the same time, financial dependence plays an important

moderating role. The interaction term is statistically significant, showing that the impact of secrecy on discouragement and rationing differs according to the level of financial dependence. The negative coefficient of the interaction term shows that the positive effect of secrecy on discouragement and rationing is smaller in the case of financially dependent firms. Since these firms cannot rely on internal funds to finance their working capital, they have no choice but to seek external financing and disclose the necessary information, even if this conflicts with their preference to withhold information due to a culture of secrecy. This reduces the impact of a culture of secrecy. In short, it seems that the constraints associated with financial dependence marginally moderate the effects of cultural secrecy, even if the main effect persists.

4.3.3. Sources of Discouragement

Our conceptualization of discouragement encompasses two distinct categories of factors (e.g., [Chakravarty and Xiang, 2013](#)): (i) objective constraints, such as complicated application procedures, unfavorable interest rates, excessive collateral requirements, or insufficient loan amounts and terms; and (ii) fear of loan application rejection. Following [Naegels et al. \(2021\)](#) and [Perrin et al. \(2023\)](#), the former can be characterized as rational, while the latter is identified as emotional. We refine our results and examine whether a national culture of secrecy affects rational and emotional discouragement differently.

We run our main model using the different explanations for discouragement as separate dependent variables. The results are reported in Table 6. In essence, a national culture of secrecy affects rational discouragement, explaining discouragement due to complex procedures, collateral requirements, and loan size and maturity. Conversely, it does not explain discouragement due to fear of rejection, nor does it explain discouragement due to the interest rate.

The fact that a culture of secrecy essentially affects rational motives for discouragement suggests that it alters the expected credit terms and costs faced by firms, leading them to preemptively refrain from applying

¹⁸ With the inclusion of the interaction term, the coefficient of *Secrecy* shows the effect of secrecy on discouragement or rationing, while holding the *Financial Dependence* dummy fixed at 0 (i.e., no financial dependence). Similarly, the *Financial Dependence* dummy shows the effect of financial dependence on discouragement or rationing, while holding *Secrecy* fixed at 0.

Table 6
Sources of discouragement.

	Discouraged due to:				
	Procedures	Interest rates	Collateral	Size of loan and maturity	Fear of rejection
	(1)	(2)	(3)	(4)	(5)
Secrecy	0.005*** (0.000)	0.002 (0.281)	0.004*** (0.000)	0.006** (0.041)	0.001 (0.291)
Control variables	All	All	All	All	All
Constant	2.362*** (0.000)	0.414** (0.032)	−1.172* (0.059)	−4.233*** (0.000)	−2.151*** (0.000)
Observations	30,239	30,239	30,239	30,239	30,239
Pseudo R ²	0.103	0.122	0.090	0.122	0.121

This table presents the results of probit regressions with p-values in parentheses. The dependent variables are dummy variables for the different reasons reported for a firm being discouraged (question K.17 of the WBES). The key independent variable is *Secrecy*, which is a country-level measure of the extent to which a country maintains a high degree of secrecy in social interactions. The control variables are the same as those in the main model, including fixed effects (Table 3). *, **, and *** denote estimates significantly different from zero at the 10%, 5%, and 1% levels, respectively.

for credit. In particular, this can be seen as a consequence of increased opacity and accumulated corruption—the two channels discussed earlier. The absence of an effect on the emotional motive is consistent with the fact that secrecy is an umbrella for deep-rooted cultural characteristics that are not necessarily perceptible to economic agents themselves.

5. Robustness tests

5.1. Alternative indicators of secrecy

In this section, we test the robustness of our results with three country-level alternative indicators of *Secrecy*. First, we build again on the conceptual framework of Gray (1988), who suggests that masculinity may also have a link with secrecy. The underlying idea is that feminist societies that emphasize the quality of life, people, and the environment will tend to be more open, especially with regards to socially related information. Therefore, as in Hope et al. (2008) and Pasiouras et al. (2021), we perform a robustness test with the use of an alternative measure of secrecy calculated as $Secrecy2 = UAI + PDI - INDIV - MASC$, where MASC refers to the score of masculinity (estimations in columns (1) and (2) of Table 7). The results are consistent with those presented in Table 3: firms evolving a culture with a higher degree of secrecy are more discouraged and more rationed.

Second, following Hope et al. (2008), we use the GLOBE dataset (House et al., 2004) to construct two alternative measures of cultural secrecy.¹⁹ As in Hope et al. (2008), the GLOBE Secrecy Index is based on the sum of the following national culture indicators from GLOBE: uncertainty avoidance, institutional collectivism (inversely related to Hofstede's individualism score), and power distance. We also compute two versions of the index, following Hope et al. (2008). GLOBE Secrecy

¹⁹ The GLOBE project's dataset is an alternative to the dataset from Hofstede Insights. GLOBE researchers identified 9 national cultural indicators. Data were collected from the answers to questionnaires from 17,370 middle managers from 951 organizations from 62 societies over the period 1995–1997 (Gupta et al., 2004; House and Hanges, 2004).

(Practices) is based on what GLOBE defines as cultural 'practices' (i.e., 'as is' in society), while GLOBE Secrecy (Values) is based on cultural 'values' (i.e., 'as they should be' in society).²⁰ We run our main model, this time using these two GLOBE-based indicators of cultural secrecy (reported in columns (3) and (4) of Table 7). The results are consistent with our main results. An increase in cultural secrecy is associated with reduced access to credit. Firms in these countries are more discouraged from applying for credit, and when they do apply, they face higher credit rationing.

5.2. Endogeneity: Omitted variables

It could be argued that the results presented thus far are clouded by endogeneity. Omitted variables, simultaneity, measurement error, and selection are the four main sources of endogeneity (Wooldridge, 2010; Hill et al., 2021). In the analysis presented thus far, we have attempted to mitigate omitted variable concerns by including various country-level control variables in the regressions. In the analysis that follows in Sections 5.2.1 and 5.2.2, we provide two additional tests with the use of sub-regional geographic fixed effects and a two-stage approach, as in El Ghoul et al. (2019). Both tests should reduce concerns about omitted variable bias.

5.2.1. Sub-regional geographical fixed effects

Unobservable characteristics can drive both the preferences for a national culture of secrecy and firm discouragement and rationing. Since our main measure of cultural secrecy is time invariant at the country level, it is not possible to include country fixed effects, leaving room for potential omitted variable bias. We reinforce our main models with (i) geographical sub-regional fixed effects based on the sub-regional classification of the United Nations. For the 35 countries in our sample, this represents 21 geographical sub-regions. Adding these geographical fixed effects partly controls for shared unobserved characteristics in terms of economic, institutional, and other characteristics that neighboring countries may share.²¹ These sub-regional fixed effects are also multiplied by time, which step saturates the models, likely absorbing several unobserved characteristics in the credit market (columns 1 to 8 of Table 8). They confirm the impact of the national culture of secrecy, both for borrowers' discouragement and rationing.

To assess the extent to which this setting resolves an omitted variable bias, we adopt Oster's (2019) approach. Her test is based on the notion that adding new control variables effectively tackles potential omitted variable bias to the extent that this new set of control variables (i) leads to a substantial increase in the model's R² and (ii) preserves the sign and significance of the variable of interest. As suggested in her work, "one approach to robustness is to assume a value for R_{max} and calculate the value of δ for which $\beta = 0$ " (p. 195). A cut-off of $\delta = 1$ is proposed, beyond which unobservables need to be more important than observables to produce a treatment of 0. As a maximum R², we "adopt the assumption that the unobservables explain as much of the variation in the outcome as the observables do (...): $R_{\max} = R_{\text{control}} + (R_{\text{control}} - R_{\text{uncontrol}})$ " Oster (2013, p. 19). In our case, this is a more conservative approach than the sometimes $1.3R_{\text{control}}$ used, as it is closer to $2R_{\text{control}}$. The assumed R_{max} and computed delta values are reported below each model in Table 8. With the full set of regressors and fixed effects (models 4 and 8), delta converges to 1, suggesting that the covariates tackle

²⁰ The GLOBE research project examines culture as both practices and values. As discussed in Triandis (2004) practices are acts or "the way things are done in this culture," and values reflect judgments about "the way things should be done". Consequently, for each culture dimension, the GLOBE provides both "as is" scores and "should be" scores.

²¹ Considering that neighbouring countries may share societal values and cultural characteristics the inclusion of the geographical sub-regional dummies is a rather strong test.

Table 7

Alternative indicators of secrecy.

	Discouraged (1)	Rationed (2)	Discouraged (3)	Rationed (4)	Discouraged (5)	Rationed (6)
Secrecy 2	0.003*** (0.000)	0.004*** (0.000)				
GLOBE Secrecy (practices)			0.415*** (0.000)	0.227*** (0.001)		
GLOBE Secrecy (values)					0.485*** (0.000)	0.160*** (0.001)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects						
Constant	1.821*** (0.000)	3.827*** (0.000)	−5.787*** (0.006)	7.042 (0.324)	−5.354*** (0.000)	4.711 (0.219)
Observations	30,239	6,760	14,242	4,269	14,242	4,269
Pseudo R ²	0.181	0.093	0.203	0.146	0.205	0.146

This table presents the results of probit regressions with p-values in parentheses. The dependent variables are *Discouraged* and *Rationed*. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply. *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount requested. The three robustness variables are: *Secrecy2*, which is an alternative country-level measure of the degree of a country to maintain a high level of secrecy in social interactions; *Globe based measure of secrecy*, with two alternative definitions, namely *GLOBE Secrecy (practices)* and *GLOBE Secrecy (values)*. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Table 8

Endogeneity: Addressing omitted variable bias.

	Discouraged				Rationed			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Secrecy	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.004*** (0.000)	0.003*** (0.000)	0.003** (0.035)	0.003*** (0.004)
24 Geographical Sub-Regions FE	No	No	Yes	No	No	No	Yes	No
24 Geographical Sub-Regions × Years FE	No	No	No	Yes	No	No	No	Yes
Control variables	None	All	All	All	None	All	All	All
Observations	30,239	30,239	30,239	30,239	6,760	6,760	6,760	6,760
R ²	0.002	0.219	0.231	0.261	0.003	0.094	0.114	0.115
Assumed R ² _{max}		0.421	0.471	0.501		0.187	0.228	0.231
Delta		0.7010	0.7914	0.9992		0.7254	0.8426	0.9983

This table presents the results of OLS regressions with p-values in parentheses. The dependent variables are *Discouraged* and *Rationed*. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply. *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount requested. The key independent variable is *Secrecy*, which is a country-level measure of the degree of a country to maintain a high level of secrecy in social interactions. Models 1 and 5 use no control variables; models 2 and 6 correspond to the main model in Table 3; models 3 and 7 add fixed effects for 24 geographical subregions; models 4 and 8 interact these geographical fixed effects with year fixed effects. Oster's (2019) delta is reported. This delta "can be interpreted as the degree of selection on unobservables relative to observables that would be necessary to explain away the result" (p. 195). A delta at one suggests results robust to omitted variable bias. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% levels, respectively.

potential omitted variable bias.

5.2.2. Country-level two-step approach

As mentioned earlier, our *Secrecy* variable is a country-level time-invariant variable; therefore, we cannot include country fixed effects in our regression. As a further robustness test, in this section, we adopt the methodology employed by El Ghoul et al. (2019). Their approach consists of a two-stage regression. The first stage extracts the country's fixed effects associated with discouragement and rationing. In the second stage, these country fixed effects are used as the dependent variable and regressed on the *Secrecy* variable. Accordingly, we first regress our discouraged and rationed variables on a set of dummy variables for all countries in our sample, as well as the full set of control variables. This captures the effect of each country on the probability of being discouraged or rationed, controlling for the control variables.

$$\text{Discouraged} = a + \varphi * \text{Countries FE} + \theta * \text{Controls} + \varepsilon$$

$$\text{Rationed} = a + \varphi * \text{Countries FE} + \theta * \text{Controls} + \varepsilon$$

Second, we keep all the regression coefficients $\hat{\varphi}$ associated with the different countries and regress them on the set of country variables, including *Secrecy*. The aim is to capture the proportion of the country's

effect (country coefficient) that is due to its secrecy culture and, thus, indirectly the effect of secrecy on discouragement and rationing.

$$\hat{\varphi} = \alpha + \beta * \text{Secrecy} + \gamma * \text{Controls} + \varepsilon$$

Table 9 presents the second step of the regression and shows the effect of secrecy on the country coefficients obtained from the first step. These results are consistent with our main findings: *Secrecy* positively and significantly explains the fixed effects associated with borrowers' discouragement and borrowers' rationing.

5.3. Endogeneity: Reverse causality

One can argue that the results presented thus far are clouded by endogeneity due to simultaneity. As discussed in other studies on national culture and firm-level outcomes (e.g., Mourouzzidou-Damtsa et al., 2019; Pasiouras et al., 2021), simultaneously causality is unlikely to be an issue given that it is difficult to argue that individual firm's outcomes will cause changes in national culture. Mourouzzidou-Damtsa et al. (2019), for example, highlight that national culture evolves slowly over very long periods, and perceptions about culturally related aspects depend on personal attributes that are deeply rooted in societal characteristics. Still, one could be concerned that cultural secrecy is not

Table 9

Endogeneity: Two-step country-level approach.

	Country coefficient <i>Discouraged</i> (1)	Country coefficient <i>Rationed</i> (2)
Secrecy	0.005*** (0.008)	0.004*** (0.000)
Control variables	All	All
Constant	−1.632** (0.021)	0.813*** (0.001)
Observations	171	139
R ²	0.563	0.614
Adjusted R ²	0.515	0.608

This table presents the second step results of the two-step approach adapted from El Ghouli et al. (2019). The first step (not reported) regresses the *Discouraged* and *Rationed* variables separately on a set of dummy variables for all countries in the sample, as well as the control variables of Model 3. The second step (below) regresses the fixed effect coefficients associated with the different countries on the set of country variables, including *Secrecy*. *Secrecy* is a country-level measure of the degree to which a country maintains a high level of secrecy in social interactions. The aim is to capture the proportion of the country effect (country coefficient) that is due to its secrecy culture and thus indirectly the effect of secrecy on discouragement and rationing. The second step is an OLS regression. *, ** and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% levels, respectively.

perfectly exogenous to firms' access to credit and that repeated failures or successes in accessing credit affect the extent to which firms retain information, which in turn might lead to a culture of secretiveness.

In this section, we adopt a more formal approach to address endogeneity concerns with the use of an instrumental variable approach. We instrument cultural secrecy by the historical proportion of cousin marriages. A growing body of research in anthropological studies has underlined the role of kinship in shaping group behavior (e.g., Schulz et al., 2018) with cousin marriage playing a central role in this dynamic (e.g., Shaw and Raz, 2015; Schulz et al., 2019). Societies with strong kinship, notably resulting from more cousin marriage, display stronger in-group favoritism and stronger out-group defiance (kin-oriented). These characteristics are likely to be positively covariate with secretiveness, as societies that are more kin-oriented are likely to be more secretive because individuals prefer to restrain information from outsiders. For example, Jiang and Min (2023) mention that there is a dark side in family relationships that can lead to a culture of secrecy. Similarly, Miller and Le Breton-Miller (2021) highlight the unusual capacity and incentive for privacy and secrecy as distinguishing characteristics of family firms. In short, cousin marriage is likely to be a relevant instrument for cultural secretiveness. To ensure that it is also an exogenous instrument, we employ the *pre-industrial* proportion of cousin marriage. We obtain the data from and construct the variable as in Giuliano and Nunn (2018).

We run a two-stage IV regression and report the results in Table 10. Standard econometric tests of the instruments confirm our conceptual discussion. Based on the *J-test*, we find no evidence that the instruments are not exogenous, while the *F-test*, which tests the joint significance of the two instruments, shows that the instruments are relevant. The first stage shows a positive and significant relationship between the historical share of cousin marriages and a culture's level of secrecy, in line with our theoretical expectations. The second stage shows that the instrumented *Secrecy* has a positive and statistically significant effect on the likelihood of both being discouraged and being rationed. Standard errors are robust to heteroscedasticity.

5.4. Endogeneity: Selection bias

Finally, our sample might be subject to selection bias. Our study focuses on firms that stated that they needed credit and rules out firms that replied that they did not need credit. However, firms might answer

Table 10

Endogeneity: IV regression.

	First step	
	<i>Secrecy</i>	
	(1)	(2)
Cousin Index	2.631*** (0.000)	4.789*** (0.000)
	Second step	
	<i>Discouraged</i>	
Secrecy Instrumented	0.005*** (0.000)	<i>Rationed</i> 0.006*** (0.000)
Control variables	All	All
Constant	2.101*** (0.000)	12.256*** (0.000)
Observations	30,239	6,760
Exogeneity (<i>J-stat</i>)	0.112 (0.916)	0.571 (0.712)
Relevance (<i>F-stat</i>)	104.21 (0.000)	191.12 (0.000)

This table presents the results of a two-step instrumental variable regression with p-values in parentheses. In the first step, we instrument *Secrecy* based on the historical proportion of cousin marriage (*Cousin Index*). The two variables are expected to covariate in the same direction, with more cousin weddings associated with more kin-oriented communities and more secrecy. The second step employs *Secrecy instrumented* and reports the exogenous effect of *Secrecy* on borrowers' discouragement and credit rationing. We report the exogeneity test (*J-test*) and the relevance test (*F-test*). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

that they do not need a credit while actually needing one and believing they could not obtain it. From this perspective, stating the need for credit might reflect the likelihood of being discouraged. This would pose a selection problem.

To address concerns about selection bias, we perform a two-stage Heckman regression. We first model the likelihood of needing credit and calculate the associated lambda from this first-stage regression. We create the dummy variable *Need*, equal to 1 if the firm needs credit, and 0 otherwise; that is, if the firm answered "No need of a credit" to question K.17. We employ a probit model and regress the likelihood of needing credit on firms' characteristics.²² From this first-stage regression, we compute the associated Heckman lambda (inverse Mill's ratio) and then add it to the second-stage regression, which corresponds to our main model.

Table 11 presents the results. In the case of discouragement, the lambda is positive and significant, suggesting the existence of selection bias. Still, the positive and significant impact of the national culture of secrecy on the likelihood of being discouraged remains the same. Regarding a firm's rationing, the lambda is insignificant and the main results do not change. In short, considering the selection bias associated with a negative claim about the need for credit does not impact our results.

5.5. Respondents with an existing line of credit

Kon and Storey (2003) model discouragement as firms that do not apply despite being creditworthy and in need of credit. Empirically, creditworthiness has always been assumed in the discouragement literature due to the difficulty of assessing it without a credit application (Chakravarty and Yilmazer, 2009; Han et al., 2009; Chakravarty and Xiang, 2013; Mac an Bhaird et al., 2016). In our study, to ensure creditworthiness, we adopt Petersen and Rajan's (1994) reasoning and focus on firms that possess an existing line of credit with some financial

²² Alternatively, we also employ a bivariate probit model (e.g., Freely et al., 2012) that yields similar results. In a general manner, all our results are robust to the use of either logit or probit models.

Table 11
Endogeneity: Selection bias.

	<i>Need</i> (1)	<i>Discouraged</i> (2)	<i>Rationed</i> (3)
Secrecy		0.003*** (0.002)	0.004*** (0.000)
$\lambda 1$		1.617*** (0.000)	
$\lambda 2$			1.312** (0.012)
Control variables	All	All	All
Country dummies	Yes		
Sector dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Constant	0.274* (0.082)	3.436*** (0.000)	4.184*** (0.000)
Observations	91,425	30,239	6,760
Pseudo R ²	0.109	0.182	0.120

This table presents the results of probit regressions and a Heckman selection model with p-values in parentheses. The dependent variables are *Need*, *Discouraged*, and *Rationed*. *Need* is a dummy variable taking the value of one if the firm needs credit. This first-stage regression provides Heckman's lambda (inverse Mill's ratio), which is then employed in the second stage regression to control for a selection bias. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply. *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount that was requested. The key independent variable is *Secrecy*, which is a country-level measure of the degree of a country to maintain a high level of secrecy in social interactions. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% levels, respectively.

institutions. The underlying idea is that banks have open lines of credit for these firms and allow short-term lending. From the bank's point of view, these firms are deemed creditworthy. In Table 12, we restrict the sample to respondents with an existing line of credit and rerun the main analysis. The results are similar, ruling out the role of a loose definition of discouragement in explaining our results.

5.6. Accounting for credit risk

The business environment and, in particular, credit risk in the market may play central roles in lenders' decisions as well as borrowers' perceptions of the outcome of their credit application. The WBES does not provide a firm-level measure of risk. Furthermore, given that the information provided in the WBES database is anonymous, it is not possible to match the firms with external information and calculate or attach firm-specific risk measures from other sources to them. Therefore, we resort to aggregate industry-specific information to capture the overall credit risk conditions for each sector in each country at a given point in time.

Our first measure of risk is the aggregate sector-specific probability of default (PoD) from the Credit Research Initiative (CRI) of the National University of Singapore.²³ Our second measure is the actuarial spread from the same source.²⁴ In both cases, we resort to the one-year ahead (i. e., 12 months) estimations.²⁵ Based on information about the activity and industry of each firm in the WBES, we assign the most closely related

²³ The PoD estimations of the CRI are based on the forward intensity model developed by Duan et al. (2012). The CRI computes PD on an individual firm-level basis; however, it also aggregates the CRI PD of all firms with a specific region and/or sector to deliver an overview of the credit environment at a certain point in time (Credit Research Initiative, 2019).

²⁴ This measure reflects the credit risk of corporations by summarizing the information embedded in the term structure of the physical probability of default and the discount rate (Credit Research Initiative, 2018), and it is equivalent to pricing CDS purely based on their actuarial values (Duan, 2014).

²⁵ Using different forecasting horizons does not influence our main results.

Table 12
Restricting the sample to respondent with existing line of credit.

	<i>Discouraged</i> (1)	<i>Rationed</i> (2)
Secrecy	0.003*** (0.003)	0.004*** (0.000)
Control variables	All	All
Sector dummies	Yes	Yes
Year dummies	Yes	Yes
Constant	2.124** (0.021)	4.812 (0.626)
Observations	14,919	5,694
Pseudo R ²	0.137	0.103

This table presents the results of probit regressions with p-values in parentheses. The dependent variables are *Discouraged* and *Rationed*. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply. *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount requested. The key independent variable is *Secrecy*, which is a country-level measure of the degree of a country to maintain a high level of secrecy in social interactions. We restrict our sample to respondents with an existing line of credit. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% levels, respectively.

sectoral-level aggregate estimates from the CRI for the corresponding point in time.

We then re-estimate the specifications of Table 3 with the inclusion of these two measures of credit risk, presenting the results in Table 13. The PoD and the actuarial spread in columns (1) and (3), respectively, are based on the average of the 12 monthly estimations in each year. In columns (2) and (4), we use the December CRI estimations from the year preceding the WBES survey.²⁶ In all cases, considering credit risk does not affect our main results.

5.7. Definition of rationing

In our study, the average level of rationing is 18.3%. There is a wide range of reported levels of rationing in the literature. Some figures from previous studies are similar to ours. For example, using the Capitalia survey of Italian manufacturing firms, Mancusi and Vezzulli (2014) report a level of rationing of 16.75%. Similarly, Ferrando et al. (2017) report a combination of partial and total rationing rates as high as 22% in the euro area between 2009 and 2014. However, other studies report lower levels of credit rationing. For example, Murro and Peruzzi (2022) report an average level of credit rationing of 3.8% in Italy. As in Minetti and Zhu (2011), they use two specific questions from the Survey of Italian Manufacturing Firms: "In the last year, would the firm have liked to obtain more credit at the market rate? In the last year, did the firm request more credit than it actually received?". In France, Kremp and Sevestre (2013) parametrically estimated partial or total credit rationing at 6%. Overall, it seems worth providing some context to our figures for their future use in the literature.

First, unlike other studies, our sample does not have a European focus and is mainly composed of emerging economies. Emerging economies in our sample have a much higher level of credit rationing than developed economies. In our sample, European countries have an average rationing rate of around 9% (including countries such as Turkey, Portugal, Hungary, and Ukraine with higher rates). In contrast, countries in the East Asia-Pacific region (including the Philippines, Malaysia, and Indonesia) have a rationing rate of almost 28%. This

²⁶ For example, in columns (1) and (3) we match the WBES data for 2018 with the average of the twelve one-year ahead CRI PoD and actuarial spread estimations from each month from January 2018 to December 2018. In columns (2) and (4), we match the WBES data for 2018 with the CRI one-year ahead estimations from December 2017.

Table 13
Accounting for sectoral credit risk.

	<i>Discouraged</i> (1)	<i>Discouraged</i> (2)	<i>Rationed</i> (3)	<i>Rationed</i> (4)
Secrecy	0.002*** (0.000)	0.003*** (0.000)	0.005*** (0.000)	0.005*** (0.000)
Control variables	All	All	All	All
Actuarial Spread 1Y (avg)	0.004 (0.237)		0.023 (0.684)	
Prob. of Default 1Y (avg)	−21.423 (0.232)		−103.532 (0.235)	
Actuarial Spread 1Y (dec)		−0.123 (0.303)		−0.253 (0.232)
Prob. of Default 1Y (dec)		51.122 (0.134)		281.716 (0.154)
Sector dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Constant	2.303*** (0.000)	2.376*** (0.000)	3.169*** (0.000)	3.312*** (0.000)
Observations	24,214	24,214	5,381	5,381
Pseudo R ²	0.178	0.180	0.112	0.115

This table presents the results of probit regressions with p-values in parentheses. The dependent variables are *Discouraged* and *Rationed*. *Discouraged* is a dummy variable taking the value of one if the firm needed credit but decided not to apply. *Rationed* is a dummy variable taking the value of one if the firm applied for credit but did not get accepted or did not obtain the full amount requested. The key independent variable is *Secrecy*, which is a country-level measure of the degree of a country to maintain a high level of secrecy in social interactions, we control for sectoral credit risk. *, **, and *** denote an estimate significantly different from zero at the 10%, 5%, and 1% levels, respectively.

explains why our average rationing rate tends to be higher than some of the aforementioned studies that focus on European countries or developed economies. Second, in our main framework, we defined rationing as firms either not receiving the full amount or being rejected altogether. Several studies employ measures that combine different aspects of credit constraints, including both partial and full rationing (e.g., Ferrando et al., 2017). However, compared to employing a stricter definition, it pushes the average value of rationing even further.

As a robustness exercise, we adopt a more conservative definition of rationing, retaining only those firms that were completely rejected. In this case, the proportion of rationed firms falls to 10.9%. Using the same model and this stricter definition of rationing yields similar results (coefficient of *Secrecy* = 0.009, significant at the 1% level).²⁷

5.8. Clustering of errors

As a final robustness test, given that the main variable of interest is at the country-level, we re-estimate the baseline specifications of Table 3 while: (i) clustering the standard errors at the country-level with a standard clustering approach, (ii) using the wild cluster bootstrap (Cameron et al., 2008) that is particularly suitable for cases with either a small number of clusters or an uneven number of observations across clusters. In both cases, the results remain the same.²⁸

6. Conclusions

Our results show that the culture of secrecy is positively and statistically significantly associated with both the probability of being discouraged and the probability of being rationed. We show that cultural secrecy hampers firms' access to credit through its effect on information asymmetries. These results are robust to different tests and to the inclusion of different firm- and country-specific variables. In particular, the results hold when saturating the model, controlling for sectoral

credit risk, using alternative secrecy indicators, restricting the sample to respondents with an existing credit line, and using estimation techniques to address endogeneity. More importantly, our results hold when we control for the standard indicators of corporate accounting disclosure used in the literature, either at the firm level or at the country level. Thus, our indicator of cultural secrecy has explanatory power that goes beyond such standard indicators, capturing a variety of deep-rooted observable and unobservable characteristics that define different preferences for disclosure and are related not only to hard (i.e., accounting) but also to soft and proprietary information.

Further analysis using SEM shows that the impact of the culture of secrecy is transmitted through corruption (both public official and bank official corruption) and corporate transparency and disclosure. Finally, our results suggest that the impact of cultural secrecy on credit discouragement and credit rationing is moderated by country-specific trust in banks and interpersonal trust, as well as firm-specific financial dependence on external sources.

An implication of these findings is that the culture of secrecy is an important omitted variable in previous studies examining cross-country differences in business discouragement and rationing. In addition, our results highlight the need to consider cultural differences when designing high-level policies to promote business finance as well as when designing and implementing policies that affect the financial decisions and strategies of lending institutions.

CRedit authorship contribution statement

Jérémie Bertrand: Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Paul-Olivier Klein:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Fotios Pasiouras:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization.

Data availability

The authors do not have permission to share data.

²⁷ For brevity of space, we do not report these regressions. They are available from the authors upon request.

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Acknowledgments

We would like to thank Thorsten Beck (Handling Editor), an

Associate Editor, and two anonymous reviewers for numerous suggestions that improved earlier versions of the manuscript. Any remaining errors are our own.

Appendix A. – Definition of variables

Variable	Definition
Main Variables	
Discouraged	Dummy variable equal to 1 if the firm is discouraged (i.e., decides not to apply), 0 if it has applied for credit.
Rationed	Dummy variable equal to 1 if the firm is rationed (fully or partly) in its last loan request, 0 if it is fully provided.
Secrecy	Indicator of a national culture of secrecy. It is the sum of uncertainty avoidance (UA) and power distance (PD) scores minus the individualism (IND) score of the Hofstede's national culture indicators discussed below
Uncertainty Avoidance	Indicator of national culture that reveals the “degree to which the members of a society feel uncomfortable with uncertainty and ambiguity”
Power distance	Indicator of national culture that reveals the “degree to which the less powerful members of a society accept and expect that power is distributed unequally”
Individualism	Indicator of national culture that reveals the “preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families”
Control Variables	
Manager Experience	Manager experience (in years).
CEO Female	Dummy variable equal to 1 if the manager of the firm is a woman, 0 otherwise.
Log(Size)	Natural logarithm of firm's total assets.
Log(Age)	Natural logarithm of firm's age.
Sole Ownership	Dummy variable equal to 1 if the firm has only one owner, 0 if it has more.
Limited Corp.	Dummy variable equal to 1 if the firm is a limited corporation, 0 otherwise.
Access to Financing Obstacle	Dummy variable equal to 1 if the firm considers that access to financing is a “Major Obstacle” or a “Very Severe Obstacle” to the current operations of the establishment, 0 otherwise.
Public Corruption Obstacle	Dummy variable equal to 1 if the firm considers that “Corruption” of public officials is a “Major Obstacle” or a “Very Severe Obstacle” to the current operations of the establishment, 0 otherwise.
F.S. Certified	Dummy variable equal to 1 if the firm's annual financial statements are checked or certified by an external auditor, 0 otherwise.
Quality Certification	Dummy variable equal to 1 if the firm owns a quality certification, 0 otherwise.
R&D	Dummy variable equal to 1 if the firm has spending on formal R&D activities, 0 otherwise.
Auditing and Reporting Strength	Country aggregate of response to the World Economic Forum's Executive Opinion Survey question “In your country, how strong are financial auditing and reporting standards?” [1 = extremely weak; 7 = extremely strong].
Getting Credit Score	This measure reflects the following two dimensions: (i) legal rights with respect to secured transactions, (ii) the reporting of credit information. The first dimension measures whether certain features that facilitate lending exist within the applicable collateral and bankruptcy laws. The second dimension measures the coverage, scope, and accessibility of credit information available through credit reporting service providers, such as credit bureaus or credit registries.
Inflation	Rate of inflation.
Growth GDP/capita	Growth of GDP per capita.
Financial Development	Domestic banking credit to the private sector, as a share of GDP.
Economic Freedom	Country's overall economic freedom score, ranging from 0 to 100, with a higher score indicating that a country is more economically free. The index is based on 12 indicators grouped into the following four broad categories: (i) Rule of Law (property rights, government integrity, judicial effectiveness), (ii) Government Size (government spending, tax burden, fiscal health); (iii) Regulatory Efficiency (business freedom, labor freedom, monetary freedom), (iv) Open Markets (trade freedom, investment freedom, financial freedom).
Institutional Environment	Average of the following six variables from the Worldwide Governance Indicators: (i) Voice and accountability, (ii) Political stability and absence of violence/terrorism, (iii) Government effectiveness, (iv) Regulatory quality, (v) Rule of law, (vi) Control of corruption. Higher values indicate better institutional environment.
Financial Literacy	Financial literacy variable from Klapper and Lusardi (2020)
Trust in Banks	Weighted average by country of responses to the question: “Could you tell me how much confidence you have in banks: Is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?”
Interpersonal Trust	Based on the WVS question: “Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?” The measure of country-level interpersonal trust is the proportion of respondents from each country that replied “most people can be trusted”.
Corruption of bank officials	Country average of responses to the question 29f of the 1998–2000 WBES wave: “Please judge on a four-point scale how problematic are these different financing issues for the operation and growth of your business: Corruption of bank officials.”
Financial Dependence	Dummy variable equal to 1 if the firms has less than half of its working capital financed by internal funds, and equal to 0 otherwise.
High Financial Dependence	Dummy variable equal to 1 if the firms has less than 25% of its working capital financed by internal funds, and equal to 0 otherwise.
Alternative Measures	
Secrecy 2	Alternative indicator of a national culture of secrecy. It is the sum of uncertainty avoidance (UA) and power distance (PD) scores minus the individualism (IND) score, less the masculinity (MASC) score of the Hofstede's national culture indicators.
GLOBE Secrecy (practices)	Alternative indicator of culture of secrecy, calculated as the summation of the following national culture indicators from the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project: uncertainty avoidance, institutional collectivism, power distance. Higher values indicate a higher culture of secrecy. The indicator is based on the so-called GLOBE “as is” scores of national culture, indicating practices (i.e., “the way things are done in this culture”).
GLOBE Secrecy (values)	Alternative indicator of culture of secrecy, calculated as the summation of the following national culture indicators from the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project: uncertainty avoidance, institutional collectivism, power distance. Higher values indicate a higher culture of secrecy. The indicator is based on the so-called GLOBE “should be” scores of national culture, indicating values (i.e., “the way things should be done”).
Long-Term Orientation	Indicator of national culture of long-term orientation from Hofstede.
Indulgence	Indicator of national culture of indulgence from Hofstede.
Instrumental Variables	
Cousin Marriage	Proportion of pre-industrial ancestors of a country that favor cousin marriage. The variable is obtained from and calculated as in Giuliano and Nunn (2018, p. 13) .

This table presents the definition of the variables used in the analysis

Appendix B. – List of countries and years

Country	Year	Observations	Secrecy	Discouraged	Rationed
Argentina	2010	605	89	0.301	
	2017	607	89	0.344	0.196
Bangladesh	2013	896	120	0.538	
Chile	2010	554	126	0.087	
Colombia	2010	591	134	0.109	
	2017	781	134	0.143	0.129
Czech Republic	2013	136	73	0.079	
	2019	235	73	0.091	0.046
Ecuador	2010	138	137	0.064	
	2017	295	137	0.217	0.211
Egypt	2013	796	125	0.643	0.405
	2016	524	125	0.578	0.349
	2020	881	125	0.716	0.228
Estonia	2013	149	40	0.157	
	2019	182	40	0.082	0.144
Ghana	2013	486	130	0.624	
Greece	2018	303	125	0.44	0.178
Guatemala	2010	198	188	0.319	
	2017	192	188	0.22	0.1
India	2014	4970	69	0.614	
Indonesia	2015	865	112	0.691	0.279
Jordan	2013	284	105	0.558	0.11
	2019	194	105	0.642	0.844
Kenya	2013	396	95	0.348	
	2018	527	95	0.373	0.2
Lebanon	2013	301	85	0.224	0.116
	2019	175	85	0.523	0.192
Malaysia	2015	578	110	0.355	0.397
Mexico	2010	696	133	0.28	
Nigeria	2014	1150	105	0.717	
Pakistan	2013	322	111	0.706	
Peru	2010	647	135	0.102	
	2017	704	135	0.078	0.125
Philippines	2015	308	106	0.25	0.152
Poland	2013	190	101	0.208	
	2019	235	101	0.343	0.144
Romania	2013	269	150	0.309	
	2019	471	150	0.669	0.261
Russia	2012	1794	149	0.455	
	2019	650	149	0.692	0.354
Serbia	2013	271	153	0.318	
	2019	209	153	0.121	0.07
Slovak Republic	2013	139	99	0.227	
	2019	190	99	0.408	0.2
Slovenia	2013	180	132	0.117	
	2019	238	132	0.056	0.045
Thailand	2016	463	108	0.854	0.2
Trinidad and Tobago	2010	422	86	0.543	
Turkey	2013	460	114	0.108	
	2019	859	114	0.466	0.102
Ukraine	2013	541	162	0.669	
	2019	777	162	0.692	0.394
Uruguay	2010	224	124	0.177	
	2017	212	124	0.138	0.19
Venezuela	2010	205	145	0.133	
Vietnam	2015	574	80	0.175	0.207

This table presents the countries and years in the sample, with the number of observations and the values of *Secrecy*, *Discouraged*, and *Rationed*.

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