Does national culture impact trade credit provision of SMEs?

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Abstract

Trade credit provision considerably varies from country to country, especially among small- and medium-sized enterprises (SMEs). However, there is scant literature on the determinants of such variations. Thus, this study determines how cultural differences contribute to this dissimilarity by using a sample of 12,257 manufacturing companies from 37 countries spanning the period of 1998 to 2018. In this case, culture is measured by both collectivism and uncertainty avoidance. Based on the results, there is a positive effect of collectivism and uncertainty avoidance on the provision of trade credit, through a reduction of asymmetric information between companies and their customers. We also found that in countries with high collectivism and uncertainty avoidance, the increase in trade credit provision is more pronounced for firms with unstable demand/low reputations or firms that are financially unconstrained. Our findings make an important contribution to the understanding of credit flows among SMEs outside formal financial systems.

Keywords: National culture, trade credit provision, small- and medium-sized enterprises (SMEs), collectivism, uncertainty avoidance.

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1. Introduction

In general, small- and medium-sized enterprises (SMEs) are inclined to offer more trade credit to their clients, which allows the latter to defer payments (García-Teruel and Martínez-Solano, 2010b). SMEs also consider trade credit provision a crucial policy for the purpose of attracting customers and ensuring product quality, since their market share and reputation are typically lower than large firms (García-Teruel and Martínez-Solano, 2010b). García-Teruel and Martínez-Solano (2010a) also showed that, although accounts receivable makes up more than a quarter of SMEs' total assets, this figure considerably differs between countries. Specifically, they found that the ratio of accounts receivable to assets varied from 39.3% for Spain, 36.6% for Greece, 35.6% for France, 35.4% for Belgium, 28.6% for the United Kingdom, and 25.7% for Sweden to 19.18% for Finland between 1996 and 2002. This cross-country difference raises an interesting question: What factors account for the significant variation in SMEs' trade credit provision (TCP) across countries?

Previous studies that examined the various determinants of SMEs' TCP mostly focused on a single country (e.g., Petersen and Rajan, 1997; García-Teruel and Martínez-Solano, 2010b; Huyghebaert, 2006; Wilson and Summers, 2002; Niskanen and Niskanen, 2006; Xiu et al., 2023). Among the few cross-country studies, García-Teruel and Martínez-Solano (2010a) documented that cross-country differences in SMEs' TCP are influenced by firm-specific attributes such as sales growth, ability to access external capital, capacity to generate internal funds, product quality, and profitability. In related research, Demirgüç-Kunt and Maksimovic (2001) identified country-level institutional contributors, including the development of a country's legal infrastructure and banking system. Specifically, in countries with well-developed banking and legal systems, small firms have a greater incentive to extend trade credit to their customers.

In the present study, we propose that the informal institutional context, i.e., culture, is an important explanatory factor for the variation in SMEs' TCP across countries. According to Schwartz (1994) and Hofstede (2001), culture guides principles in people's lives by providing a set of beliefs, norms, shared values, and expected behaviors. As a result, it is considered to be the most fundamental influence on people's decision-making (Williamson, 2000; Guiso et al., 2006). In line with this view, previous studies have demonstrated that cultural differences across countries play a substantial role in explaining various corporate decisions in SMEs. Specifically, they found a substantial influence of national culture on risk-taking and proactiveness (Kreiser et al., 2010), profit reinvestment (El Ghoul et al.,

2016a), and firm profitability (Gaganis et al., 2019). However, the relationship between these cultural traits and SMEs' TCP has not been explored.

Therefore, we fill this gap by investigating to what extent cross-country differences in SMEs' TCP can be attributed to national culture. In this case, we use the cultural dimensions created by Hofstede (2001) to determine whether the variation in SMEs' TCP across countries is influenced by the degree of collectivism and uncertainty avoidance of a country. In addition to examining the cross-country differences, we consider the cultural differences among regions within a single country. In particular, we employ state-level culture within the United States (U.S.) created by Vandello and Cohen (1999) to investigate whether the individualism-collectivism dimension affects TCP. Moreover, we consider the possibility that culture has an indirect effect on SMEs' TCP. In other words, instead of having an explicit effect, culture may impact SMEs' TCP through its influence on managers' attitudes and motives. Given that SMEs grant trade credit to customers based on financial, operational, and commercial motives (Martínez-Sola et al., 2014), we examine how cultural differences across countries and those across U.S. states affect these motives and hence, TCP.

Using a sample of 12,257 manufacturing SMEs across 37 countries spanning the period of 1998 to 2018, we found that SMEs in nations with high degrees of collectivism and uncertainty avoidance have a tendency to grant more trade credit to customers. At the state level (in this case, within the U.S.), collectivism has a positive correlation with TCP. These results imply that the cultural differences among regions matter in SMEs' decisions regarding their TCP. We also found that the level of collectivism and uncertainty avoidance has an impact on the financial, operational, and commercial motives of SMEs' TCP. Particularly, cultures with high collectivism and uncertainty avoidance generally encourage firms to provide more trade credit to their customers when they are financially unconstrained, face unstable demand, and have low reputations. These findings are still valid in the case of state-level cultural differences within the U.S. Moreover, we implemented additional tests for the purpose of ensuring the robustness of our results, i.e., using alternative measures of TCP and national culture, using alternative estimation methods, and testing for endogeneity regarding culture.

Our study contributes to the existing literature. We provide new insights into the determinants of cross-country SMEs' TCP variation by emphasizing the role of national culture. The closest papers related to ours are Moro et al. (2021), Xiu et al. (2023), and El Ghoul and Zheng (2016). Moro et al. (2021) documented how culture affects SMEs' use of trade credit among European countries. Xiu et al. (2023) examined how merchant guild

culture affects private firms' access to trade credit in China. Our study differs from theirs in two ways. First, we focus on SMEs' trade credit provision to their clients, not their receipt of trade credit from their suppliers. Previous studies showed that firms' use of trade credit can be divided into two aspects, including granting of trade credit to customers and the receipt of trade credit from suppliers (Ferrando and Mulier, 2013; Petersen and Rajan, 1997; Fisman and Love, 2003; Love et al., 2007). Moro et al. (2021) and Xiu et al. (2023) emphasised the point that firms receive more trade credit from their suppliers and use it as a short-term source of financing to overcome difficulties in accessing the capital market. In contrast, our study analyzes the trade credit offered by SMEs to clients to maintain market competitiveness and enhance market share. Second, while Xiu et al. (2023) employed merchant guilds culture as typical social culture in China and investigated its association with firms' access to trade credit provided by their suppliers among different regions of China, our study uses collectivism and uncertainty avoidance to analyse the influence of cultural differences on SMEs' offering of trade credit across 37 different countries.

Moreover, our study complements that of El Ghoul and Zheng (2016), which used a sample of large firms in the industrial sector to demonstrate the association between cross-country cultural differences and TCP. However, our study differs from that of El Ghoul and Zheng (2016) in three ways. First, we focus on SMEs that are most likely to have lower bargaining power and must ensure their product quality (Petersen and Rajan, 1997). Consequently, despite the accompanying costs, SMEs are compelled to offer more trade credit to reduce information asymmetry about their product quality and to establish a reputation. If they fail to do so, then their sales volume and profit level will drop (Long et al., 1993; Martínez-Sola et al., 2014). Hence, trade credit is particularly important for SMEs, compared to large firms. Furthermore, unlike larger firms with more sophisticated governance structures, most small businesses are owned and managed by families or individuals. As a result, cultural values have a greater effect on their business decisions (El Ghoul et al., 2016a). Second, we extend the study of El Ghoul and Zheng (2016) by demonstrating cultural effects on the operational, financial, and commercial motives for using trade credit among SMEs. Finally, instead of focusing on national data alone, we use Vandello and Cohen's (1999) state individualism-collectivism index to analyze the cultural influences on SMEs' TCP across U.S. states. Overall, we believe that these differences provide interesting insights.

The remainder of this study is structured as follows. Section 2 highlights the relevant literature and hypothesis development, while Section 3 presents the sample, variables, and

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methodology. Section 4 discusses the regression results, while Section 5 analyzes the link between the cultural differences across U.S. states and TCP. Finally, Section 6 concludes this study.

2. Relevant literature and hypothesis development

2.1. National culture and trade credit provision

2.1.1. *Collectivism and trade credit provision*

The collectivist culture reflects the extent to which individuals in a society are likely to be interdependent, rather than those with independent self-construal (Hofstede, 2001). In this regard, a strong collectivist culture emphasizes group harmony and embeddedness, whereas a weak collectivist culture (i.e., individualist culture) pursues individual achievements and independence (Hofstede, 2001). In collectivist societies, people tend to share similar opinions/beliefs, and they work toward a feeling of harmonious interdependence. Consequently, they maintain strong, intimate relationships among themselves (Hofstede, 2001).

Predicting the relationship between a collectivist culture and SMEs' trade credit provision (TCP) is justified from the context of information asymmetry. According to Martínez-Sola et al. (2014), TCP is essential for SMEs to maintain their target growth in competitive markets. Nevertheless, this policy can attract customers with low credit scores who have difficulty accessing bank financing (Pike et al., 2005). Accordingly, there is a high likelihood that firms will be exposed to delinquency risk if their customers fail or refuse to pay by the agreed date (Ng et al., 1999). Although these issues are likely to jeopardize their financial viability (Pike et al., 2005), SMEs are less likely to enforce credit terms on their customers (e.g., charging penalty interest on late payments) because of their weak bargaining power (Wilson and Summers, 2002). Hence, the firms incur transaction costs associated with evaluating and monitoring customers' credit risk to mitigate the information asymmetry regarding the buyer's payment intention (Smith, 1987; Ng et al., 1999).

Information asymmetry may be less severe in collectivistic countries that emphasize group connections. Previous research has shown that organizations in these countries generally attach great importance to their social networks and tend to share information, rather than withhold information (Hofstede, 2001; Kashefi-Pour et al., 2020). Accordingly, it would be favorable for SMEs to provide more trade credit in collectivist societies in which they can learn about customers' ability to pay (at a relatively low cost) through business networks. In line with this argument, McMillan and Woodruff (1999) documented that

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companies can acquire knowledge about the reliability of customers by directly dealing with them and by asking other manufacturers before offering trade credit. In the case of customer insolvency, information on customers' behavior is shared among firms through business networks (McMillan and Woodruff, 1999). Thus, the problem of asymmetric customer information tends to be lower in strong collectivist societies, leading SMEs to extend more trade credit than those in weak collectivist societies. Based on these arguments, we propose the following hypothesis:

H$_1$: TCP is positively correlated with the degree of the collectivistic culture.

2.1.2. *Uncertainty avoidance and trade credit provision*

Uncertainty avoidance reflects the degree to which people avoid situations that are unknown, uncertain, or unstructured (Hofstede, 2001). Individuals from cultures in which there is a high degree of uncertainty avoidance are less tolerant of vagueness, less willing to take risks, and more inclined to prefer predictable outcomes (Bae et al., 2012). Conversely, people in low uncertainty avoidance societies tend to accept higher levels of risk and hence, they have a lower sense of urgency when facing uncertain situations (Hofstede, 2001).

The association between uncertainty avoidance and trade credit provision (TCP) can be developed through the following channel. According to information asymmetry theory, imperfect information exists in transactions between two parties in which the seller has better knowledge of product quality than the buyer, and in which poor quality may not be readily apparent upon first inspection (Pike et al., 2005). This can increase customers' concerns about product quality because they cannot guarantee whether the products received will meet their requirements and expectations (Pike et al., 2005). Such anxiety is much greater for customers from countries with high levels of uncertainty avoidance because they do not accept unclear situations, thereby any deviation from their expectations about product quality can lead to dissatisfaction. In this sense, companies with a good reputation are more likely to reduce customers' uncertainty (Pike et al., 2005). However, compared to large firms, SMEs tend to lack a well-established reputation for quality. As a result, they must rely on the provision of trade credit (as a product quality guarantee) to prevent a loss of sales (Martínez-Sola et al., 2014). Specifically, firms offer a long credit period so that their customers have time to test the product and determine it is of satisfactory quality before making payment

(Smith, 1987; Lee and Stowe, 1993). In this case, customers have the right to refuse to pay if the goods received do not meet their expectations (Lee and Stowe, 1993).

Some studies have suggested that firms can choose product warranties and money-back guarantees, as two possible alternatives to trade credit and assuring product quality (Lee and Stowe, 1993; Long et al., 1993). Nevertheless, trade credit substantially differs from these two mechanisms. With trade credit, customers withhold their payment, and they have the option to refuse to pay whenever the quality of the delivered product does not fulfill their expectations. Importantly, customers will lose nothing in the case where companies go bankrupt (Long et al., 1993). In contrast, under product warranties and money-back guarantees, customers must make payment at the time of sale and they can only take advantage of these warrantee mechanisms when firms are still in business (Long et al., 1993). Meanwhile, prospective buyers may doubt the value of a warranty contract offered by firms (especially if they are small firms) because they are afraid that such firms could go bankrupt and break the warranty contract after selling the product (Lee and Stowe, 1993). Accordingly, customers in countries with high levels of uncertainty avoidance tend to be more risk-averse (Hofstede, 2001), making it difficult for SMEs to sell products with warranties. Consequently, SMEs may prefer to use trade credit as a form of protection for their customers.

Based on the aforementioned discussion, we propose that SMEs from high uncertainty avoidance countries are inclined to provide more trade credit because they consider the use of such credit as a means of reducing the information asymmetries between buyers and sellers. Consequently, our second conjecture is as follows:

H2: TCP is positively associated with a country's degree of uncertainty avoidance.

2.2. National culture and trade credit motives

According to Martínez-Sola et al. (2014), financial, operational, and commercial motives can draw SMEs' extension of trade credit. The following sub-section discusses the influence of national culture on such motives.

2.2.1. *National culture and the financial motive*

Recent studies have suggested that SMEs' trade credit provision (TCP) depends on their level of financial constraints, since information asymmetry can limit their access to external financing (Ferris, 1981; Petersen and Rajan, 1997; El Ghoul et al., 2016b; Hoang et al., 2019). The financial motivation for using trade credit states that companies with relatively easy

access to financial markets (i.e., financially unconstrained firms) generally offer more trade credit to the clients that have productive investment opportunities, but are unable to obtain funds from capital markets (Schwartz, 1974). In this regard, financially stable firms act as financial intermediaries through which they pass their funds to financially constrained customers, thus financing the growth of their customers (Emery, 1984; Paul and Boden, 2008). Such firms may also optimize sales (Schwartz, 1974), increase their market share, and alleviate the constraints on growth imposed by market size (Paul and Boden, 2008).

National culture is expected to impact the financial motives for TCP of SMEs. Firms in highly collectivist countries can reduce the risk of slow payments and debt defaults because they have a greater ability to obtain information on customers' creditworthiness from their business networks (McMillan and Woodruff, 1999; Ng et al., 1999). This allows companies with easier access to capital markets to use more trade credit for the purpose of building stronger customer relationships and providing more support to their customers' growth (Fabbri and Menichini, 2010). Hence, the following hypothesis is proposed:

H$_3$: In countries with high degrees of collectivism, financially unconstrained companies are more likely to increase their TCP.

Moreover, financially unconstrained firms are inclined to increase the provision of trade credit when they operate in nations with high degrees of uncertainty avoidance, where customers are generally concerned about the quality of all products that they purchase (Lee et al., 2007). This helps them reduce any asymmetries in product quality awareness, thus reinforcing the supplier-customer relationship (Long et al., 1993; Pike et al., 2005). The following is our hypothesis based on this perspective:

H$_4$: In countries with high levels of uncertainty avoidance, financially unconstrained companies are more likely to increase their TCP.

2.2.2. *National culture and the operational motive*

In addition to the financial motive, firms can use trade credit for operational motives to address the role of variable product demand in their operating decisions (Emery, 1987). In the face of fluctuating demand, firms have two options: constant changes in production or the selling price. However, both the companies and customers will be significantly affected by either scenario. (Emery, 1987). Specifically, the variation in production places firms under

the burden of high production costs, while the variation in price makes customers incur high costs for searching for information. Compared to these options, the use of trade credit in response to variable demand is a cost-effective alternative through which customers are encouraged to purchase products during a period of low demand (Nadiri, 1969; Emery, 1984). This enables firms to decrease the cost of storing excess inventories (in the case of constant production) and to avoid the costs associated with changing production levels. Hence, firms with volatile demand are more likely to extend trade credit to clients (Long et al., 1993)

The operational motive for the use of trade credit can be affected by national culture. Particularly, people from collectivist cultures are inclined to cooperate and distribute information with one another (McMillan and Woodruff, 1999), which brings benefits for firms in the presence of variable demand (Chen and Liao, 2018). Firms can also use the information shared by other firms in the line of business to forecast their customers' variable product demand (Chen and Liao, 2018). Through this activity, firms can increase (or reduce) their TCP in response to the fluctuations in demand. This can help firms increase sales, reduce operating costs and decrease inventory (Mateut et al., 2015). In addition, the collaboration in nations with a high level of collectivism allows firms to reduce uncertainty concerning buyer payment intentions because they can access customer information on creditworthiness through their business connections (McMillan and Woodruff, 1999; Ng et al., 1999). In general, asymmetric information about buyer default risk is low in countries with high levels of collectivism. Hence, when firms estimate variable demand, they are willing to respond to such uncertainty by increasing their TCP. In this regard, we present the following hypothesis:

H5: In countries with high levels of collectivism, firms with unstable demand are more likely to increase their TCP.

Previous research has shown that a high uncertainty avoidance culture emphasizes a strong correlation between managers' anxiety and the speed with which they act to decrease uncertainty and ambiguity in uncertain situations (Li et al., 2013; Chen et al., 2015). Consistent with this view, when product demand is irregular because of uncertainty or seasonality, firms have a propensity to use more trade credit to respond to variable demand (Emery, 1984). In particular, firms meet a temporary deficit in demand, with temporary

relaxation in credit terms and vice versa. By doing so, they reduce operating costs and avoid the loss of sales. Thus, we present our next hypothesis:

H6: In nations with high degrees of uncertainty avoidance, firms with unstable demand are more likely to increase their TCP.

2.2.3. *National culture and the commercial motive*

From the commercial perspective, firms can use trade credit with the intention of creating a reputation for product quality (Lee and Stowe, 1993; Long et al., 1993). This indicates that firms can provide longer credit terms so that their customers can inspect the product quality before making a payment (Smith, 1987; Cheng and Pike, 2003). Meanwhile, use of trade credit, as a quality signal, is not necessary for large firms because they already have a good reputation for product quality and have little need to provide trade credit (Long et al., 1993). Alternatively, small firms generally provide more trade credit to guarantee product quality because they lack a well-established reputation (Long et al., 1993).

As for national culture, it is expected to influence the commercial motive for SMEs' TCP. In particular, a collectivist culture can help boost the provision of trade credit by SMEs, especially those lacking an established reputation. This is because firms in this culture may have the advantage of easily acquiring information about buyers' reliability through the information shared by other firms in the same line of business (McMillan and Woodruff, 1999). Consequently, businesses are more willing to offer trade credit to build their brand's image for high-quality products because they are less concerned about consumers' late payments or defaults (McMillan and Woodruff, 1999; Pike et al., 2005).

Meanwhile, strong social networks in countries with a high degree of collectivism can help customers learn about product quality via information sharing (Izquierdo and Izquierdo, 2007). As a result, managers in such countries have a tendency to be more concerned with maintaining a positive public image (Chen et al., 2015). SMEs also have a tendency to provide more trade credit because an increase in the provision of such credit is a signal to the market that companies are attempting to improve their reputation for high-quality products, which, in turn, can increase customer loyalty (Wilson and Summers, 2002; Cheng and Pike, 2003; Paul and Boden, 2008). Based on this discussion, we present the following hypothesis:

H7: In countries with high levels of collectivism, companies with low reputations are more likely to increase their TCP.

Finally, according to Lee et al. (2007), customers from countries with high levels of uncertainty avoidance tend to be more concerned with product quality. Therefore, in such countries, companies with low reputations tend to reduce customers' concerns by using trade credit as an implicit warranty. In this regard, we offer the following hypothesis:

H$_8$: In countries with high levels of uncertainty avoidance, companies with low reputations are more likely to increase their TCP.

3. Sample, variables, and methodology

3.1. Sample

We first selected manufacturing SMEs (SIC 2007 codes 1011–3320) according to the official definitions of manufacturing SMEs across countries.[5] We only included such firms in our sample because of the homogeneity across industries in terms of credit (Martínez-Sola et al., 2014). We excluded companies with anomalies in their accounts, e.g., firms whose values in their sales, assets, or trade credit receivable are negative, and firms whose total liabilities and equity differ from their total assets. Moreover, following Chen et al. (2015), we required that each country includes a minimum of 100 observations. Our final sample consisted of 12,257 firms from 37 nations spanning the period of 1998 to 2018, resulting in an unbalanced panel of 111,919 firm-year observations. Country-level data was gathered from various sources (as detailed in Appendix I), while firm-level variables were collected from the DataStream and Thomson One databases. In this case, we eliminated 1% of the extreme values for all of the firm-level variables to ease the influence of outliers.

3.2. Variables

In this study, trade credit provision (TCP) was the explained variable, which is defined as the ratio of accounts receivable to sales (Petersen and Rajan, 1997). Firms with a higher value of TCP tend to reflect a higher proportion of sales made by offering trade credit to customers. The main explanatory variable was culture (CULTURE). In this regard, we followed previous research (Zheng et al., 2013; Chen et al., 2015; Li et al., 2013) and used Hofstede's (2001) two cultural dimensions: individualism/collectivism (IDV) and uncertainty avoidance (UAI).

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[5] Official definitions of manufacturing SMEs across countries are available at the SME Finance Forum. We can provide a table of such definitions, upon request.

The values of these two dimensions were derived from a survey of IBM employees' values, conducted in more than 70 countries over the period 1967–1973 (Hofstede, 2001). The cultural framework of Hofstede is broadly applied and has the greatest impact among various cultural classifications in cross-cultural research because it is clear, parsimonious, and resonant (Kirkman et al., 2006). Following Zheng et al. (2013), the collectivism (CLT) index (our main cultural dimension) was constructed as 100 minuses Hofstede's individualism (IND) index. Higher collectivism (CLT) reflected a greater degree of collectivist value, while uncertainty avoidance (UAI) measured the degree to which people in a culture avoid situations that are unknown/ambiguous, as in Hofstede (2001).

Following previous studies (Petersen and Rajan, 1997; Demirgüç-Kunt and Maksimovic, 2001; Niskanen and Niskanen, 2006; García-Teruel and Martínez-Solano, 2010a; García-Teruel and Martínez-Solano, 2010b; Giannetti et al., 2011), we controlled for firm- and country-level variables that influence TCP. The firm-level control variables included sales growth (SGROWTH), firm size (SIZE), short-term finance (STLEV), inventories (INVENT), tangibility assets (TANG), and gross profit margin (GPROF). At the country level, we included GDP growth (GDPGROWTH). Detailed definitions for all of the variables are provided in Appendix I.

Table 1 presents the summary statistics of the variables in this study across countries. The U.S., China, South Korea, Japan, and the United Kingdom are the top five nations represented in the sample, with the U.S. firms making up the largest share of the total sample (31.93%). Accordingly, the regression results are presented with and without the U.S. firms to ensure that our findings are not biased by an over-representation of these firms. Column (3) shows that the overall mean value of TCP is 0.259 across 37 countries. Some countries, such as Denmark, the U.S., Canada, and South Africa, have a mean TCP of less than 0.20, while others, such as Egypt and Greece, have a mean value of greater than 0.38.

The mean value of collectivism (CLT) and uncertainty avoidance (UAI) are reported in Columns (4) and (5). UAI ranges from 8 (Singapore) to 100 (Greece), whereas CLT ranges from 9 (U.S.) to 86 (Indonesia and Pakistan). The mean value for each control variable is also shown in Table 1. The sample firms have a mean value sales growth (SGROWTH) of 0.059, while the mean value of firm size (SIZE) is 4.615 and that of short-term finance (STLEV) is 0.323. Additionally, the mean values for inventories (INVENT), tangibility assets (TANG), gross profit margin (GPROF), and GDP growth (GDPGROWTH) are 0.158, 0.213, 0.323, and 0.030, respectively.

Figure 1 depicts the association between the cultural differences among countries and trade credit provision (TCP). According to Graphs (a) and (b), as the values of collectivism and uncertainty avoidance increase, TCP also rises. This indicates that these two cultural dimensions have a positive association with TCP.

INSERT TABLE [1] HERE

INSERT FIGURE [1] HERE

3.3. Methodology

In order to investigate the association between national culture and trade credit provision (TCP), we developed the following regression model:

$$TCP_{i,t} = \alpha + \beta_1 CULTURE_{i,t} + \beta_2 SGROWTH_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 STLEV_{i,t} + \beta_5 INVENT_{i,t} +$$
$$\beta_6 TANG_{i,t} + \beta_7 GPROF_{i,t} + \beta_8 GDPGROWTH + IND_{j,t} + YR_t + \varepsilon_{i,t} \qquad (1)$$

where subscripts i, t, and j refer to firm, time, and industry, respectively. In addition, IND (defined by the UK SIC 2007 codes 1011–3320) and YR capture industry- and year-fixed effects, respectively, and ε is the error term. Trade credit provision (TCP) is a dependent variable, while CULTURE is an independent variable, which consists of two cultural dimensions: collectivism (CLT) and uncertainty avoidance (UAI). Finally, sales growth (SGROWTH), firm size (SIZE), short-term finance (STLEV), inventories (INVENT), tangibility assets (TANG), gross profit margin (GPROF), and GDP growth (GDPGROWTH) are the control variables. Definitions and sources for all of the variables are presented in Appendix I.

Following previous research (Adhikari and Agrawal, 2016), random-effects generalized least squares (GLS) regression with robust standard errors was used to perform the regression Equation (1).[6] We included robust standard errors to control for heteroscedasticity, which could arise from the cross-sectional and time-series nature of the data (Petersen, 2009). Following Chen et al. (2015) and Haq et al. (2018), the coefficients for collectivism (CLT) and uncertainty avoidance (UAI) were multiplied by 100 for ease of interpretation.

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[6] We used random effects GLS regression because it allows us to include time-invariant variables such as Hofstede's collectivism and uncertainty avoidance.

4. Regression results

4.1. Effect of national culture on trade credit provision

The regression results on influence of national culture on trade credit provision (TCP) are presented in Table 2, in which Columns (1) and (2) report the results for the entire sample and Columns (3) and (4) report those for sample excluding the U.S. According to the results, the coefficients for collectivism (CLT) are all positive and statistically significant at the 1% level, regardless of whether our sample includes or excludes the U.S. (Columns (1) and (3)). The findings are in line with Hypothesis 1, which suggests that SMEs in countries with high collectivist cultures have a tendency to provide more trade credit.

According to the magnitude of the coefficient for CLT in Column (1), a one-unit increase in collectivism leads to an increase in TCP of 0.143%. Ceteris paribus, if the collectivism index moves from the lowest (9) to the highest (86), then TCP will increase by 11.01%. With the sample that excludes the U.S., an increase in collectivism by one unit results in an increase of 0.122% in TCP. If all else is equal, then a change in the collectivism index from the lowest (10) to the highest (86) will increase trade credit receivable by approximately 9.27%.[7]

Columns (2) and (4) of Table 2 show that uncertainty avoidance (UAI) is positively associated with TCP for the samples including or excluding the U.S. firms. This finding strongly supports Hypothesis 2, which suggests that SMEs from nations with a high level of uncertainty avoidance tend to extend more trade credit to clients than those from nations with a low level of uncertainty avoidance. According to the magnitude of the coefficient in Column (2), changing UAI by one unit leads to an increase in TCP of 0.083%. If all else is equal, then an increase in the UAI index from the lowest (8) to the highest (100) can increase TCP by approximately 7.64%. For the sample excluding the U.S. firms in Column (4), an increase in the UAI index by one unit results in an increase in TCP by 0.064%. Other things being equal, if the UAI index moves from the lowest (8) to the highest (100), then TCP will increase by 5.89%.

The majority of our results are consistent with prior research on control variables. Specifically, we showed that the provision of trade credit is negatively associated with sales growth (SGROWTH), firm size (SIZE), tangibility assets (TANG), and GDP growth (GDPGROWTH), but positively related to short-term finance (STLEV), inventories (INVENT), and gross profit margin (GPROF).

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[7] After the exclusion of the United States, Australia has the lowest collectivism index of 10.

INSERT TABLE [2] HERE

4.2. Robustness tests

4.2.1. *An alternative measure of trade credit provision*

In this study, we re-estimated Equation (1) by employing a different proxy for trade credit provision (TCP): the ratio of accounts receivable to total assets (TCP_2). This measure was used by Martínez-Sola et al. (2013), Martínez-Sola et al. (2014), and McGuinness et al. (2018). As shown in Part (1) in Panels A and B of Table 3, our results are similar to those obtained by using the original TCP (i.e., the ratio of accounts receivable to sales).

INSERT TABLE [3] HERE

4.2.2. *Alternative proxies to collectivism and uncertainty avoidance*

It is important to note that Hofstede's cultural dimensions were developed during the 1970s, which means that their values may be out-of-date, thus failing to capture cultural change over time (Kirkman et al., 2006). To address this concern, we followed Chui et al. (2010), Chen et al. (2015), Zheng et al. (2013), and Haq et al. (2018), and employed different measures of collectivism and uncertainty avoidance. First, we employed the in-group collectivism and uncertainty avoidance measures from the Global Leadership and Organizational Behavior Effectiveness (GLOBE) study of 61 societies (House et al., 2002).[8] Second, we used the collectivism and uncertainty avoidance indices of Tang and Koveos (2008).[9] Third, we replaced collectivism with Schwartz's (1994) conservatism dimension, which consists of values associated with close-knit harmonious relationships (Schwartz, 1994).[10] Finally, we re-ran the regression in Equation (1) by using the three alternative

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[8] "The GLOBE is a study of culture and leadership in 61 countries, in which there are nine dimensions of national culture: performance orientation, future orientation, assertiveness, power distance, humane orientation, societal collectivism, in-group collectivism, uncertainty avoidance, and gender egalitarianism" (House et al., 2002, p. 3). In this research, the three cultural dimensions of uncertainty avoidance, power distance, and societal collectivism reflect the same concepts as Hofstede's dimensions of uncertainty avoidance, power distance, and collectivism. Additionally, since the GLOBE project was conducted in the mid-1990s, which is more recent than Hofstede's work, it provides more updated cultural values (Chen et al., 2015).

[9] The study by Tang and Koveos (2008) is an update of Hofstede's cultural value dimensions in which they considered changes in economic conditions within countries as a source of cultural dynamics. Specifically, they suggested that national cultural values change over time, since they correlate with the national wealth change.

[10] Schwartz (1994) defined three pairs of cultural value: (i) conservatism vs. autonomy; (ii) hierarchy vs. egalitarianism; and (iii) harmony vs. mastery. However, since we did not find a corresponding dimension to Hofstede's uncertainty avoidance, the conservatism dimension was used as an alternative measure of Hofstede's

proxies for collectivism and uncertainty avoidance. The outcomes in Part (2) of Panels A and B in Table 3 indicate that collectivism and uncertainty avoidance have a positive relationship with TCP, which is in keeping with our main results.

4.2.3. *Endogeneity problems*

A major concern of our study was the endogeneity problems that may arise from three main sources: measurement errors, simultaneity bias, and omitted explanatory variables (Wooldridge, 2010). As for any measurement errors, we investigated the sensitivity of our results by using alternative proxies for trade credit provision (TCP) and culture. As shown in Sections 4.2.1 and 4.2.2, our findings were the same for all of the measurements used, which mitigates our concern about such errors. In terms of simultaneity bias, this issue corresponds to the possibility that a firm's TCP can impact a country's culture. However, national culture can vary and develop over a long period of time, ranging from centuries to millennia (Williamson, 2000; Hofstede, 2001). Meanwhile, culture has a long-lasting effect on social institutions, with only gradual changes (Licht et al., 2007). Thus, due to the inability of trade credit decisions to influence national culture at the firm level, we did not consider simultaneity bias to be of much concern in our study.

Given that measurement errors did not alter our main findings and simultaneity bias was improbable, our major concern was omitted explanatory variables. Specifically, the omission of variables can cause endogeneity problems because they are possibly associated with collectivism and uncertainty avoidance, which, in turn, can affect TCP. This can cause a biased and inconsistent estimate of the impact of these two cultural dimensions on TCP. Hence, we based our study on previous research (Zheng et al., 2013; Chen et al., 2015) and tackled these problems in two ways.

First, following previous studies (Demirgüç-Kunt and Maksimovic, 2001; Palacín-Sánchez et al., 2019), additional control variables were included in Regression Model (1). Specifically, inflation was considered as our first country-level control variable to control for the economic situation in each country. Demirgüç-Kunt and Maksimovic (2001) suggested that companies tend to decrease TCP when they operate in countries with high inflation. Our second country-level control variable was private credit, which indicates the development of banking systems. According to Demirgüç-Kunt and Maksimovic (2001), companies that

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collectivism dimension because it comprises important value for societies that priorities close-knit harmonious relationships (Zheng et al., 2013).

operate in nations with more developed banking systems are more likely to extend credit to their clients. Another country-level control variable in our model was creditor rights (Djankov et al., 2007), which measures the rights of secured creditors in the bankruptcy process. In this regard, strong creditor rights facilitate firms' access to financing from financial intermediaries on more favorable terms, which enables them to increase TCP (Demirgüç-Kunt and Maksimovic, 2001). Finally, following Demirgüç-Kunt and Maksimovic (2001), we used law and order as a fourth country-level control variable, for the purpose of capturing the overall efficiency of each country's legal system. In this case, firms tend to increase their TCP when they operate in nations with efficient legal systems.

According to the regression results, with the inclusion of the additional control variables in Part (3) of Panels A and B in Table 3, these controls did not have a significant impact on our previous finding that collectivism and uncertainty avoidance have a positive relationship with TCP. This result reduces our concern that the omission of country-level factors can change our findings.

Second, we used the instrumental variable (IV) approach to mitigate any endogeneity concerns. To make this estimation, we isolated the exogenous component of culture by using instruments for collectivism and uncertainty avoidance, followed by an examination of their association with TCP. Following Zheng et al. (2013), we used disease (DISEASE) from Murray and Schaller (2010), which indicates the historical prevalence of infectious diseases among different countries, as an instrument for collectivism. Fincher et al. (2008) showed that human cultures are more collectivist in ecological regions characterized by a higher prevalence of infectious diseases. Consequently, we expected a positive correlation between disease and collectivism. In terms of uncertainty avoidance, Hofstede (2001) documented that religion offers ultimate certainty to people, thus helping them cope with uncertainty. He also showed that different religious groups have different reactions to uncertainty avoidance. For example, Catholicism emphasizes certainties (high uncertainty avoidance), while Protestantism encourages facing uncertainties (low uncertainty avoidance). Following Li et al. (2013) and Kwok and Tadesse (2006), we used religion from La Porta et al. (1999), defined as the percentages of people in the Protestant (PROTESTANT), Roman Catholic (CATHOLIC), and Muslim (MUSLIM) religious faiths in 1980, as instruments for uncertainty avoidance. In this regard, we expected a negative association between the three religious instruments and uncertainty avoidance.

The IV regression results are presented in Table 4. The first-stage regression results in Panel A show that countries with a high prevalence of infectious disease have a high score on

the collectivism index. Conversely, countries with a high percentage of Protestants have a low score on uncertainty avoidance. These results are consistent with our previous expectations. In order to ensure the suitability of the selected instruments, we performed several important specification tests. First, the Kleibergen-Paap under-identification test was conducted to verify the rank condition. Based on the results of this test presented in Columns (1) through (4), the null conjecture was rejected at the 1% level, which indicates that the excluded instruments are correlated with collectivism and uncertainty avoidance. Thus, the model is well identified. Second, an F-test of excluded instruments was conducted to assess the relevance of our instruments in which the null hypothesis is that variation in collectivism and uncertainty avoidance cannot be explained by instruments. The results of this test shown in Columns (1) through (4) indicate that this null hypothesis is rejected at the 1% level. Third, since we used more than one instrument for uncertainty avoidance, an over-identification test was conducted with the null hypothesis of no relationship between excluded instruments and the error term. The insignificant Hansen J-statistics in Columns (2) and (4) (p-value = 0.343 and 0.260) show a failure to reject the null hypothesis, which indicates that our instruments are exogenous and valid. Most importantly, from the results of the second-stage regressions in Panel B, we found that the coefficients for collectivism and uncertainty avoidance continue to be positive and significant at the 1% level. These results dispel our concern about influence of the endogeneity problem on main findings.[11]

INSERT TABLE [4] HERE

4.3. National culture and trade credit motives

4.3.1. *National culture and the financial motive*

Following Baños-Caballero et al. (2014) and Hill et al. (2012), two proxies for financial constraints were used to examine the effect of national culture on the financial motives for trade credit provision (TCP): cash flow (CFLOW) and liquidity (LIQ), in which the former is defined as the ratio of earnings before interest and tax plus depreciation to total assets, and the latter is defined as the ratio of cash and cash equivalents to total assets. We assumed that

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[11] Moreover, to ensure the robustness of our results, we checked the sensitivity of our findings to alternative estimation methods. Following previous studies (Chui et al., 2010; Chen et al., 2015; Bae et al., 2012; Zheng et al., 2013), we re-estimated Equation (1) using the Fama–MacBeth approach (Fama and MacBeth, 1973) and weighted least squares (WLS) estimation. As presented in Part (4) of Panels A and B in Table 3, collectivism and uncertainty avoidance have a positive association with TCP, which reinforces our previous findings.

firms with greater cash flow and liquidity tend to extend more trade credit to their customers because they are less likely to experience financing constraints (Petersen and Rajan, 1997; García-Teruel and Martínez-Solano, 2010b). To account for the possible moderation effect between culture and the financial motive, we added the interactions of the two cultural dimensions with cash flow and liquidity to Equation (1).

The results in Table 5 suggest that culture and the financial motive mutually enhance one another's influence on SMEs' TCP. In Columns (1) and (3), the coefficients for CLT * CFLOW and CLT * LIQ are all positive and statistically significant at the 1% level for the full sample. In Columns (5) and (7), these coefficients are still significant, even when the U.S. firms are excluded. These outcomes suggest that, consistent with Hypothesis 3, collectivism triggers greater incentives for SMEs to increase TCP when they are less likely to face financial constraints. According to asymmetric information theory, when it is difficult to establish informational symmetries between buyers and sellers, companies must incur the transaction costs associated with monitoring buyers (Ng et al., 1999). However, this issue will be less of a problem in high collectivist countries in which companies can use their business networks to obtain information about the trustworthiness and financial capacity of their customers (McMillan and Woodruff, 1999). Hence, in such countries, financially unconstrained firms with greater financial capacity are more willing to extend trade credit to finance the growth of their customers.

According to Columns (2), (4), (6), and (8) in Table 5, the coefficients for UAI * CFLOW and UAI * LIQ are statistically significant and positive at the 1% level for the full sample and the sample that excludes the U.S. Consistent with Hypothesis 4, our findings indicate that uncertainty avoidance can impact SMEs' financial motive for TCP. In particular, the more risk-averse and less tolerant ambiguity customers are in high uncertainty avoidance cultures, the more nervous they are about good quality (Lee et al., 2007). Consequently, firms from such societies recognize that they must reduce the worries of customers by increasing the use of trade credit, as a means of guaranteeing product quality (Petersen and Rajan, 1997; García-Teruel and Martínez-Solano, 2010b).

INSERT TABLE [5] HERE

4.3.2. *National culture and the operational motive*

This section focuses on the role of national culture in the operational motive for trade credit. Following Long et al. (1993) and Banker et al. (2014), we employed two alternative

measures of demand variability: sales volatility (SALESVOL), defined as the standard deviation of sales divided by mean sales (both over three years); and demand uncertainty (DEMANDUNCERT), measured by the standard deviation of long-term changes in sales. Since trade credit is expected to be granted more frequently to customers when companies face higher sales volatility and demand uncertainty, we augmented Equation (1) with SALESVOL and DEMANDUNCERT, as well as their interactions with the two dimensions of national culture.

According to the results for full sample in Columns (1) and (3) of Table 6, the coefficients for the interaction variables CLT * SALESVOL and CLT * DEMANDUNCERT are all statistically significant and positive. In Columns (5) and (7), the same signs of these coefficients are found for the sample that excludes the U.S. These findings show that nations with high levels of collectivism stimulate firms with uncertain demand to increase TCP. In other words, companies in such societies can access information about buyers' creditworthiness and estimate variable demand through connections with their partners in the same line of business (McMillan and Woodruff, 1999). This allows firms to extend more trade credit to customers in response to variable demand (Aviv, 2001).

Finally, as shown in Columns (2), (4), (6), and (8) of Table 6, the coefficients for UAI * SALESVOL and UAI * DEMANDUNCERT are positive and statistically significant at the 1% level for the full sample and the sample that excludes the U.S. firms. These results are in keeping with Hypothesis 6, suggesting that firms with unstable demand tend to increase TCP for the purpose of reducing operating costs and avoiding loss of sales when they operate in nations with high degrees of uncertainty avoidance.

INSERT TABLE [6] HERE

4.3.3. *National culture and the commercial motive*

In order to investigate whether national culture influences the commercial motive for using trade credit in SMEs, we followed Hill et al. (2012) and Petersen and Rajan (1997), and used firm age (AGE) and market share (MKSHARE) as two proxies for a firm's reputation. In this case, firm age is defined as the logarithm of (1+ age), in which age is the number of years since the firm was founded. As for market share, it is measured as annual firm sales divided by annual industry sales. Older firms with higher market shares generally provide a positive signal regarding product quality to buyers because such firms are usually well-

established in their product market. Consequently, the advantages of TCP in reducing asymmetric information regarding the quality of goods for such firms are expected to be less significant than younger firms with smaller market shares. In this study, we augmented Equation (1) with firm age (AGE) and market share (MKSHARE), and their interactions with the two national culture dimensions.

According to Columns (1), (3), (5), and (7) in Table 7, the coefficients for CLT * AGE and CLT * MKSHARE are all negative and statistically significant for the full sample and the sample that excludes the U.S. Consistent with Hypothesis 7, our findings indicate that firms with less-established reputations are inclined to increase TCP when operating in countries with high levels of collectivism. There may be several reasons for this observation. On the one hand, in collectivist countries, firms have the advantage of obtaining information on customers' creditworthiness, leading to a reduced risk of late payments or defaults (McMillan and Woodruff, 1999). This benefit allows firms to increase TCP, as a means of enhancing their reputation for product quality. On the other hand, customers from countries with high levels of collectivism tend to share information about product quality through social networks (Izquierdo and Izquierdo, 2007). This motivates firms with low reputations to use more trade credit to build customers' confidence in their products.

As shown in Columns (2), (4), (6), and (8) of Table 7, the coefficients for UAI * AGE and UAI * MKSHARE are negative and significant at the 1% level for the full sample and the sample that excludes the U.S. These findings support Hypothesis 8, suggesting that firms with low reputations tend to increase TCP for the purpose of guaranteeing product quality in societies with high levels of uncertainty avoidance. This is because customers in such societies have more concerns about product quality (Lee et al., 2007).

INSERT TABLE [7] HERE

5. Investigation of state-level cultural effects in the U.S.

5.1. Influence of cultural differences among U.S. states on trade credit provision

Culture has been defined as "the collective programming of the mind, which distinguishes the members of one group or category of people from another" (Hofstede, 2001, p. 9). Accordingly, individuals from different nations and regions within nations tend to have different attitudes and behaviors, which influence their decision-making (Hofstede, 2001). In this section, we investigate whether the cultural differences among U.S. states influence the trade credit provided by SMEs.

Individualism is central to U.S. culture, whose political, philosophical, and social foundations are based on liberalism (Vandello and Cohen, 1999). This value has been corroborated in cross-cultural research that demonstrated that the authors demonstrate that the U.S. is a prototypical individualist culture with an individualism-collectivism dimension (Hofstede, 1980). In line with this view, Vandello and Cohen (1999) did not deny that the U.S. is a highly individualistic country, but they argued that the level of this dimension varies among U.S. states. In particular, the authors developed an eight-item index to rank U.S. states based on their collectivist vs. individualist characteristics. Their index reflected a wide range of cultural practices, ranging from family structure and living arrangements to social, political, economic, and religious behaviors. States with lower scores in this index tend to be more individualistic, while those with higher scores tend to be more collectivist.

We also investigated whether the cultural differences across U.S. states influence the trade credit provision (TCP) of SMEs by using Vandello and Cohen's (1999) individualism-collectivism dimension. Prior research on the determinants of SMEs' TCP in a single nation found that such provision is affected by firm-level factors, including sales growth, firm age, short-term financing, cash flow, etc. (Petersen and Rajan, 1997; Wilson and Summers, 2002; Huyghebaert, 2006; Niskanen and Niskanen, 2006; García-Teruel and Martínez-Solano, 2010b). Our study expands the existing literature by highlighting the cultural differences between regions within a country, as an important factor that impacts SMEs' TCP.

Based on the descriptive statistics at the state level presented in Table 8, the number of firms is the highest in California, Texas, and Massachusetts. Specifically, California has the largest number of firms, accounting for 36.51% of the sample, followed by Texas with 8.79% and Massachusetts with 6.08%. In regard to TCP in Column (3), the overall mean value is 0.176 across the 50 U.S. states. Nevertheless, some states have a mean TCP of more than 0.25 (e.g., Louisiana, West Virginia, Delaware, and Alaska), while others have a mean TCP of less than 0.10 (e.g., Montana, North Dakota, and Wyoming). Additionally, in Column (5),

the mean value of State Collectivism (State CLT) varies widely across U.S. states, ranging from 31 (Montana) to 91 (Hawaii). As shown in Figure 2, there is a positive correlation between state collectivism and TCP.

INSERT TABLE [8] HERE

INSERT FIGURE [2] HERE

Column (1) in Table 9 presents the results for the effect of State CLT on SMEs' TCP within the United States. Specifically, the coefficient for State CLT is positive and statistically significant at the 1% level, indicating that companies in highly collectivistic U.S. states tend to sell more on trade credit than companies in U.S. states with low collectivism. This result can also be interpreted that companies in a high collectivist culture are less concerned about customers' non-payment because they can obtain information on the reliability of buyers through their business networks (McMillan and Woodruff, 1999). Consequently, they tend to increase TCP in such cultures. Additionally, the magnitude of the coefficient for State CLT shows that TCP increases by 0.143% as State CLT increases by one unit. Other things being equal, the movement of State CLT from the lowest (31) to the highest (72) can increase TCP by 5.86%. Regarding the control variables, sales growth (SGROWTH), firm size (SIZE), tangibility assets (TANG), and state-level GDP growth (State-level GDPGROWTH) have significant and negative associations with TCP, while short-term finance (STLEV), inventories (INVENT), and gross profit margin (GPROF) have significant and positive associations with TCP.

5.2. Influence of state-level culture within U.S. states on trade credit motives

In accordance with our previous global analysis, we employed cash flow (CFLOW) and liquidity (LIQ) as two proxies for the existence of financing constraints to investigate the influence of state-level collectivism on the financial motivation for trade credit. According to the results in Columns (2) and (3) of Table 9, the coefficients for State CLT * CFLOW and State CLT * LIQ are all positive and statistically significant at the 1% level. This indicates that financially unconstrained firms in high-collectivism states tend to grant more trade credit to their clients.

Furthermore, to shed light on whether state-level culture within the United States impacts the operational motives for TCP, we used SALESVOL and demand uncertainty

(DEMANDUNCERT), as two alternative measures of demand variability. According to the results in Columns (4) and (5), the coefficients for State CLT * SALEVOL and State CLT * DEMANDUNCERT are positive and statistically significant. This suggests that, consistent with Hypothesis 5, firms with uncertain demand tend to increase trade credit provision when they operate in high collectivist U.S. states.

Finally, we demonstrated whether the state-level culture within the U.S. influences the commercial motive. Specifically, we used firm age (AGE) and market share (MKSHARE) as two proxies for a firm's reputation to maintain consistency with our previous research in the international context. From the results in Columns (6) and (7), the coefficients for State CLT *AGE and State CLT*MKSHARE are significant and negative, indicating that companies with a less-established reputation generally increase trade credit provision when they operate in high collectivist U.S. states.

INSERT TABLE [9] HERE

6. Conclusion

This study investigated whether national culture has an impact on cross-country variations in SMEs' trade credit provision (TCP). Following Hofstede (2001), culture was measured by two cultural dimensions: collectivism and uncertainty avoidance. Using a sample of 12,257 manufacturing SMEs across 37 countries over the period 1998 to 2018, SMEs tend to increase the provision of trade credit when they operate in nations with high levels of collectivism and uncertainty avoidance. In addition, based on state-level panel data from the U.S., this study examined how cross-state cultural differences impact SMEs' TCP. Using the individualism-collectivism dimension constructed by Vandello and Cohen (1999) for U.S. states, we found that companies generally extend more trade credit to customers when they are situated in high collectivist states.

We further determined how culture indirectly influences SMEs' TCP by affecting their various motivations. Based on the findings, collectivism and uncertainty avoidance have a significant impact on the financial motivation of SMEs. In particular, companies from nations with high degrees of collectivism and uncertainty avoidance are more likely to extend trade credit when it is relatively easy for them to access financial markets.

Regarding operational motivation, firms in nations with high degrees of collectivism and uncertainty avoidance generally increase their provision of trade credit when they face unstable demand. We also found that collectivism and uncertainty avoidance impact the commercial motive of SMEs, and firms with less-established reputations tend to extend more trade credit when they operate in high collectivist countries. Moreover, we analyzed how cultural differences among U.S. states affect the trade credit motives of SMEs. Consistent with our findings for the international sample, we showed that state-level collectivism triggers greater incentives for SMEs to offer more trade credit when they have a greater financial capacity and demand variability or a lower reputation.

Finally, our results are robust to alternative measures of TCP, alternative specifications of national culture, potential endogeneity concerns, and alternative estimation methods. We also provided strong support for culture as an important determinant of SME's TCP. Overall, our study showed that cultural differences between countries and across the U.S. influence SMEs' financial decisions. Furthermore, our findings make an important contribution to the understanding of credit flows among SMEs outside formal financial systems.

Tables

Table 1–Summary statistics

| Country	Obs. (1)	N (2)	TCP (3)	Cultural index		Firm-level variables						Country-level variables
				CLT (4)	UAI (5)	SGROWTH (6)	SIZE (7)	STLEV (8)	INVENT (9)	TANG (10)	GPROF (11)	GDPGROWTH (12)
Australia	1,628	272	0.202	10	51	0.061	3.263	0.381	0.102	0.069	0.288	0.028
Austria	441	38	0.249	45	70	0.078	4.683	0.326	0.151	0.222	0.347	0.021
Belgium	387	44	0.272	25	94	0.079	4.620	0.310	0.126	0.143	0.525	0.020
Bulgaria	898	118	0.271	70	85	0.020	3.612	0.259	0.294	0.483	0.272	0.035
Canada	2,136	240	0.194	20	48	0.059	4.447	0.256	0.154	0.157	0.374	0.031
Chile	114	15	0.371	77	86	0.021	4.357	0.306	0.122	0.358	0.337	0.040
China	21,044	2,194	0.297	80	30	0.125	4.984	0.465	0.207	0.268	0.317	0.079
Denmark	429	39	0.183	26	23	0.016	4.626	0.261	0.177	0.247	0.264	0.019
Egypt	136	16	0.394	75	80	0.112	3.877	0.253	0.346	0.347	0.145	0.043
Finland	541	39	0.221	37	59	0.067	4.714	0.253	0.152	0.265	0.317	0.026
France	2,777	326	0.296	29	86	0.046	4.389	0.354	0.166	0.092	0.191	0.017
Germany	2,558	248	0.214	33	65	0.069	4.560	0.252	0.169	0.185	0.342	0.017
Greece	1,155	96	0.429	65	100	0.014	4.467	0.528	0.241	0.422	0.289	0.019
Hong Kong	1,260	114	0.318	75	29	0.224	4.275	0.358	0.103	0.118	0.305	0.031
Hungary	150	15	0.214	20	82	0.206	4.255	0.347	0.188	0.310	0.204	0.038
India	2,625	379	0.295	52	40	0.011	3.775	0.296	0.160	0.165	0.125	0.074
Indonesia	208	18	0.342	86	48	0.007	3.832	0.271	0.138	0.244	0.192	0.051
Ireland	175	25	0.206	30	35	0.051	4.763	0.346	0.152	0.136	0.526	0.057
Italy	404	55	0.352	24	75	0.056	4.622	0.432	0.216	0.168	0.435	0.008
Japan	9,870	651	0.320	54	92	0.014	4.865	0.334	0.135	0.288	0.293	0.012
Malaysia	1,860	175	0.305	74	36	0.002	4.063	0.301	0.215	0.384	0.268	0.054
Mexico	167	12	0.331	70	82	0.193	5.651	0.268	0.118	0.065	0.713	0.028
Netherlands	213	28	0.250	20	53	0.030	4.460	0.364	0.174	0.105	0.419	0.022
Norway	256	36	0.294	31	50	0.080	4.055	0.274	0.112	0.065	0.345	0.020
Pakistan	227	35	0.233	86	70	0.114	3.732	0.478	0.288	0.511	0.171	0.044
Poland	1,529	154	0.341	40	93	0.052	4.443	0.292	0.167	0.376	0.287	0.036
Romania	745	83	0.342	70	90	0.171	4.219	0.323	0.225	0.486	0.305	0.039
Russia	798	109	0.271	61	95	0.282	4.304	0.319	0.277	0.234	0.178	0.037
Singapore	3,846	328	0.321	80	8	0.047	4.669	0.329	0.141	0.280	0.262	0.045
South Africa	340	35	0.187	35	49	0.257	4.012	0.263	0.159	0.313	0.400	0.029
South Korea	14,255	1,301	0.352	82	85	0.050	4.792	0.317	0.141	0.318	0.219	0.031
Spain	408	35	0.343	49	86	0.051	4.712	0.409	0.232	0.274	0.296	0.030
Sweden	1,996	303	0.231	29	29	0.073	3.788	0.302	0.161	0.044	0.313	0.024
Thailand	1,091	80	0.362	80	64	0.036	4.369	0.230	0.177	0.280	0.220	0.040
Turkey	567	74	0.328	63	85	0.198	4.143	0.384	0.196	0.330	0.221	0.061
United Kingdom	4,488	613	0.212	11	35	0.040	4.249	0.306	0.137	0.125	0.440	0.024
United States	30,197	3,914	0.176	9	46	0.059	4.423	0.255	0.133	0.109	0.443	0.025
Total	111,919	12,257	0.259	54	46	0.059	4.615	0.323	0.158	0.213	0.323	0.030

This table reports the average by country of all of the variables in the main regressions. Obs. and N are the observations and the number of manufacturing firms per country in the sample, respectively. All of the variables are defined in Appendix I.
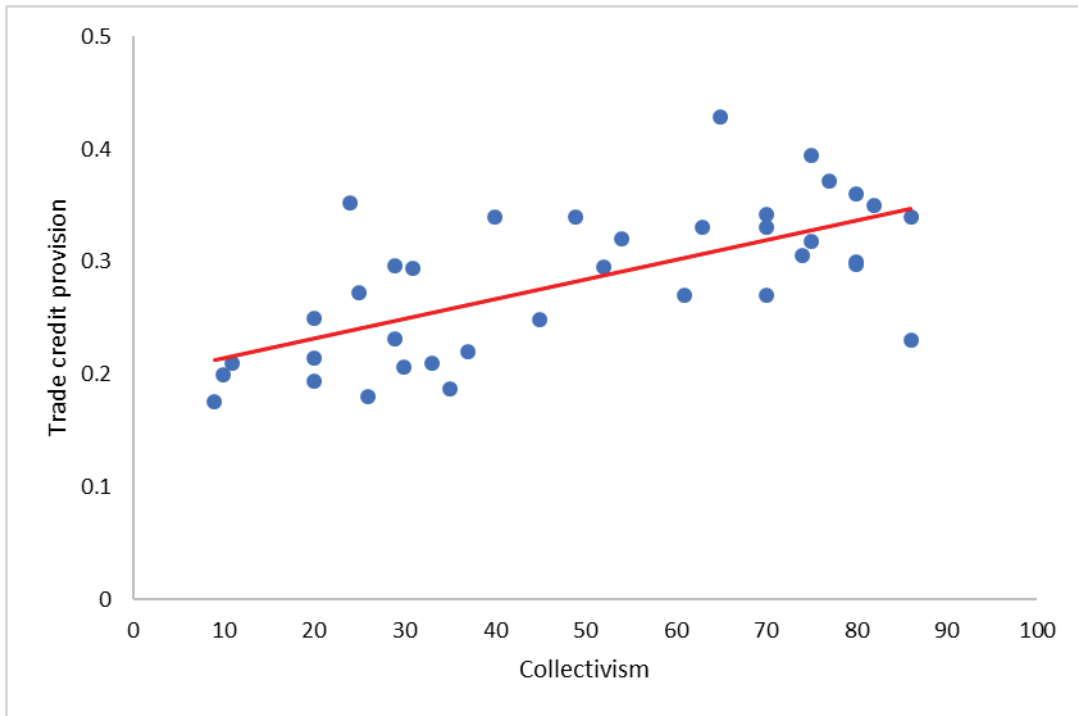
a. Collectivism and trade credit provision
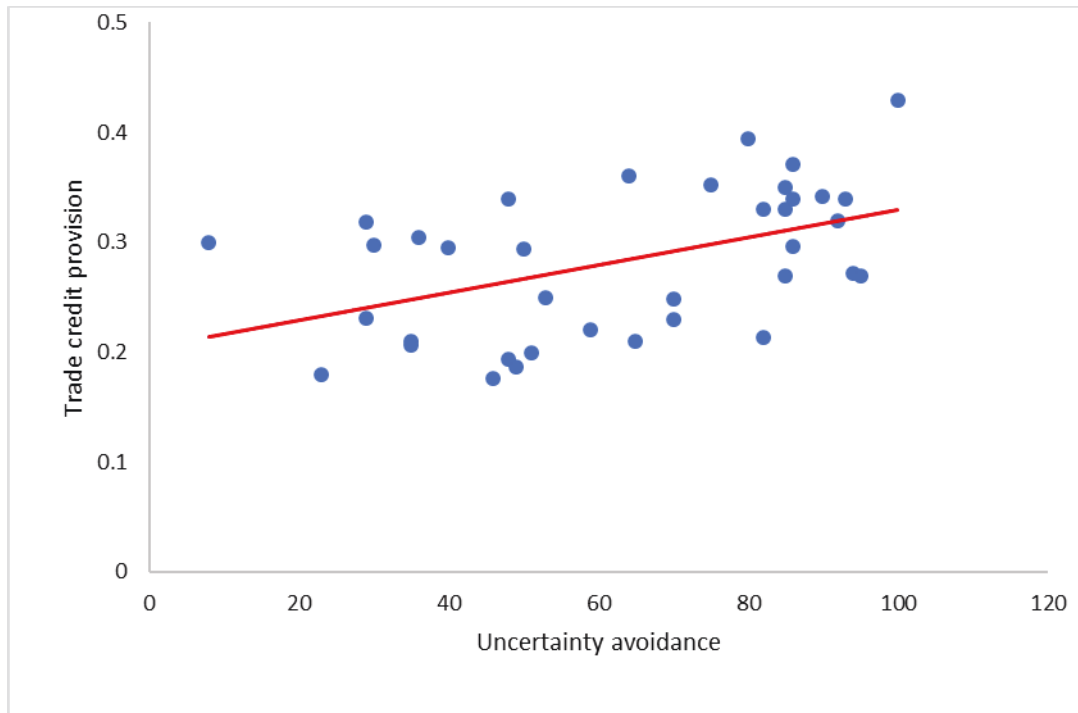
b. Uncertainty avoidance and Trade credit provision

Figure 1–Cultural differences across countries and trade credit provision (TCP)

Table 2–Influence of national culture on trade credit provision (TCP)

	Full sample		Sample without the United States	
	(1)	(2)	(3)	(4)
CLT	0.143***		0.122***	
	(0.002)		(0.001)	
UAI		0.083***		0.064***
		(0.005)		(0.002)
SGROWTH	−0.006***	−0.009***	−0.011***	−0.015***
	(0.024)	(0.046)	(0.039)	(0.054)
SIZE	−0.038***	−0.032***	−0.055***	−0.046***
	(0.018)	(0.017)	(0.018)	(0.017)
STLEV	0.259***	0.273***	0.302***	0.307***
	(0.003)	(0.003)	(0.003)	(0.004)
INVENT	0.048***	0.052***	0.019***	0.022***
	(0.006)	(0.004)	(0.005)	(0.006)
TANG	−0.217***	−0.188***	−0.263***	−0.245***
	(0.023)	(0.033)	(0.074)	(0.063)
GPROF	0.034***	0.020***	0.058***	0.051***
	(0.002)	(0.003)	(0.003)	(0.003)
GDPGROWTH	−0.160***	−0.995***	−0.115***	−0.583***
	(0.005)	(0.005)	(0.005)	(0.005)
Constant	0.310***	0.227***	0.398***	0.362***
	(0.006)	(0.007)	(0.008)	(0.008)
IND and YR FE	Yes	Yes	Yes	Yes
Observations	111,919	111,919	81,722	81,722
R-squared	0.210	0.186	0.200	0.176

The definitions of all of the variables are reported in Appendix I. Random-effects GLS regression with robust standard errors is used to estimate all of the models. Robust standard errors are presented in parentheses. Columns (1) and (2) present the results of the full samples, while Columns (3) and (4) report the results of the sample without the U.S. The coefficients for CLT and UAI are multiplied by 100 for ease of interpretation. ***, **, and * show 1%, 5%, and 10% significance levels, respectively.

Table 3–Robustness test

		Coefficient of CLT	Coefficients of UAI
Panel A. Full sample			
(1)	**Alternative definitions of trade credits**		
	TCP_2	0.077***	0.083***
		(0.001)	(0.002)
(2)	**Alternative measures of CLT and UAI**		
	GLOBE	0.058***	0.105***
		(0.002)	(0.001)
	Tang and Koveos (2008)	0.174***	0.154***
		(0.004)	(0.003)
	Schwartz (1994)	0.079***	-
		(0.003)	-
(3)	**Endogeneity problems**		
	Additional country-level control variables	0.091***	0.121***
		(0.004)	(0.005)
(4)	**Alternative estimation methods**		
	Fama–MacBeth regression	0.126***	0.089***
		(0.003)	(0.005)
	Weighted least squares regression	0.200***	0.033***
		(0.003)	(0.004)
Panel B. Sample without the United States			
(1)	**Alternative definitions of trade credits**		
	TCP_2	0.023***	0.052***
		(0.002)	(0.003)
(2)	**Alternative measures of CLT and UAI**		
	GLOBE	0.035***	0.085***
		(0.002)	(0.001)
	Tang and Koveos (2008)	0.145***	0.072***
		(0.003)	(0.004)
	Schwartz (1994)	0.067***	-
		(0.002)	-
(3)	**Endogeneity problems**		
	Additional country-level control variables	0.097***	0.109***
		(0.005)	(0.006)
(4)	**Alternative estimation methods**		
	Fama–MacBeth regression	0.119***	0.067***
		(0.002)	(0.003)
	Weighted least squares regression	0.219***	0.040***
		(0.004)	(0.003)

The definitions of all of the variables are presented in Appendix I. Random-effects GLS regression with robust standard errors was used to estimate all of the models. Robust standard errors are presented in parentheses. Panel A presents the regression results for the full sample, while Panel B reports the regression results for the sample without the U.S. In this table, we only provide the coefficients for CLT and UAI because of space constraints. These coefficients are multiplied by 100 for ease of interpretation. ***, **, and * show 1%, 5%, and 10% significance levels, respectively.

Table 4–Instrumental variables (IV) regression

Panel A. First-stage regression

Dependent variables	Full sample		Sample without the United States	
	CLT	UAI	CLT	UAI
	(1)	(2)	(3)	(4)
DISEASE	33.780***		25.570***	
	(0.076)		(0.034)	
MUSLIM		−0.735		−0.520
		(0.554)		(−0.456)
CATHOLIC		0.529		0.515
		(0.245)		(0.203)
PROTESTANT		−0.728***		−0.736***
		(0.089)		(0.078)
IND and YR	Yes	Yes	Yes	Yes
Under-identification test	42.04***	31.04***	20.04***	28.00***
F-test of excluded instruments (Weak identification test)	51.05***	22.00***	47.00***	18.04***
P-value of the Hansen J test Over-identification		0.343		0.260

Panel B. Second-stage regression

Dependent variables	Full sample		Sample excluding the United States	
	TCP	TCP	TCP	TCP
	(1)	(2)	(3)	(4)
Predicted_CLT	0.159***		0.180***	
	(0.036)		(0.028)	
Predicted_UAI		0.089***		0.079***
		(0.041)		(0.036)
SGROWTH	−0.006***	−0.016***	−0.012***	−0.016***
	(0.027)	(0.056)	(0.028)	(0.067)
SIZE	−0.036***	−0.028***	−0.055***	−0.028***
	(0.031)	(0.021)	(0.032)	(0.022)
STLEV	0.257***	0.273***	0.303***	0.273***
	(0.013)	(0.023)	(0.016)	(0.033)
INVENT	0.046***	0.061***	0.011*	0.061***
	(0.005)	(0.006)	(0.006)	(0.008)
TANG	−0.223***	−0.173***	−0.278***	−0.173***
	(0.013)	(0.023)	(0.012)	(0.037)
GPROF	0.033***	0.010***	0.063***	0.012***
	(0.004)	(0.003)	(0.003)	(0.005)
GDPGROWTH	−0.013	−0.729***	−0.028	−0.726***
	(0.038)	(0.026)	(0.032)	(0.035)
Constant	0.288***	0.244***	0.370***	0.248***
	(0.024)	(0.038)	(0.031)	(0.047)
IND and YR	Yes	Yes	Yes	Yes
Observations	93,218	111,919	63,208	81,722
R-squared	0.214	0.179	0.195	0.165

The results of the first-stage regressions are shown in Panel A, in which the disease (DISEASE) variable is an instrumental variable for collectivism (CLT) and Protestant (PROTESTANT), Roman Catholic (CATHOLIC), and Muslim (MUSLIM) are instruments for uncertainty avoidance (UAI). The results of the second-stage regressions are shown in Panel B, in which Predicted_CLT and Predicted_UAI are the predicted cultural indices obtained from the first-stage regressions. The definitions of all of the variables are presented in Appendix I. The results for the full sample are presented in Columns (1) and (2), while the results for the full sample without the U.S. are reported in Columns (3) and (4). The coefficients for Predicted_CLT and Predicted_UAI are multiplied by 100 for the ease of interpretation. Robust standard errors are presented in parentheses. ***, **, and * show 1%, 5%, and 10% significance levels, respectively.

Table 5–National culture and financial motives

	Full sample				Sample without the United States			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CLT	0.124***		0.123***		0.117***		0.109***	
	(0.002)		(0.003)		(0.002)		(0.003)	
CLT * CFLOW	0.341***				0.156***			
	(0.031)				(0.036)			
CLT * LIQ			0.253***				0.203***	
			(0.017)				(0.018)	
UAI		0.0637***		0.044***		0.032***		0.017***
		(0.003)		(0.002)		(0.002)		(0.002)
UAI * CFLOW		0.333***				0.263***		
		(0.033)				(0.063)		
UAI * LIQ				0.203***				0.252***
				(0.027)				(0.017)
CFLOW	0.147***	0.172***			0.086***	0.105***		
	(0.038)	(0.036)			(0.053)	(0.067)		
LIQ			0.176***	0.181***			0.204***	0.214***
			(0.049)	(0.051)			(0.064)	(0.087)
SGROWTH	−0.007***	−0.010***	−0.0035*	−0.006***	−0.013***	−0.017***	−0.008***	−0.0117***
	(0.016)	(0.015)	(0.019)	(0.022)	(0.021)	(0.026)	(0.027)	(0.049)
SIZE	−0.049***	−0.047***	−0.052***	−0.052***	−0.060***	−0.052***	−0.066***	−0.0625***
	(0.002)	(0.003)	(0.004)	(0.005)	(0.008)	(0.006)	(0.001)	(0.005)
STLEV	0.289***	0.308***	0.263***	0.271***	0.314***	0.320***	0.304***	0.305***
	(0.003)	(0.003)	(0.002)	(0.006)	(0.008)	(0.007)	(0.004)	(0.007)
INVENT	0.040***	0.041***	0.044***	0.048***	0.017***	0.019***	0.0191***	0.0242***
	(0.045)	(0.056)	(0.068)	(0.076)	(0.085)	(0.055)	(0.068)	(0.078)
TANG	−0.227***	−0.205***	−0.245***	−0.215***	−0.268***	−0.251***	−0.293***	−0.270***
	(0.029)	(0.028)	(0.038)	(0.043)	(0.052)	(0.095)	(0.046)	(0.054)
GPROF	0.024***	0.010***	0.034***	0.025***	0.053***	0.044***	0.0848***	0.0746***
	(0.002)	(0.003)	(0.005)	(0.006)	(0.003)	(0.008)	(0.004)	(0.008)
GDPGROWTH	−0.186***	−0.745***	−0.219***	−1.062***	−0.142***	−0.480***	−0.255***	−0.734***
	(0.022)	(0.022)	(0.032)	(0.031)	(0.023)	(0.052)	(0.033)	(0.038)
Constant	0.361***	0.309***	0.351***	0.319***	0.416***	0.393***	0.449***	0.406***
	(0.058)	(0.060)	(0.073)	(0.075)	(0.069)	(0.078)	(0.093)	(0.062)
IND and YR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	111,919	111,919	111,919	111,919	81,722	81,722	81,722	81,722
R-squared	0.224	0.204	0.233	0.215	0.212	0.193	0.215	0.185

The definitions of all of the variables are presented in Appendix I. Random-effects GLS regression with robust standard errors was used to estimate all of the models. The coefficients for CLT and UAI, along with their interaction terms, are multiplied by 100 for ease of interpretation. Columns (1)–(4) report the findings for the full sample, while Columns (5)–(8) present the results for the sample without U.S. states. Robust standard errors are presented in parentheses. ***, **, and * show 1%, 5%, and 10% significance levels, respectively.

Table 6–National culture and operational motives

	Full sample				Sample without the United States			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CLT	0.124***		0.144***		0.118***		0.122***	
	(0.002)		(0.002)		(0.001)		(0.003)	
CLT * SALESVOL	0.175***				0.172***			
	(0.094)				(0.045)			
CLT * DEMANDUNCERT			0.286***				0.208***	
			(0.011)				(0.013)	
UAI		0.076***		0.082***		0.039***		0.041***
		(0.002)		(0.002)		(0.002)		(0.002)
UAI * SALESVOL		0.124***				0.124***		
		(0.023)				(0.025)		
UAI * DEMANDUNCERT				0.117***				0.101***
				(0.010)				(0.012)
SALESVOL	0.015***	0.053***			0.014	0.047***		
	(0.043)	(0.012)			(0.014)	(0.013)		
DEMANDUNCERT			0.028***	0.060***			0.024***	0.050***
			(0.045)	(0.041)			(0.045)	(0.043)
SGROWTH	−0.007***	−0.009***	−0.006***	−0.008***	−0.059***	−0.021***	−0.011***	−0.014***
	(0.023)	(0.021)	(0.016)	(0.017)	(0.067)	(0.026)	(0.020)	(0.021)
SIZE	−0.039***	−0.034***	−0.038***	−0.033***	−0.105***	−0.049***	−0.056***	−0.048***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)	(0.004)	(0.001)	(0.001)
STLEV	0.257***	0.270***	0.258***	0.271***	0.305***	0.304***	0.302***	0.305***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
INVENT	0.050***	0.055***	0.049***	0.053***	0.084***	0.024***	0.020***	0.0240***
	(0.047)	(0.048)	(0.045)	(0.047)	(0.021)	(0.057)	(0.055)	(0.056)
TANG	−0.216***	−0.186***	−0.215***	−0.187***	−0.304***	−0.245***	−0.261***	−0.243***
	(0.021)	(0.029)	(0.029)	(0.029)	(0.065)	(0.036)	(0.031)	(0.035)
GPROF	0.034***	0.018***	0.034***	0.021***	0.083***	0.055***	0.058***	0.0517***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.007)	(0.003)	(0.003)	(0.003)
GDPGROWTH	−0.153***	−0.981***	−0.187***	−0.907***	−0.042	−0.579***	−0.140***	−0.521***
	(0.023)	(0.025)	(0.022)	(0.023)	(0.051)	(0.028)	(0.023)	(0.026)
Constant	0.323***	0.259***	0.370***	0.234***	0.548***	0.421***	0.399***	0.369***
	(0.069)	(0.071)	(0.056)	(0.059)	(0.092)	(0.093)	(0.075)	(0.038)
IND and YR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	111,919	111,919	111,919	111,919	81,722	81,722	81,722	81,722
R-squared	0.212	0.187	0.224	0.201	0.183	0.176	0.200	0.190

The definitions of all of the variables are presented in Appendix I. Random-effects GLS regression with robust standard errors was used to estimate all of the models. The coefficients for CLT and UAI, along with their interaction terms, are multiplied by 100 for ease of interpretation. Columns (1)–(4) report the findings for the full sample, while Columns (5)–(8) present the results for the sample without U.S. states. Robust standard errors are presented in parentheses. ***, **, and * show 1%, 5%, and 10% significance levels, respectively.

Table 7–National culture and commercial motives

	Full sample				Sample without the United States			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CLT	0.188***		0.169***		0.155***		0.131***	
	(0.004)		(0.002)		(0.007)		(0.003)	
CLT * AGE	−0.032***				−0.029***			
	(0.005)				(0.008)			
CLT * MKSHARE			−0.057***				−0.027***	
			(0.003)				(0.004)	
UAI		0.057***		0.093***		0.045***		0.059***
		(0.003)		(0.003)		(0.003)		(0.004)
UAI * AGE		−0.015***				−0.025***		
		(0.002)				(0.003)		
UAI * MKSHARE				−0.028***				−0.029***
				(0.003)				(0.001)
AGE	−0.017***	−0.027***			−0.075*	−0.028***		
	(0.023)	(0.015)			(0.044)	(0.017)		
MKSHARE			−0.080***	−0.061***			−0.102***	−0.088***
			(0.011)	(0.011)			(0.034)	(0.023)
SGROWTH	−0.008***	−0.014***	−0.004**	−0.009***	−0.010***	−0.016***	−0.011***	−0.015***
	(0.019)	(0.014)	(0.016)	(0.017)	(0.024)	(0.021)	(0.020)	(0.022)
SIZE	−0.039***	−0.046***	−0.013***	−0.016***	−0.057***	−0.046***	−0.038***	−0.037***
	(0.012)	(0.016)	(0.015)	(0.020)	(0.016)	(0.014)	(0.025)	(0.018)
STLEV	0.243***	0.310***	0.266***	0.274***	0.290***	0.305***	0.303***	0.306***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
INVENT	0.046***	0.153***	0.046***	0.0509***	0.018***	0.021***	0.0195***	0.0226***
	(0.050)	(0.046)	(0.045)	(0.046)	(0.060)	(0.055)	(0.054)	(0.055)
TANG	−0.218***	−0.042***	−0.208***	−0.189***	−0.264***	−0.245***	−0.264***	−0.246***
	(0.033)	(0.029)	(0.035)	(0.029)	(0.039)	(0.035)	(0.035)	(0.035)
GPROF	0.025***	0.207***	0.031***	0.040***	0.053***	0.049***	0.058***	0.0508***
	(0.028)	(0.025)	(0.025)	(0.024)	(0.036)	(0.032)	(0.031)	(0.032)
GDPGROWTH	−0.260***	−0.061**	−0.119***	−0.168***	−0.171***	−0.548***	−0.098***	−0.567***
	(0.025)	(0.023)	(0.021)	(0.023)	(0.027)	(0.026)	(0.025)	(0.027)
Constant	0.337***	0.321***	0.358***	0.319***	0.422***	0.373***	0.423***	0.409***
	(0.069)	(0.061)	(0.012)	(0.013)	(0.010)	(0.078)	(0.016)	(0.018)
IND and YR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	111,919	111,919	111,919	111,919	81,722	81,722	81,722	81,722
R-squared	0.232	0.219	0.226	0.211	0.224	0.191	0.203	0.186

The definitions of all of the variables are presented in Appendix I. Random-effects GLS regression with robust standard errors was used to estimate all of the models. The coefficients CLT and UAI, along with their interaction terms, are multiplied by 100 for ease of interpretation. Columns (1)–(4) report the findings for the full sample, while Columns (5)–(8) present the results for the sample without U.S. states. Robust standard errors are presented in parentheses. ***, **, and * show 1%, 5%, and 10% significance levels, respectively.

Table 8–Descriptive statistics for each U.S. state

State	Obs (1)	N (2)	TCP (3)	Cultural index State CLT (4)	Firm-level variables SGROWTH (5)	SIZE (6)	STLEV (7)	INVENT (8)	TANG (9)	GPROF (10)	State-level variable State-level GDPGROWTH (11)
Alabama	50	7	0.107	57	0.045	4.481	0.182	0.041	0.134	0.199	0.01
Alaska	8	1	0.501	48	0.098	4.686	0.778	0.143	0.264	0.626	0.01
Arizona	526	49	0.163	49	0.092	4.542	0.216	0.147	0.101	0.444	0.03
Arkansas	164	17	0.104	54	0.028	4.548	0.274	0.145	0.257	0.309	0.02
California	6,688	1,429	0.192	60	0.074	4.529	0.295	0.128	0.088	0.466	0.04
Colorado	699	78	0.165	36	0.019	4.176	0.226	0.140	0.133	0.464	0.02
Connecticut	413	43	0.163	50	0.023	4.347	0.234	0.190	0.125	0.409	0.01
Delaware	16	3	0.333	55	0.107	3.955	0.160	0.191	0.033	0.274	0.02
Florida	1,704	205	0.143	54	0.033	3.935	0.257	0.185	0.106	0.392	0.03
Georgia	435	44	0.181	60	0.057	4.328	0.256	0.080	0.092	0.545	0.03
Hawaii	40	5	0.158	91	0.087	3.849	0.188	0.213	0.618	0.414	0.02
Idaho	67	7	0.118	42	0.097	3.798	0.340	0.275	0.202	0.308	0.03
Illinois	754	63	0.165	52	0.029	4.708	0.195	0.127	0.151	0.370	0.02
Indiana	83	13	0.134	57	0.196	4.677	0.118	0.151	0.202	0.253	0.02
Iowa	81	10	0.103	39	0.042	4.126	0.211	0.188	0.503	0.184	0.02
Kansas	145	16	0.195	38	0.122	4.654	0.295	0.199	0.175	0.337	0.02
Kentucky	54	8	0.199	53	0.219	4.647	0.165	0.114	0.195	0.509	0.01
Louisiana	72	10	0.281	72	0.134	4.908	0.147	0.131	0.336	0.216	0.02
Maine	28	3	0.126	45	0.030	3.787	0.124	0.128	0.242	0.624	0.02
Maryland	537	62	0.181	63	0.044	3.972	0.304	0.052	0.086	0.545	0.03
Massachusetts	2,117	238	0.176	46	0.089	4.398	0.263	0.106	0.088	0.565	0.02
Michigan	338	39	0.197	46	0.069	4.461	0.231	0.125	0.140	0.364	0.02
Minnesota	1,108	108	0.163	41	0.067	4.455	0.180	0.138	0.111	0.498	0.02
Mississippi	45	4	0.213	64	0.019	5.207	0.119	0.043	0.325	0.199	0.01
Missouri	186	16	0.133	46	0.027	4.451	0.128	0.164	0.190	0.340	0.01
Montana	30	3	0.058	31	0.007	4.021	0.313	0.084	0.563	0.146	0.03
Nebraska	113	9	0.170	35	0.107	4.384	0.177	0.159	0.071	0.492	0.02
Nevada	464	67	0.149	52	0.050	3.800	0.259	0.153	0.148	0.401	0.03
New Hampshire	80	9	0.112	43	0.137	4.383	0.341	0.143	0.133	0.541	0.02
New Jersey	1,791	200	0.169	59	0.046	4.155	0.244	0.128	0.088	0.495	0.01
New Mexico	15	5	0.181	51	0.021	4.870	0.135	0.238	0.096	0.472	0.01
New York	2,084	227	0.155	53	0.033	4.433	0.201	0.141	0.099	0.411	0.02
North Carolina	1,114	53	0.154	56	0.018	4.415	0.247	0.135	0.085	0.470	0.02

State	Obs (1)	N (2)	TCP (3)	Cultural index State CLT (4)	Firm-level variables SGROWTH (5)	SIZE (6)	STLEV (7)	INVENT (8)	TANG (9)	GPROF (10)	State –level variables GDPGROWTH (11)
North Dakota	39	4	0.098	37	0.033	5.022	0.182	0.096	0.513	0.174	0.04
Ohio	336	35	0.136	45	0.039	4.494	0.202	0.152	0.147	0.383	0.02
Oklahoma	133	10	0.116	42	0.044	4.513	0.191	0.302	0.159	0.309	0.03
Oregon	260	26	0.113	33	0.030	4.439	0.184	0.167	0.226	0.352	0.03
Pennsylvania	1,111	130	0.172	52	0.076	4.206	0.256	0.138	0.118	0.487	0.02
Rhode Island	82	7	0.176	48	0.071	4.780	0.133	0.165	0.151	0.433	0.01
South Carolina	730	79	0.222	70	0.039	4.402	0.247	0.143	0.163	0.349	0.03
South Dakota	10	2	0.122	36	0.024	3.372	0.141	0.070	0.227	0.193	0.02
Tennessee	160	22	0.146	56	0.093	3.776	0.279	0.092	0.118	0.371	0.02
Texas	3,251	344	0.202	58	0.055	4.551	0.257	0.140	0.164	0.382	0.03
Utah	455	45	0.156	61	0.053	4.231	0.198	0.131	0.107	0.524	0.04
Vermont	52	4	0.103	42	0.167	5.034	0.136	0.101	0.369	0.415	0.01
Virginia	573	51	0.176	60	0.034	4.500	0.215	0.161	0.240	0.358	0.02
Washington	667	78	0.162	37	0.065	4.228	0.251	0.103	0.083	0.567	0.03
West Virginia	102	5	0.283	48	0.004	4.978	0.265	0.079	0.211	0.390	0.01
Wisconsin	176	18	0.157	46	0.141	4.220	0.191	0.142	0.105	0.409	0.02
Wyoming	11	3	0.075	35	0.040	2.769	0.663	0.127	0.019	0.165	0.02
Total	30,197	3,914	0.176	58	0.059	4.423	0.255	0.133	0.109	0.443	0.03

This table provides the average of the main variables by U.S. state. Obs. and N are the observations and the number of manufacturing firms per state in the sample, respectively. State CLT is obtained from the study of Vandello and Cohen (1999). The other variables are defined in Appendix I.
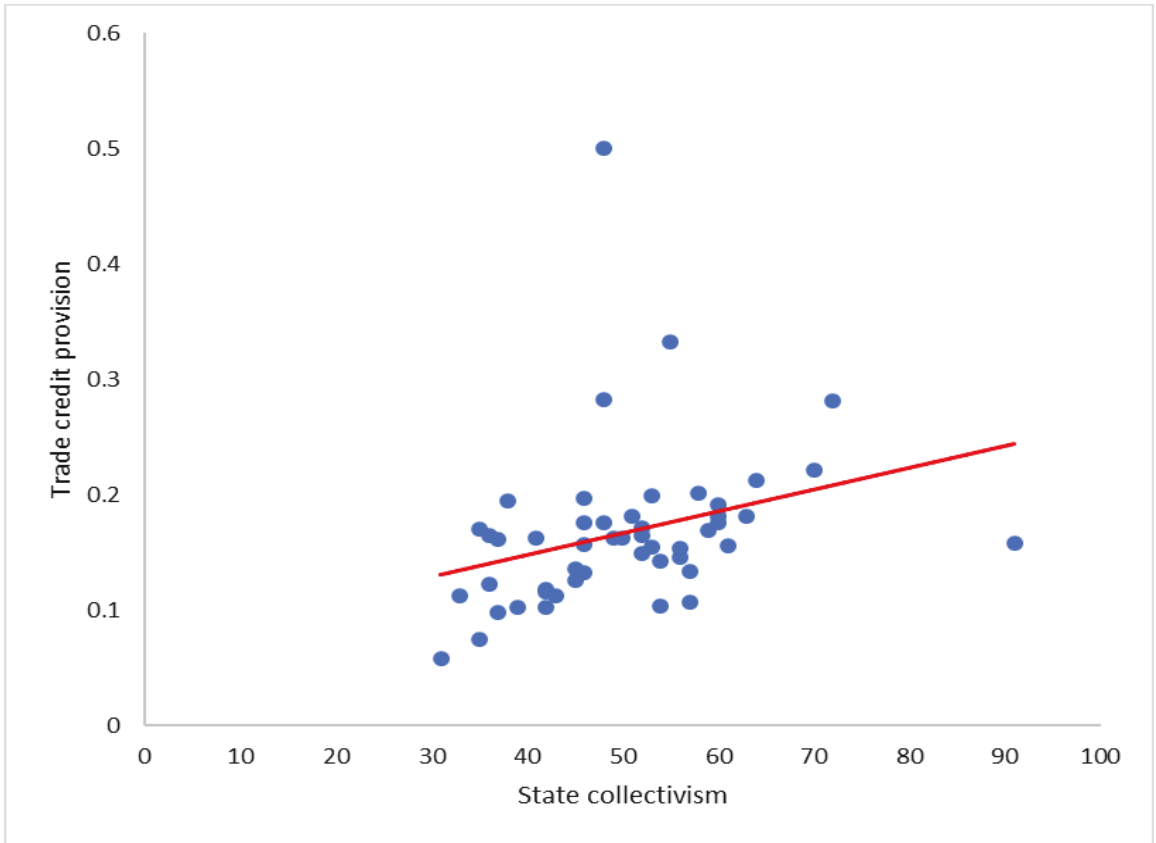
Figure 2–Collectivism and trade credit provision (TCP) across U.S. states

Table 9–The influence of the state-level individualism-collectivism dimension on trade credit provision and the interaction of this cultural dimension with financial motives, operational motives, and commercial motives in the United States

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
State CLT	0.143***	0.187***	0.173***	0.142***	0.126***	0.149***	0.165***
	(0.001)	(0.002)	(0.003)	(0.004)	(0.005)	(0.003)	(0.005)
State CLT * CFLOW		0.360***					
		(0.004)					
State CLT * LIQ			0.271***				
			(0.004)				
State CLT * SALESVOL				0.231***			
				(0.002)			
State CLT * DEMANDUNCERT					0.234*		
					(0.017)		
State CLT * AGE						−0.069***	
						(0.008)	
State CLT * MKSHARE							−0.078***
							(0.002)
CFLOW		0.090***					
		(0.030)					
LIQ			0.146***				
			(0.023)				
SALESVOL				0.071			
				(0.027)			
DEMANDUNCERT					0.029**		
					(0.019)		
AGE						−0.035	
						(0.025)	
MKSHARE							−0.063
							(0.033)
SGROWTH	−0.022 ***	−0.031	−0.019	−0.018***	−0.013***	−0.004*	−0.010***
	(0.016)	(0.033)	(0.034)	(0.029)	(0.024)	(0.026)	(0.027)
SIZE	−0.160***	−0.027***	−0.172***	−0.015***	−0.013***	−0.017***	−0.011***
	(0.015)	(0.029)	(0.029)	(0.037)	(0.045)	(0.074)	(0.024)
STLEV	0.183***	0.248***	0.148***	0.181***	0.185***	0.169***	0.184***
	(0.052)	(0.091)	(0.096)	(0.054)	(0.042)	(0.052)	(0.055)
INVENT	0.072***	0.074***	0.064***	0.073***	0.071***	0.074***	0.070***
	(0.075)	(0.063)	(0.032)	(0.076)	(0.067)	(0.075)	(0.069)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TANG	−0.092***	−0.118***	−0.141***	−0.091***	−0.107***	−0.115***	−0.107***
	(0.048)	(0.071)	(0.072)	(0.084)	(0.071)	(0.048)	(0.068)
GPROF	0.009**	0.0113*	0.059***	0.010**	0.015***	−0.015**	−0.032***
	(0.041)	(0.065)	(0.069)	(0.041)	(0.044)	(0.041)	(0.045)
State-level GDPGROWTH	−0.222***	−0.255***	−0.244***	−0.218***	−0.256***	−0.117**	−0.217***
	(0.046)	(0.056)	(0.078)	(0.063)	(0.085)	(0.098)	(0.087)
Constant	0.065***	0.168***	0.208***	0.085***	0.172***	0.095***	0.0487***
	(0.019)	(0.014)	(0.015)	(0.017)	(0.018)	(0.021)	(0.038)
IND and YR	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	30,197	30,197	30,197	30,197	30,197	30,197	30,197
R-squared	0.136	0.145	0.110	0.137	0.139	0.120	0.138

The definitions of all of the variables are presented in Appendix I. Random-effects GLS regression with robust standard errors was used to estimate all of the models. The coefficient for State CLT, along with their interaction terms, are multiplied by 100 for ease of interpretation. Robust standard errors are presented in parentheses. ***, **, and * show 1%, 5%, and 10% significance levels, respectively.

Appendix I–The definitions of the variables

Variables	Descriptions	Sources
TCP	Trade credit provision is defined as accounts receivable over sales.	DataStream and Thomson One
TCP_2	An alternative measure of trade credit provision is calculated as accounts receivable divided by total assets.	DataStream and Thomson One
CLT	The index of collectivism created by Hofstede.	Hofstede (2001)
UAI	The index of uncertainty avoidance created by Hofstede.	Hofstede (2001)
SGROWTH	Sales growth is calculated as sales annual growth.	DataStream and Thomson One
SIZE	Firm size is the natural logarithm of sales.	DataStream and Thomson One
STLEV	Short-term finance is defined as the ratio of current liabilities to sales.	DataStream and Thomson One
LIQ	Liquidity is defined as cash and cash equivalents over total assets.	DataStream and Thomson One
CFLOW	Cash flow is defined as the ratio of earnings before interest and tax plus depreciation to total assets.	DataStream and Thomson One
INVENT	Inventories are defined as the ratio of finished goods held by firms to sales	DataStream and Thomson One
TANG	The tangibility of assets is the ratio of net property, plant, and equipment to total assets.	DataStream and Thomson One
GPROF	Gross profit margin is the ratio of gross profit to sales.	DataStream and Thomson One
SALESVOL	Sale volatility is defined by the standard deviation of sales (3 years) divided by mean sales over a 3-year period.	DataStream and Thomson One
DEMANDUNCERT	Demand uncertainty is measured by the standard deviation of long changes in sales.	DataStream and Thomson One
AGE	Firm age is defined as the logarithm of (1 + age), where age is the number of years since the firm was founded.	DataStream and Thomson One
MKSHARE	Market share is defined as the ratio of annual firm sales to annual industry sales.	DataStream and Thomson One
GDPGROWTH	The annual growth rate of GDP for each country in the sample.	World Bank Databank
State-level GDPGROWTH	The annual growth rate of GDP for each U.S. state	The U.S. Bureau of Economic Analysis.
INFLATION	Inflation is measured by the annual growth rate of the GDP implicit deflator.	World Bank Databank
PRIVATE CREDIT	The ratio of private credit to GDP	World Bank Databank
CREDIT RIGHTS	"An index of credit rights, which measures four powers of secured lenders in bankruptcy: (1) whether there are restrictions, such as creditor consent, when a debtor files for reorganization; (2) whether secured creditors are able to seize their collateral after the petition for reorganization is approved, i.e., whether there is no automatic stay or asset freeze imposed by the court; (3) whether secured creditors are paid first out of the proceeds of liquidating a bankrupt firm; and (4) whether an administrator, not management, is responsible for running the business during the reorganization. A value of one is added to the index when a country's laws and regulations provide each of these powers to secured lenders. The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights) and is constructed every January from 1978 to 2003" (Bae and Goyal, 2009, p. 857).	Djankov et al. (2007)

Variables	Descriptions	Sources
LAW AND ORDER	An indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. This index is scored from 1 to 6. Lower scores indicate a tradition of depending on physical force or illegal means to settle claims, while higher scores indicate sound political institutions and a strong court system.	International Country Risk Guides
DISEASE	"An overall index of the historical prevalence of nine diseases in various geopolitical regions around the world. Leishmanias, schistosomes, trypanosomes, leprosy, malaria, typhus, filariae, dengue, and tuberculosis are among the nine diseases that have been coded. The overall index has a mean value of approximately 0. Positive scores represent disease prevalence that is greater than the mean, whereas negative scores indicate disease prevalence that is less than the mean" (Murray and Schaller, 2010, p.101).	Murray and Schaller (2010)
PROTESTANT	Percentage of the population that was Protestant in 1980	La Porta et al. (1999)
CATHOLIC	Percentage of the population that was Roman Catholic in 1980	La Porta et al. (1999)
MUSLIM	Percentage of the population that was Muslim in 1980	La Porta et al. (1999)
State CLT	The index of collectivism-individualism developed by Vandello and Cohen (1999). A higher score indicates a higher level of collectivism.	Vandello and Cohen (1999)

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