International evidence on state ownership and trade credit: Opportunities and motivations

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Abstract

Recent events, most notably the Global Financial Crisis and the COVID-19 pandemic, have made it increasingly apparent that liquidity is synonymous with corporate survival. In this paper, we explore how governments can fulfill an important need as suppliers of liquidity. Building on the financing advantage view of state ownership, we theorize how state-owned enterprises (SOEs) may provide capital by offering trade credit to customer firms. The data indicate a positive relation between the level of state ownership and the provision of trade credit. Using an institution-focused framework, we further determine that the nation's institutional environment systematically affects the opportunities and motivations for SOEs to grant trade credit. Specifically, we find that SOEs grant more trade credit in countries with less developed financial markets, weaker legal protection of creditors, less comprehensive information-sharing mechanisms, more collectivist societies, left-wing governments, and higher levels of unemployment. Firm-level factors also influence the credit-granting decisions of SOEs, with SOEs with lower levels of state ownership and higher extents of internationalization offering lower amounts of trade credit. Overall, our study offers novel insights regarding the important role of state-owned firms as providers of liquidity.

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INTRODUCTION

Understanding how state ownership influences firm decision-making and performance has been an important theme in international business research and at JIBS (e.g., Boubakri, Guedhami, Kwok, & Saffar, 2016; Cuervo-Cazurra, Inkpen, Musacchio, & Ramaswamy, 2014; Vaaler & Schrage, 2009). The argument for state ownership rests on the ability of government ownership to overcome market weaknesses and allow firms to pursue socially desirable objectives (Megginson & Netter, 2001). This paper investigates one of the ways state-owned enterprises (SOEs) can compensate for financial market weakness, namely, by supplying trade credit.

Trade credit is pervasive around the world (Beck, Demirgüç-Kunt, & Maksimovic, 2008; Demirgüç-Kunt & Maksimovic, 2001; El Ghouli & Zheng, 2016; Rajan & Zingales, 1995). For instance, in our sample of publicly listed industrial firms from 64 countries, aggregate trade credit reached nearly \$US 4.7 trillion in 2013, with approximately 20% (16%) of the average firm's sales (assets) in trade receivables. Speaking broadly to the importance of this ubiquitous source of financing, extant research (e.g., Carbo-Valverde, Rodriguez-Fernandez, & Udell, 2016; Fisman & Love, 2003; Garcia-Appendini & Montoriol-Garriga, 2013) concludes that industries that rely on trade credit experience faster growth and exhibit greater resiliency to financial crises. However, compared to other sources of financing, prior literature tells us little about the determinants of the provision of trade credit in an international setting.

Building on the financing advantage theory of trade credit (e.g., Meltzer, 1960; Nilsen, 2002; Petersen & Rajan, 1997), we posit that the link between state ownership and trade credit is contingent upon SOEs' greater access to financing. The soft budget constraint view holds that the government can relax an SOE's budget constraint by providing easy access to finance, as well as tax discounts and other forms of support (Kornai, Maskin, & Roland, 2003). We argue that these financing advantages present the SOE with greater opportunities to extend trade credit, opportunities that will be further enhanced by higher levels of state ownership. Thus, the financing advantage theory predicts that firms with greater levels of state ownership should provide more trade credit.

Consistent with the financing advantage theory, the data indeed indicate a strongly significant positive relation between state ownership and trade credit. However, our data also indicate that the relation between state ownership and trade credit varies across countries (i.e., there appears to be variation in this relation that the financing advantage theory alone cannot fully explain). Thus, the unanswered (and perhaps more intriguing) question is why the relation between state ownership and trade credit varies across nations. We turn to international business theories to seek answers. We follow Grøgaard, Rygh, and Benito (2019), Knutsen, Rygh, and Hveem (2011), and Puck and Filatotchev (2018) and similarly conduct research to "bridge" the domains of finance and international business (IB). Specifically, we endeavor to complement our more finance-centric study of trade credit provision

by SOEs by positioning it within a broader IB context. To this end, we evaluate SOEs' credit-granting decisions using core IB perspectives (Puck & Filatotchev, 2018: 2), and consider how (1) macro- or country-level, and (2) micro- or firm-level factors affect the relation between state ownership and trade credit provision.

Using an institution-focused framework (Williamson, 2000), we contend that the extent to which an SOE will exploit financing advantages is shaped by a nation's institutional environment. Most notably, we contend that the institutional environment affects the SOE's opportunities and motivations to extend trade credit. Accordingly, a large part of our theoretical framework and empirical analysis involves exploring the impact of various country-level (institutional) boundary conditions on credit-granting decisions by SOEs.¹

Further helping us to seek answers to our question about the decision-making process of SOEs, the IB frameworks of Grøgaard et al. (2019), Knutsen et al. (2011), and Puck and Filatotchev (2018) suggest that we should consider firm-level factors (in addition to the institutional environment). Therefore, we also examine firm-level characteristics to identify clues about the relation between state ownership and trade credit. We specifically investigate how firm-level boundary conditions (such as the firm's extent of state ownership and degree of internationalization) can impact the credit-granting decisions of SOEs.

Our sample of 574 newly privatized firms (NPFs) from 64 institutionally diverse countries provides a powerful setting for addressing these issues. We focus on NPFs because the change in ownership structure during privatization leads to changes in agency problems, information asymmetry, and implicit government guarantees. Following Chen, El Ghouli, Guedhami, and Nash (2018), we define an NPF as an entity in which state ownership has been recently reduced through privatization. An NPF will thus have a zero or positive level of residual state ownership.

The findings support our predictions of how state ownership affects trade credit and provide direct evidence of the important role of country- and firm-level boundary conditions in influencing this relation. We find robust evidence that state ownership is positively and significantly related to the supply of trade credit. Our findings further suggest that institutional characteristics, by affecting the SOE's opportunities and motivations to extend trade credit, also can affect the relation between

state ownership and trade credit provision. We identify financial, legal, informational, political, cultural, and social factors that impact the credit-granting decisions of SOEs. Furthermore, the data indicate that firm- or micro-level factors also weigh significantly on SOEs' credit-granting decisions. Specifically, our analysis shows that the extent of state shareholdings and degree of internationalization impact the credit-granting decisions of SOEs.

Finally, we explore whether the more liberal granting of trade credit by SOEs has economic costs. The idea is that trade credit provision by SOEs may impose costs by "propping up" politically connected but inefficient firms, hence reducing efficiency-enhancing resource reallocation. Accordingly, our final empirical analysis examines the potential "dark side" of SOE-mandated trade credit by analyzing the market valuation consequences for SOEs. We find that the market tends to discount the value of trade credit provided by SOEs. This indicates that the more extensive granting of trade credit by SOEs is likely to be a loss-making subsidization, rather than a positive-NPV business decision.

Our paper adds to several strands of literature. Our paper extends the state ownership literature by identifying that trade credit from SOEs can help firms overcome limited access to capital in less developed financial markets and by documenting that governments use credit-granting by SOEs to achieve political and social objectives. Our study contributes to the growing research in international business regarding the firm-level implications of state capitalism (e.g., Boubakri et al., 2016; Grøgaard et al., 2019; Inoue, Lazzarini, & Musacchio, 2013; Lazzarini & Musacchio, 2018). Also, our cross-country dataset allows us to directly examine how differences in institutional factors may affect the formulation of the SOE's credit-granting decisions (which helps us to understand why all state owners are not the same).

Our study's contribution to institutional theory can primarily be positioned within the institutional economics school of thought. A pioneer of institutional economics, North (1990) recognizes that cross-country variance in institutions contributes to cross-country variance in the behavioral and organizational responses of global firms. Based upon theory from institutional economics, our study considers such institutional heterogeneity by examining the effect of differences in the quality and effectiveness of national institutions on the trade credit decisions of SOEs.

Following Inoue et al. (2013) and Musacchio et al. (2015), we recognize that weaknesses in the quality and effectiveness of institutions cause "institutional voids" that may adversely impact firm-level decision-making.² Our study primarily considers the "institutional void" that arises due to lesser-developed capital markets. Aspects of this "institutional void" have been studied in the international business literature. For example, Oxelheim, Randoy, and Stonehill (2001) compile a list of actions that firms lacking access to well-developed capital markets may take to increase the availability of the financing required to engage in FDI.³ Our study, by identifying the liquidity-enhancing role of trade credit offered by SOEs, adds to that list of actions that can help firms overcome the "institutional void" of less-developed capital markets.

Overall, developing a better understanding of the role of SOEs as providers of liquidity contributes to a better understanding of the national context in which firms operate. Our study draws from the finance literature to add to the richness of our understanding of national context. Specifically, our paper identifies how a corporate finance decision (i.e., the granting of trade credit by SOEs) helps to improve the functioning of national capital markets by enhancing the availability of funding for liquidity-deprived firms.

STATE OWNERSHIP, COUNTRY- AND FIRM-LEVEL BOUNDARY CONDITIONS, AND TRADE CREDIT

State Ownership and Trade Credit

The corporate finance literature outlines five categories of theories that potentially explain the provision of trade credit by suppliers: (1) financing advantage, (2) price discrimination, (3) monitoring/credit enforcement, (4) implicit warranty, and (5) transaction cost. We argue that financing advantage is most relevant when considering the relation between state ownership and trade credit because it provides direct predictions of how ownership structure (i.e., state vs. private) should affect the provision of trade credit.

The financing advantage theory contends that firms with greater access to financing should be better able to provide funding to customers through trade credit. Meltzer (1960), Nilsen (2002), and Petersen and Rajan (1997) note that firms with greater ability to acquire capital will be

more likely to channel the cash received to less-liquid firms by offering more trade credit. The other theories do not lend themselves as well to the evaluation of the differences between SOEs and privately owned enterprises (POEs). These other theories are also heavily predicated on the assumption that firms seek to maximize profits.⁴

We argue that state ownership may create an advantage with respect to access to finance because SOEs benefit from implicit government guarantees, tax discounts, preferential access to credit, and other forms of soft budget constraints, particularly during times of financial distress (Borisova, Fotak, Holland, & Megginson, 2015; Borisova & Megginson, 2011; Boubakri, El Ghoul, Guedhami, & Megginson, 2018; Faccio, Masulis, & McConnell, 2006; Holland, 2019; Kornai et al., 2003; Nash, 2017; Boubakri, Chen, El Ghoul, Guedhami, & Nash, 2020). It follows that, as the level of state ownership increases, SOEs should suffer less from financial constraints and should have greater access to finance (Holland, 2019). More importantly, the financing advantage theory suggests that SOEs can pass their access to liquidity on to their buyers through the provision of trade credit.

Our basic premise is that SOEs choose to grant more trade credit than POEs. This choice requires both opportunity and motive. While we have noted that the financial advantages from the soft budget constraint should provide the opportunity, we next consider what, specifically, drives the motivation. We identify the following characteristics (reflecting differences between SOEs and POEs) that may answer this question.

Different goals

When evaluating the motives of SOEs and POEs, Vernon (1979) observes that SOEs' goals typically extend beyond profit maximization, and usually consider the entity's impact on the nation's well-being. More specifically, Grøgaard et al. (2019) highlight SOEs' non-economic goals (i.e., the explicit targeting of social, allocational, and/or political aspirations). For example, Redding (2005), John, Litov, and Yeung (2008), and Bai, Lu, and Tao (2006) document that SOEs are frequently tasked with promoting societal stability by maintaining long-term employment.

Putniņš (2015) argues that the pursuit of non-economic goals (such as full employment), while inconsistent with profit maximization, aligns with the view that state ownership is justifiable in the

event of market failures. Identifying key market failures as resulting from monopolies, externalities, and public goods, Putniņš (2015) contends that full employment can be considered a public good (by contributing to social stability), and that it also generates positive externalities (by deterring crime and facilitating overall wellbeing). Therefore, if an SOE's objective is to foster full employment, it would be correspondingly motivated to maintain (if not maximize) output by granting larger amounts of trade credit.

Different risk profiles

The granting of trade credit, like the offering of any loan, involves risk to the creditor. Relative to POEs, SOEs may grant differing levels of credit because they face differing levels of risk. Vernon (1979) notes that governments are usually willing to accept greater amounts of risk than private enterprises. Arrow and Lind (1970), Benito, Rygh, and Lunnan (2016), Filatotchev, Strange, Piesse, and Lien (2007), Fogel, Morck, and Yeung (2008), Grøgaard et al. (2019), Knutsen et al. (2011), Rygh (2018), and Samuelson and Vickrey (1964) further note that the state as an owner and investor is typically highly diversified. This portfolio effect may allow SOEs to tolerate greater amounts of risk (such as the additional risk inherent in more generously granting trade credit). Furthermore, Benito et al. (2016), Cui and Jiang (2012), and Knutsen et al. (2011) argue that the bailout potential facilitated by state backing should also embolden SOEs to accept more risk (and thus prompt them to offer larger amounts of trade credit). Moreover, ownership by the state may be consistent with "patient capital" as described by Redding (2005). Specifically, Musacchio et al. (2015), Benito et al. (2016), and Rygh (2018) note that financial support from the soft budget constraint, by mitigating the SOE's threat of bankruptcy, allows state-owned firms the latitude to pursue projects with longer-term payoffs. That is, the soft budget constraint endows the SOE with the "patience" to undertake investments that may be deemed excessively risky by private firms (which may have more myopic requirements for short-term financial results). Similarly, Bass and Chakrabarty (2014), Benito et al. (2016), Filatotchev et al. (2007), and Grøgaard et al. (2019) recognize that differences in SOEs' time horizons may contribute to differences in risk preferences, allowing SOEs to engage in projects that POEs may find too risky.

Different accountability

Krueger (1990) notes that a lack of transparency may contribute to inefficiency and posits that SOEs in general often face less public scrutiny than POEs. More specifically, this insulation from investor oversight may motivate SOEs to more generously grant trade credit.

Additionally, while accountability for SOEs may be lower than for POEs, the granting of trade credit, in general, may also be subject to lower public scrutiny. In other words, of the various methods a state could use to funnel capital to a favored firm, trade credit is among the least likely to draw public ire (or to have negative implications for the SOE or its associated politicians). To illustrate, we briefly outline three specific ways a government can inject cash into a favored firm: (1) a direct grant from the state, (2) a loan from a government-owned bank (GOB), or (3) trade credit provided by an SOE.

A direct grant from the state is usually highly conspicuous and could invite a great deal of public surveillance. For example, Krueger (1990) explores the role of accountability in improving the efficiency of SOEs. She contends that delineating the amount of government subsidies channeled to SOEs as a line item in the federal budget would make the support more publicly apparent. She also argues that the resultant public “embarrassment” for the SOE and/or the affiliated politicians would encourage performance improvements.

Loans from a GOB may also lead to negative consequences, mostly because of the regulatory scrutiny that banks face. Bank loans in which the borrower defaults or is delinquent attract more attention than accounts receivable that are unpaid or are in arrears. Acharya, Eisert, Eufinger, and Hirsch (2019) and Caballero, Hoshi, and Kashyap (2008) describe the repercussions for the state if it chooses to channel funds to favored firms through loans from GOBs. Specifically, Acharya et al. (2019) and Caballero et al. (2008) note that a bad bank loan invites increased regulatory monitoring, necessitates larger provisioning, and requires the commitment of additional capital.

In contrast, the granting of trade credit by a non-bank SOE would not attract the same amount of potentially negative attention. Although non-bank SOEs must provide an allowance for doubtful accounts, the public backlash would be much less intense than it would be for a bank (because a bank must abide by strict regulations, such as those mandated by the Basel Accords).

Therefore, we argue that trade credit provision by SOEs (relative to other methods of state-sponsored financial subsidies) allows a government to more effectively camouflage funding channeled to favored entities. That is, accounts receivable from SOEs may represent a form of “stealth financing,” which should generally attract less scrutiny from market participants and political opponents. We expect that this stealth aspect of trade credit provision may provide further motivation for SOEs to grant larger amounts of accounts receivable.

The above discussion leads to our hypothesis as to how state ownership affects the provision of trade credit by NPFs. Stated formally,

Hypothesis 1: The proportional level of state ownership will affect the amount of trade credit offered by the NPF. Higher (lower) state ownership in NPFs will be associated with more (less) trade credit.

Macro (Country-Level) Boundary Conditions

While the discussion above suggests that the financing advantage theory, emphasized in the finance literature, offers an explanation of the credit-granting decisions of SOEs, there are other factors to consider. In fact, SOEs’ choices to grant trade credit are driven by opportunities and motivations, which in turn are related to a nation’s institutional environment. Examining the conditional effects of state ownership on trade credit (i.e., variations in Hypothesis 1) helps explain why the relation between state ownership and trade credit varies across nations.

To guide our investigation as to how macro (or country-level) factors may affect credit-granting decisions by state-owned firms, we follow the analytical framework developed by institutional economists such as North (1990) and Williamson (2000). These institutional typologies consider how formal and informal institutions influence corporate behavior. As summarized by Boubakri et al. (2016), the Williamson (2000) framework is embodied within a four-tiered hierarchy. Level 1 comprises informal institutions (e.g., national culture) that vary across countries and impose informal constraints on decision-making (Williamson, 1998). Level 2 represents the formal institutions (e.g., the legal environment). Level 3 houses the governance institutions (which oversee the specific design of contracts). Level 4 consists of resource allocation and employment (e.g., the domain of

neoclassical marginal analysis). Inspired by Williamson's framework, we next discuss how formal (such as financial, legal, political, and informational) and informal (such as national culture and social) institutions may influence the trade credit-granting decisions of SOEs at the corporate level.

From a macro (country-level) perspective, we propose boundary conditions to reflect each nation's financial, legal, informational, political, cultural, and social environments. By identifying how a country-level institutional context affects the formulation of credit-granting decisions by SOEs, we offer additional important evidence as to how and why institutions matter.

In the following section, we consider how the nation's institutional environment may shape the opportunities and the motivations for SOEs to offer trade credit. We begin by considering the SOE's opportunities.

Institutional Factors that Affect the SOE's Opportunities to Extend Trade Credit

Financial environment

Our focus on the financing advantage theory of trade credit naturally suggests that a nation's financial environment is an important institutional boundary condition that affects the relation between state ownership and trade credit. That is, financing advantages may be especially valuable for SOEs operating in less developed financial markets. A well-functioning financial market is crucial to the optimal allocation of resources and is a key contributor to economic growth. Thus, in settings where firms have limited access to capital, SOEs can help overcome these difficulties by providing an alternative source of funds (such as trade credit).

We argue that SOEs' financing advantages (notably, the augmentation provided by the soft budget constraint) are especially valuable for those operating in less developed financial markets. Fisman and Love (2003), Demirgüç-Kunt and Maksimovic (2001), Cull, Xu, and Zhu (2009), Ge and Qiu (2007), and Petersen and Rajan (1997) support the notion that implicit borrowing in the form of trade credit can be an alternative source of funds in these environments. In our context, firms with greater access to private credit should have lower demand for alternative sources of financing (such as trade credit extended by SOEs). More directly, Robb and Robinson (2014) and Cosh, Cumming, and Hughes (2009) use survey data to identify that trade credit is not always the firm's first choice as a

source of financing. Therefore, if funding opportunities abound, finance-seeking firms have numerous options and the need for the state to extend its "helping hand" (through SOE-facilitated trade credit) is reduced. Accordingly, we expect SOEs to provide less trade credit if a nation's financial market is more developed and thus offers more funding opportunities for borrowers.⁵ Our next hypothesis is:

Hypothesis 2.1: In nations with less well-developed financial markets, there will be a stronger positive relation between state ownership and trade credit provision.

Legal environment

Based on the seminal work of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998), we expect that a nation's legal environment is a potentially significant country-level boundary condition that contributes to cross-national differences in corporate decision-making. Evidence from La Porta et al. (1997), Levine (1998, 1999), and Djankov, McLiesh, and Shleifer (2007) indicates that stronger legal protection of shareholders and creditors is associated with larger and deeper capital markets. Because the granting of trade credit is a form of lending, we focus on the legal rights of creditors. Overall, since funding opportunities should be less available in nations with weaker legal protection of creditors, we expect a negative relation between the strength of creditor rights and the provision of trade credit by SOEs. Accordingly, our next hypothesis is:

Hypothesis 2.2: Stronger protection of creditor rights will have a negative impact on the relation between state ownership and the provision of trade credit.

Information environment

The information environment is another country-level boundary condition that may affect the opportunities for SOEs to extend trade credit. Specifically, Rygh (2018) argues that state ownership may become more advantageous as the writing of complete contracts becomes increasingly difficult. To the extent that complete contracting is challenging in a more opaque information environment, we would expect that a weaker information environment would contribute to a larger role for state ownership (and thus a greater amount of

trade credit provision by SOEs). Conversely, in a better information environment, the contracting-based advantages of state ownership should diminish, thereby lessening SOEs' role as providers of trade credit. Accordingly, we form Hypothesis 2.3 regarding the impact of the country-level boundary condition relating to the nation's information environment:

Hypothesis 2.3: In countries with a stronger information environment, there will be a weaker relation between state ownership and the provision of trade credit.

Institutional Factors that Affect the SOE's Motivations to Extend Trade Credit

To grant trade credit, a firm must have opportunity and motivation. We next consider how the institutional environment affects the SOE's motivations to offer trade credit.

Political environment

Political motivations should affect the relation between state ownership and the provision of trade credit. We consider various institutional settings in which the motivations of SOEs to advance political agendas by preferentially allocating trade credit should differ. Specifically, we examine the role of a country's political orientation (i.e., left- versus right-wing government).

Beck, Clarke, Groff, Keefer, and Walsh (2001) and Megginson, Nash, Netter, and Poulsen (2004) posit that left-wing governments exert more state control over a nation's economy. Additionally, Besley and Case (2003) and Jager (2017) identify that government spending is higher when a left-wing political party is in power. Heightened levels of government spending increase the likelihood of subsidies for SOEs, which make possible more extensive financing advantages for SOEs, which in turn leads to a greater ability of SOEs to extend trade credit. Accordingly, left-wing governments should have greater motivation to use SOEs to grant larger amounts of trade credit. Our hypothesis regarding this effect is as follows:

Hypothesis 3.1: In nations with a more left-oriented political environment, there will be a stronger positive relation between state ownership and trade credit provision.

Cultural environment

A central tenet of the privatization literature (e.g., Megginson & Netter, 2001) is that changes in ownership should cause changes in motivation. Larger proportions of state ownership should lead to greater motivation to pursue non-economic objectives. Larger proportions of private ownership should lead to greater motivation to pursue value maximization. Our analysis of the provision of trade credit allows us to explore this relation more deeply. First, we focus on the motivations of SOEs to engage in activities that enhance social welfare. To provide evidence that SOEs tailor credit-granting decisions to engineer socially desirable outcomes, we consider different institutional settings where we expect the motivations to preferentially allocate trade credit to vary. Our next hypothesis captures how a nation's cultural environment affects credit-granting by SOEs.⁶

Prior research suggests that countries with collectivist national cultures are associated with governments committed to increased state control, greater intervention in the economy, and stronger emphasis on fulfilling social expectations (e.g., Boubakri, Cosset, & Saffar, 2017; Boubakri et al., 2016; Boubakri, Guedhami, Kwok, & Wang, 2019; House, Javidan, Hanges, & Dorfman, 2002). Because government motivations to intervene in economic activity should be stronger in countries with a more collectivist society, SOEs should grant larger amounts of trade credit in those countries. This leads to Hypothesis 3.2:

Hypothesis 3.2: In nations with a more collectivist culture, there will be a stronger positive relation between state ownership and trade credit provision.

Social environment

The privatization literature (e.g., Boycko, Shleifer, & Vishny, 1996; Megginson & Netter, 2001; Shapiro & Willig, 1990; Shirley, 1999) identifies that the SOE's adherence to social objectives contributes to diminished financial and operating performance (relative to that of privately owned firms). More recently, Grøgaard et al. (2019) insightfully demonstrate that commitment to social (non-economic) goals is a key area of differentiation between the performance of SOEs and POEs. It follows that the rigor in which social goals

are pursued should be contingent on the proportion of state ownership. That is, firms with greater levels of state ownership should have stronger motivation to pursue social objectives and should be more devoted to the “double bottom line” (Inoue et al., 2013).

The pursuit of social objectives is also emblematic of the “patient” capital provided by the government as a shareholder (Inoue et al., 2013; Lazzarini & Musacchio, 2018; Redding, 2005). These authors specifically note that stability of employment is a social objective typically associated with “patient” capital. Therefore, “patient” providers of capital (e.g., the state) should be willing to put forth more effort to support employment stability, such as extending more trade credit during times of economic stress. However, as privatization reduces the level of state ownership, that “patience” may wear thin as the resultant shift towards private ownership decreases the firm’s propensity to liberally grant trade credit and increases its commitment to value maximization.

Furthermore, the need for the social engineering that is frequently attributed to SOEs may be intensified if a country faces more dire social and economic conditions. Lazzarini and Musacchio (2018), focusing on circumstances that may whet a government’s appetite for intervention, identify that periods of economic turmoil may spur governments to attach even greater emphasis to achieving social objectives (such as maintaining employment stability during periods of financial downturn). Thus, we follow Lazzarini and Musacchio (2018) and contend that, in countries plagued by high unemployment, SOEs should have stronger motivation to foster employment security by supporting the economy through the more liberal granting of trade credit. Hypothesis 3.3 is as follows:

Hypothesis 3.3: In nations with greater social needs (such as high levels of unemployment), there will be a stronger positive relation between state ownership and trade credit provision.

Micro (Firm-Level) Boundary Conditions

We also recognize that micro (or firm-level) factors may affect the opportunities and motivations that shape the SOE’s credit-granting decisions, shedding additional light on variations in the relation between state ownership and trade credit provision.

Level of state ownership (majority vs. minority)

We build upon Musacchio, Lazzarini, and Aguilera’s (2015) work, which notes that different forms of state capitalism lead to different types of economic outcomes. Specifically, we capitalize on their more nuanced perspective to gauge how the provision of trade credit may vary according to the different typologies of state capitalism. We draw from Grøgaard et al. (2019) and Benito et al. (2016) as well. They find similarly that variance in performance can be traced to an SOE’s ownership type.

Following Benito et al. (2016), we categorize the type of state ownership based on whether the state is a majority investor (i.e., government owns more than 50% of the firm’s shares) or a minority investor (i.e., government is not the largest shareholder). As we discussed earlier, SOEs have both the opportunity (due to the financing advantages facilitated by soft-budget constraints) and the motivation (due to differences in goals, risk profiles, and public accountability) to grant more trade credit. Moreover, the level of state ownership calibrates the magnitude of the SOE’s opportunities and motivations for granting trade credit.

Regarding the motivations that underpin credit-granting decisions by SOEs, a reduction in state ownership should serve to relax the grip of the state’s “grabbing hands”. Specifically, Benito et al. (2016), Grøgaard et al. (2019), Inoue et al. (2013), and Lazzarini and Musacchio (2018) contend that a decrease in state ownership reduces the likelihood of government interference. This precipitates a shift away from non-economic goals (i.e., political and/or social objectives) and facilitates a heightened focus on profitability and other ambitions more consistent with private ownership. As a result, the motivations to more liberally extend trade credit in efforts to achieve political or social goals will be reduced.

The opportunities to extend trade credit should also change with changes in the level of state ownership. Benito et al. (2016) and Musacchio et al. (2015) note that a reduction in state ownership typically constricts the flow of government-sponsored financial support, thus diverting the tributary of the financing advantage. That is, as state ownership decreases, the soft budget constraint (which is the source of the financing advantage for SOEs) will begin to “harden”. This reduces the opportunities for more extensive granting of trade credit.

As a result, with larger degrees of state ownership, the credit-granting opportunities should be greater and the motivations should be stronger.

Accordingly, Hypothesis 4.1 proposes the following relation between the extent of state ownership and the provision of trade credit.

Hypothesis 4.1: SOEs with majority (minority) state ownership will grant higher (lower) amounts of trade credit.

Extent of internationalization

An SOE's degree of internationalization is another firm-level factor to consider when evaluating the determinants of credit-granting. By definition, a firm experiencing increased internationalization should have a higher level of foreign sales and/or foreign ownership, both of which should reduce the SOE's motivations to grant trade credit.

First, as foreign sales increase, the SOE's non-economic motivations to extend trade credit should decrease. Sapienza (2004), Shleifer (1998), and Shleifer and Vishny (1994) document that governments use SOEs to pursue political and social goals (e.g., maximizing employment, endowing favored enterprises, channeling resources to constituents). Politicians engage in such machinations ostensibly to secure votes or, more broadly, foster goodwill amongst the citizenry. In this paper, we argue that one way SOEs attempt to fulfill these types of objectives is by providing liquidity through the more liberal granting of trade credit. However, granting trade credit to a foreign customer (i.e., foreign sales) would generate no political or social benefit in the home country of the SOE.⁷ Foreign customers do not vote in domestic elections; supporting employment in foreign countries does not provide social benefits in the SOE's home country. Therefore, if the SOE grants more trade credit in an effort to fulfill social/political goals (and those goals are specific to the domestic market), SOEs with more international sales should offer less overall trade credit.

Second, relative to domestic investors, foreign shareholders should have different expectations regarding the firm's performance. These different expectations of foreign owners should temper the SOE's motivations to use credit-granting to engineer specific political or social outcomes. Foreign investors should be ambivalent to the SOE's domestic objectives (i.e., political and social goals). Instead, foreign owners should be more motivated by profitability. Providing evidence consistent with

an enhanced focus on profitability, D'Souza, Megginson, and Nash (2007), Brown, Earle, and Telegdy (2007), and Djankov and Murrell (2002) find that having greater foreign ownership contributed to stronger increases in the financial and operating performance of newly privatized firms. Therefore, by shifting focus from non-economic goals to profit maximization, foreign ownership should affect the SOE's credit-granting decisions.

Thus, internationalization should weaken the SOE's motivations to pursue political and/or social objectives (which, in turn, should weaken the motivations to extend trade credit). This leads to Hypothesis 4.2:

Hypothesis 4.2: Increasing the extent of internationalization will have a negative impact on the relation between state ownership and trade credit provision.

SAMPLE, VARIABLES, AND DESCRIPTIVE STATISTICS

Sample Selection

We obtain a sample of privatized firms from Chen et al. (2018), which is constructed based on data from Privatization Barometer, Thomson Reuters, SDC Platinum Global New Issues, and SDC Platinum Mergers and Acquisitions databases. Our data consist of 574 firms from 64 countries privatized during 1981–2014. This sample compares favorably with those used in recent studies of privatized firms, such as Borisova and Megginson (2011), with a sample of 60 firms from 14 countries, Boubakri et al. (2013), with 385 firms from 57 countries, and Boubakri et al. (2020), with 473 firms from 53 countries.

Because our ownership data track the change in government shareholdings after the first privatization, we are able to analyze the time-varying effect of state ownership on trade credit. Moreover, these data cover firms from countries with diverse institutional environments, which allow us to investigate the heterogeneous effects of state ownership on trade credit and to explore the effects of country-level boundary conditions.

We match the sample of NPFs with financial information from Compustat Global. Due to the nature of the banking business (i.e., accepting

deposits, making loans), trade credit has a different connotation for firms in the financial services industry. Accordingly, we exclude firms with four-digit Standard Industrial Classification (SIC) codes between 6000 and 6999. We also omit observations with incomplete data for our key variables or with missing SIC codes. These filters yield a sample of 5503 firm-year observations.

Table 1 summarizes our sample distribution by industry, year, region, and country in Panels A, B, C, and D, respectively. Panel A shows the distribution across Fama–French’s (1997) 48 industries. Approximately 17% of our firms are utilities, 13% are in transportation, and 12% are in communication.⁸ Panel B presents the number of firm-year observations and the distribution of firms privatized from 1981 to 2014. We observe significant growth in privatizations throughout the 1980s and 1990s. Panel C reveals that the sample is widely distributed across regions, with approximately 64% of our observations located in Europe and Central Asia, 23% in East and South Asia and the Pacific, 10% in Latin America and the Caribbean, and 3% in Africa and the Middle East. Relatedly, Panel D shows that our sample consists of both developed and developing countries (exhibiting a wide heterogeneity of institutional environments). These data allow us to explore how country-level boundary conditions influence the effect of state ownership on trade credit provision.⁹

Variables

Trade credit

Following Petersen and Rajan (1997), we define trade credit (*Trade Credit*) as trade receivables scaled by total sales. We obtain trade credit data from Compustat Global, where trade receivables is the amount owed by customers for goods and services sold in the ordinary course of business.^{10,11} The “Appendix” provides definitions and data sources for all variables.

State ownership

Our primary measure of state ownership (*State Ownership*) is the percentage of shares held by the government. For robustness, we also use *State Control*, an indicator variable that equals 1 for firms in which the government retains control (i.e., owns more than 50% of the firm’s shares).

Variables used to test country-level boundary conditions hypotheses

We obtain measures of private credit (*Private Credit*) from World Development Indicators. This variable is defined as loans provided to the private sector by financial corporations divided by GDP. We measure *Government Ownership of Banks* at the country level using data from Barth, Caprio, and Levine (2013). This variable reflects the percentage of a banking system’s assets in banks that are 50% or more government-owned. While *Private Credit* is a measure of financing available to the private sector, *Government Ownership of Banks* is a proxy for credit to SOEs. We use these two measures to test Hypothesis 2.1.

To test Hypothesis 2.2, we measure the legal protection of creditors (*Creditor Rights*) with a dummy variable that indicates whether secured creditors are able to seize collateral after the reorganization petition is approved (i.e., “no automatic stay”). La Porta et al. (1998) assert that the right to repossess collateral may be the most important of the legal protections for creditors. They argue that creditors are paid because of the legal rights to claim collateral. Mann (2018) provides empirical support for this notion by verifying that an increase in creditors’ legal claims on collateral is associated with an increase in the use of debt. This is also confirmed by Costello (2019), who specifically evaluates the impact of creditor rights on trade credit provision. Costello (2019) and Longhofer and Santos (2003) verify the significance of this right by providing evidence that an increase in collateral protection is associated with an increase in the provision of trade credit.

Of the four legal protections of creditors (as listed by La Porta et al., 1998), the “no automatic stay” stipulation most directly relates to the rights to reclaim and liquidate collateral. Therefore, we expect the “no automatic stay” clause to have the most profound effect on the relation between state ownership and trade credit provision. We obtain this variable from Djankov et al. (2007).

When evaluating Hypothesis 2.3, we follow El Ghoul and Zheng (2016) and add a variable (*Information Sharing*) to indicate whether private credit registries are available in each country. We obtain this metric from Djankov et al. (2007).

Table 1 Distribution of the sample of newly privatized firms

Industry	Obs.	Percentage	Firms	Percentage	Industry	Obs.	Percentage	Firms	Percentage
Panel A: By industry									
Aircraft	79	1.44	8	1.39	Healthcare	1	0.02	1	0.17
Apparel	21	0.38	2	0.35	Machinery	147	2.67	14	2.44
Automobiles and trucks	114	2.07	10	1.74	Measuring and control equipment	22	0.40	2	0.35
Beer and liquor	66	1.20	8	1.39	Non-metallic and industrial metal mining	95	1.73	9	1.57
Business service	76	1.38	8	1.39	Petroleum and natural gas	405	7.36	40	6.97
Business supplies	36	0.65	3	0.52	Pharmaceutical products	69	1.25	6	1.05
Candy and soda	25	0.45	2	0.35	Precious metals	18	0.33	3	0.52
Chemicals	287	5.22	31	5.40	Printing and publishing	52	0.94	5	0.87
Coal	46	0.84	8	1.39	Recreation	15	0.27	1	0.17
Communication	672	12.21	66	11.50	Restaurants, hotels, motels	44	0.80	4	0.70
Computers	12	0.22	1	0.17	Retail	66	1.20	7	1.22
Construction	126	2.29	15	2.61	Shipbuilding, railroad equipment	46	0.84	5	0.87
Construction materials	247	4.49	26	4.53	Shipping containers	17	0.31	2	0.35
Consumer goods	62	1.13	6	1.05	Steel works	338	6.14	32	5.57
Defense	1	0.02	1	0.17	Textiles	48	0.87	5	0.87
Electrical equipment	63	1.14	5	0.87	Tobacco products	32	0.58	3	0.52
Electronic equipment	67	1.22	8	1.39	Transportation	706	12.83	75	13.07
Entertainment	9	0.16	1	0.17	Utilities	931	16.92	96	16.72
Fabricated products	44	0.80	3	0.52	Wholesale	79	1.44	13	2.26
Food products	159	2.89	20	3.48	Other	160	2.91	19	3.31
Year	Obs.	Percentage	Firms	Percentage	Year	Obs.	Percentage	Firms	Percentage
Panel B: By privatization year									
1981	10	0.18	1	0.17	1999	294	5.34	27	4.70
1983	6	0.11	1	0.17	2000	221	4.02	24	4.18
1984	5	0.09	1	0.17	2001	119	2.16	13	2.26
1985	21	0.38	2	0.35	2002	106	1.93	10	1.74
1986	44	0.80	4	0.70	2003	138	2.51	16	2.79
1987	103	1.87	7	1.22	2004	85	1.54	12	2.09
1988	94	1.71	8	1.39	2005	122	2.22	12	2.09
1989	172	3.13	12	2.09	2006	241	4.38	28	4.88
1990	148	2.69	15	2.61	2007	146	2.65	15	2.61
1991	386	7.01	32	5.57	2008	49	0.89	6	1.05
1992	429	7.80	46	8.01	2009	37	0.67	7	1.22
1993	337	6.12	35	6.10	2010	76	1.38	14	2.44
1994	420	7.63	42	7.32	2011	24	0.44	7	1.22
1995	362	6.58	38	6.62	2012	39	0.71	6	1.05
1996	328	5.96	33	5.75	2013	29	0.53	7	1.22
1997	504	9.16	49	8.54	2014	15	0.27	7	1.22
1998	393	7.14	37	6.45					
				Obs.	Percentage		Firms		Percentage
Panel C: By region (number of countries)									
Africa and the Middle East (9)				180	3.27		21		3.66
East and South Asia and the Pacific (12)				1248	22.68		142		24.74
Latin America and the Caribbean (8)				571	10.38		61		10.63
Europe and Central Asia (35)				3504	63.67		350		60.98

Table 1 continued

Country	Obs.	Percentage	Firms	Percentage	Country	Obs.	Percentage	Firms	Percentage
<i>Panel D: By country</i>									
Argentina	110	2.00	8	1.39	Lithuania	45	0.82	6	1.05
Australia	29	0.53	3	0.52	Malaysia	146	2.65	16	2.79
Austria	119	2.16	11	1.92	Mexico	40	0.73	4	0.70
Belgium	39	0.71	4	0.70	Morocco	24	0.44	2	0.35
Brazil	293	5.32	33	5.75	Netherlands	18	0.33	3	0.52
Bulgaria	3	0.05	1	0.17	New Zealand	43	0.78	5	0.87
Chile	41	0.75	4	0.70	Nigeria	14	0.25	3	0.52
China	1019	18.52	102	17.77	Norway	28	0.51	4	0.70
Colombia	36	0.65	4	0.70	Oman	3	0.05	1	0.17
Croatia	46	0.84	4	0.70	Pakistan	175	3.18	21	3.66
Czech Republic	28	0.51	5	0.87	Peru	36	0.65	6	1.05
Denmark	31	0.56	2	0.35	Philippines	40	0.73	6	1.05
Egypt	28	0.51	4	0.70	Poland	326	5.92	41	7.14
Finland	148	2.69	12	2.09	Portugal	73	1.33	6	1.05
France	171	3.11	20	3.48	Romania	23	0.42	4	0.70
Germany	169	3.07	12	2.09	Russia	62	1.13	8	1.39
Ghana	2	0.04	1	0.17	Saudi Arabia	6	0.11	1	0.17
Greece	106	1.93	10	1.74	Serbia	3	0.05	1	0.17
Hong Kong	15	0.27	2	0.35	Singapore	67	1.22	6	1.05
Hungary	127	2.31	11	1.92	Slovakia	17	0.31	2	0.35
India	311	5.65	34	5.92	South Africa	24	0.44	2	0.35
Indonesia	151	2.74	11	1.92	South Korea	84	1.53	7	1.22
Ireland	47	0.85	3	0.52	Spain	135	2.45	12	2.09
Israel	40	0.73	3	0.52	Sri Lanka	135	2.45	17	2.96
Italy	195	3.54	21	3.66	Sweden	73	1.33	8	1.39
Jamaica	13	0.24	1	0.17	Switzerland	18	0.33	1	0.17
Japan	42	0.76	4	0.70	Thailand	55	1.00	7	1.22
Jordan	41	0.75	4	0.70	Turkey	157	2.85	12	2.09
Kazakhstan	18	0.33	2	0.35	United Kingdom	130	2.36	15	2.61
Kenya	23	0.42	2	0.35	Venezuela	2	0.04	1	0.17
Kuwait	3	0.05	1	0.17	Vietnam	2	0.04	1	0.17
Latvia	50	0.91	5	0.87	Zimbabwe	5	0.09	1	0.17

The table presents the distribution of the sample of privatized firms. The full sample contains 5503 firm-year observations for 574 firms privatized in 64 countries over the 1981–2014 period. Panel A reports the number of observations by industry (based on 48 industry groupings in Fama & French, 1997). Panel B reports the number of observations by privatization year. Panel C presents the number of observations by region (based on World Bank group classification). Panel D provides the sample distribution by country.

We test Hypothesis 3.1 by including the political orientation variable *Left*, which indicates whether the ruling party's economic orientation is communist, socialist, social democratic, or left-wing. This variable is from the Database of Political Institutions (2012). Furthermore, we use a measure of collectivism from Hofstede (1984) to examine the role of a nation's cultural environment (Hypothesis 3.2). We obtain this measure by subtracting Hofstede's individualism score from 100, so that higher values indicate a greater degree of collectivism. To measure a country's social environment (Hypothesis 3.3), we use the unemployment rate (*Unemployment (%)*) obtained from EIU Country data.

Variables used to test firm-level boundary conditions hypotheses

We measure the level of state ownership with two indicator variables. We define *State as a Majority Investor* as 1 when a government holds more than 50% of shares in a privatized firm, and 0 otherwise. *State as a Minority Investor* is a dummy variable that equals 1 if any shareholder holds more shares than the government, and 0 otherwise. We use these two ownership variables to test Hypothesis 4.1.

To test Hypothesis 4.2, we consider two variables related to an SOE's extent of internationalization. *Cross-listing* is a dummy variable indicating whether a firm is cross-listed in the U.S. equity

market.¹² We also define *Foreign Sales* as whether a firm has revenues from foreign sales. We obtain this metric from FactSet.

Control variables

Following prior literature (Giannetti et al., 2011; Love, Preve, & Sarria-Allende, 2007; Petersen & Rajan, 1997), we control for several firm- and country-level variables related to trade credit. At the firm level, we include firm size (*Log(Sales)*); natural logarithm of total sales in \$U.S. millions; profit (*Return on Sales*); ratio of income before extraordinary items to total sales; cash holdings (*Cash Holdings*); ratio of cash and short-term investments to total assets; fixed assets (*Fixed Assets*); ratio of total property, plant, and equipment to total assets; sales growth (*Sales Growth*); growth rate of total sales; gross profit margin (*Gross Profit Margin*); ratio of total sales less cost of goods sold to total sales; and debt-equity ratio (*D/E ratio*); ratio of book value of debt to book value of equity. At the country level, we include the natural logarithm of GDP per capita in constant 2000 \$U.S. (*Log(GDP Per Capita)*) and *Private Credit*. Both are from World Development Indicators. To alleviate simultaneity concerns, we lag all right-hand-side variables by one year. To reduce the influence of outliers, we winsorize all financial variables at the 1% and 99% percentiles.

Descriptive Statistics

Panel A of Table 2 presents summary statistics for the key variables. On average, the ratio of trade credit to sales (*Trade Credit*) is around 0.17, with a standard deviation of 0.15; it varies from 0.00 to 0.86. Residual state ownership (*State Ownership*) has a mean (median) of 0.27 (0.13), in line with a sharp post-privatization decline in state ownership (Bou-bakri, Cosset, & Guedhami, 2005).

Panel B of Table 2 reports Pearson correlation coefficients between the firm- and country-level variables. We find that *Trade Credit* is positively correlated with *State Ownership*, *Gross Profit Margin*, *Log(GDP Per Capita)*, and *Private Credit*, and negatively associated with *Log(Sales)*, *D/E Ratio*, *Fixed Assets*, and *Sales Growth*.

RESULTS

Preliminary Evidence

In a first attempt to understand how government ownership affects the extension of trade credit, we

examine whether state ownership and trade credit provision evolve in systematic ways as the privatization process unfolds. Figure 1 plots the evolution of the mean levels of state ownership and trade credit provision from one year before the initial privatization (− 1) to 15 years (+ 15) afterwards.¹³ As government ownership steadily declines, trade credit provision by privatized firms also decreases over the period (− 1, + 15). Figure 1 therefore documents that NPFs tend to offer less trade credit as the state ownership share falls during privatization.¹⁴

Effect of State Ownership on Trade Credit

We next employ a multivariate analysis. Specifically, we regress *Trade Credit* on *State Ownership*, and the determinants of trade credit that we previously identified. We estimate the following regression model:

$$\begin{aligned} \text{Trade Credit}_{i,j,c,t} = & \beta_0 + \beta_1 \text{State Ownership}_{i,t} \\ & + \beta_2 \text{FLV}_{i,t-1} + \beta_3 \text{CLV}_{c,t-1} + \mu_c \\ & + \mu_j + \mu_t + \varepsilon_{i,j,c,t}, \end{aligned} \quad (1)$$

where i indexes firms, j indexes industries, c indexes countries, and t indexes years. FLV is a vector of firm-level controls and CLV is a vector of country-level controls. μ_c , μ_j , and μ_t are country-, industry-, and year-effects, respectively.

Table 3 reports regression results. To control for within-firm correlation, we base significance levels on robust standard errors adjusted for clustering at the firm level. In Model 1, the coefficient on *State Ownership* is positive and statistically significant [p value < 0.001, and 95% confidence interval (CI) between 0.031 and 0.106]. This indicates that firms provide less trade credit as state ownership decreases during privatization. This result is also economically significant: The estimated coefficient on *State Ownership* denotes that moving from the 25th (0.00) to the 75th (0.51) percentile results, on average, in a 20.7% increase in trade credit provision, holding all other variables at their mean values.¹⁵ Thus, in line with the preliminary results (see Figure 1), these findings support the financing advantage view of state ownership.

Turning to the control variables, we find that the coefficient on *Log(Sales)* loads negatively (p value = 0.022) and is statistically significant. Thus, as observed by El Ghouli and Zheng (2016), smaller firms offer a higher proportion of sales on credit. Next, consistent with Giannetti et al. (2011),

Table 2 Summary statistics and correlation matrix

Variable	N	Min	Mean	Median	Max	SD				
Panel A: Summary statistics										
Trade credit	5503	0.00	0.17	0.14	0.86	0.15				
State ownership	5503	0.00	0.27	0.13	1.00	0.29				
Log (sales)	5503	0.11	7.05	7.05	12.83	2.01				
Return on sales	5503	− 0.67	0.08	0.07	0.53	0.15				
Cash holdings	5503	0.00	0.12	0.09	0.54	0.11				
Fixed assets	5503	0.01	0.45	0.46	0.91	0.23				
Sales growth	5503	− 0.92	0.12	0.08	1.51	0.28				
Gross profit margin	5503	− 0.02	0.43	0.37	1.00	0.28				
D/E ratio	5503	0.00	0.41	0.30	2.45	0.43				
Log (GDP per capita)	5503	6.59	9.13	9.15	11.41	1.20				
Private credit	5503	8.60	76.98	75.70	233.00	42.84				
	1	2	3	4	5	6	7	8	9	10
Panel B: Correlation matrix										
1. Trade credit	1									
2. State ownership	0.03	1								
3. Log (sales)	− 0.07	0.10	1							
4. Return on sales	− 0.02	0.07	− 0.02	1						
5. Cash holdings	− 0.01	0.12	− 0.08	0.22	1					
6. Fixed assets	− 0.28	0.06	− 0.01	0.04	− 0.40	1				
7. Sales growth	− 0.06	0.05	− 0.02	0.09	0.05	0.02	1			
8. Gross profit margin	0.07	0.02	0.01	0.33	− 0.03	0.19	− 0.03	1		
9. D/E ratio	− 0.08	− 0.06	0.11	− 0.16	− 0.27	0.23	− 0.01	0.02	1	
10. Log (GDP per capita)	0.05	− 0.28	0.41	− 0.05	− 0.16	− 0.07	− 0.16	0.17	0.04	1
11. Private credit	0.04	0.08	0.26	− 0.02	0.06	− 0.10	− 0.07	− 0.03	0.13	0.31

The table presents descriptive statistics for the key variables in our analyses. The full sample contains 5503 firm-year observations for 574 firms privatized in 64 countries over the 1981–2014 period. We winsorize all financial variables at the 1% level in both tails of the distribution. The “Appendix” provides variable definitions and sources. Panel A reports summary statistics; panel B provides the pairwise correlations among the variables.

Figure 1 Evolution of state ownership and supply of trade credit. Figure plots the evolution (relative to privatization year) of state ownership and the supply of trade credit provided by NPFs. We define state ownership as the percentage of shares held by a government. We define trade credit as the ratio of trade receivables to total sales. Trade receivables equals amounts on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business. The sample comprises 574 privatized firms from 64 countries over the 1981–2014 period.

Table 3 Testing Hypothesis 1: State Ownership and Trade Credit

Variables	Basic model	Endogeneity of state ownership			
		Instrumental variable regression 1st stage	Instrumental variable regression 2nd stage	Heckman 2nd stage	PSM
	(1)	(2)	(3)	(4)	(5)
State ownership	0.069 (0.019)		0.631 (0.277)	0.106 (0.024)	0.056 (0.024)
Deficits		– 0.008 (0.003)			
Log (sales)	– 0.009 (0.004)	0.038 (0.008)	– 0.028 (0.012)	– 0.009 (0.004)	– 0.001 (0.005)
ROA	0.025 (0.028)	– 0.063 (0.068)	0.050 (0.054)	0.020 (0.031)	0.038 (0.034)
Cash holdings	– 0.126 (0.042)	0.063 (0.093)	– 0.197 (0.071)	– 0.121 (0.049)	– 0.145 (0.052)
Fixed assets	– 0.144 (0.028)	0.014 (0.063)	– 0.150 (0.045)	– 0.125 (0.030)	– 0.119 (0.034)
Sales growth	– 0.018 (0.008)	– 0.009 (0.017)	– 0.013 (0.013)	– 0.016 (0.008)	– 0.024 (0.010)
Gross profit margin	0.045 (0.018)	0.092 (0.042)	– 0.000 (0.040)	0.030 (0.021)	0.043 (0.024)
D/E ratio	0.001 (0.009)	– 0.072 (0.024)	0.046 (0.026)	0.003 (0.010)	– 0.006 (0.011)
Log (GDP per capita)	0.031 (0.021)	– 0.119 (0.012)	0.075 (0.035)	0.051 (0.024)	– 0.022 (0.049)
Private credit	0.000 (0.000)	0.001 (0.000)	– 0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Lambda				0.030 (0.008)	
Constant	– 0.051 (0.185)	1.213 (0.170)	– 0.320 (0.287)	– 0.221 (0.215)	0.401 (0.425)
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	5503	4255	4255	4003	3152
Adjusted R^2	0.387	0.271	0.648	0.430	0.420

The table shows the regression results relating state ownership to trade credit. The dependent variable is 100 times the ratio of trade receivables to total sales. Trade receivables equals amounts on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business. We lag all independent variables by one year. The “Appendix” provides variable definitions and sources. The full sample contains 5503 firm-year observations from 574 firms privatized in 64 countries. We winsorize all financial variables at the 1% level in both tails of the distribution. Regressions include country dummy variables, industry dummy variables (based on 48 industry groupings in Fama & French, 1997), and year dummy variables. Robust standard errors in parentheses below each coefficient are clustered at the firm level.

we identify that the coefficient on *Fixed Assets* is negative and significant (p value = 0.000). The coefficients on *Cash Holdings* and *Sales Growth* are also negative and statistically significant (p values of 0.003 and 0.020, respectively). This indicates that, when firms hold less internal cash or face a decline in sales, they offer more trade credit. El Ghouli and Zheng (2016) and Petersen and Rajan (1997) similarly recognize these characteristics and

attribute these relations to financially struggling firms loosening credit standards and extending trade credit in an effort to stem decreasing sales. Finally, the coefficient on *Gross Profit Margin* is positive and significant (p value = 0.014), which suggests that firms with a larger profit margin offer more trade credit.¹⁶

One potential concern with the benchmark regression results in Model 1 is that the level of

state ownership may not be exogenous. In a privatization context, Megginson and Netter (2001) note that sample selection bias can occur. For example, Bortolotti and Faccio (2009) provide evidence that governments are more likely to first privatize those firms that are more profitable and valuable. As such, poorly performing firms, which may tend to offer more trade credit to offset declining sales, are likely to have higher state ownership.¹⁷ Also, the relation between state ownership and trade credit could be driven by unobserved determinants of trade credit that are correlated with residual state ownership.

In Models 2 and 3, we address endogeneity concerns using two-stage instrumental variables (Borisova & Megginson, 2011; Boubakri et al., 2013; Guedhami, Pittman, & Saffar, 2009). We use a country's government deficits (*Deficits*) as an instrument for state ownership. We argue that our instrument satisfies the relevance condition because governments with high deficits are more likely to sell their holdings of SOEs (Borisova & Megginson, 2011; Ramamurti, 1992). Furthermore, we contend that our instrument satisfies the exclusion restriction because *Deficits* is unlikely to directly affect trade credit provision, other than through state ownership.

In the first-stage regression (Model 2), we find that *Deficits* is negatively associated with residual state ownership (p value = 0.016). This is consistent with the idea that revenues from privatization could induce fiscally challenged governments to sell more state ownership. We also find that the Kleibergen and Paap (2006) rk LM statistic for the underidentification test is 5.287, with a p value of 0.022. This indicates that the instruments are relevant and correlated with the endogenous variable. The Kleibergen–Paap rk Wald F statistic for the weak identification test is 26.084, while Stock and Yogo's (2005) critical value at 10% is 16.38, rejecting the null hypothesis that the instrumental variable is only weakly related to the endogenous variable.

Model 3 reports the results of the second-stage regression. We find that the coefficient on *State Ownership* enters positively and is statistically significant (p value = 0.023). Thus, our main results are statistically unchanged when we use instrumental variable regressions.^{18,19}

Another concern is that residual government ownership may be influenced by firm characteristics, which in turn affect a firm's trade credit policy. In Models 4 and 5, we address this issue by using a

Heckman two-stage selection analysis and propensity score matching (PSM), respectively. Under the Heckman approach, we first use a probit model to predict whether governments retain control over privatized firms.²⁰ We regress *State Control* on *Deficits*, the full set of control variables, and country, industry, and year fixed effects (as in Model 1 of Table 3). In the second-stage regression, we include the inverse Mills ratio (*Lambda*), which we estimate from the first-stage regression, as an additional control variable. The results in Model 4 continue to show that *State Ownership* is positively and significantly associated with *Trade Credit* (p value < 0.001). In addition, *Lambda* loads positively and is statistically significant (p value < 0.001), indicating some selection bias.

Next, we use PSM to randomize the sample selection procedure. Using observed firm- and country-level characteristics, we match state-controlled firms with non-state-controlled firms.²¹ Initially, we use the same probit model as in the first stage, under the Heckman two-stage selection approach. We then match firms with the closest propensity score. In the second stage (Model 5), we estimate the regression using the matched sample. The coefficient on *State Ownership* is positive and statistically significant (with p value < 0.001). These results are consistent with our main analysis, with the instrumental variables analysis, and with the Heckman two-stage selection analysis.

In summary, the results in Table 3 are consistent with the financing advantage theory (Hypothesis 1) of state ownership, indicating that firms are likely to provide more trade credit as government ownership increases. These findings continue to hold when we address endogeneity concerns.

Role of Country-Level Boundary Conditions on the Relation Between State Ownership and Trade Credit

We next consider how country-level boundary conditions may affect the relation between state ownership and trade credit provision.²² We first focus on the role of a nation's level of financial market development. To gauge the strength of demand for alternative sources of funding (such as trade credit), we introduce several proxies for financial market development. In Model 1 of Table 4, we use *Private Credit*, which captures the ease of access to financing for all borrowers. We regress *Trade Credit* on *State Ownership*, its interaction with *Private Credit*, and the controls.

Table 4 Testing macro-level boundary conditions on the relation between state ownership and trade credit: financial, legal, information, political, cultural, and social environments

Variables	Hypothesis 2.1 Financial environment		Hypothesis 2.2 Legal environment	Hypothesis 2.3 Information environment	Hypothesis 3.1 Political environment	Hypothesis 3.2 Cultural environment	Hypothesis 3.3 Social environment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
State ownership	0.113 (0.031)	0.031 (0.025)	0.069 (0.009)	0.202 (0.049)	– 0.015 (0.036)	– 0.051 (0.061)	0.013 (0.035)
State ownership × private credit	– 0.001 (0.000)						
Government ownership of banks		– 0.063 (0.029)					
State ownership × government ownership of banks		0.140 (0.059)					
Creditor rights			0.004 (0.005)				
State ownership × creditor rights			– 0.042 (0.015)				
Information sharing				0.064 (0.022)			
State ownership × information sharing				– 0.168 (0.051)			
Left					– 0.067 (0.022)		
State ownership × left					0.142 (0.060)		
Collectivism						– 0.001 (0.000)	
State ownership × collectivism						0.002 (0.001)	
Unemployment (%)							0.002 (0.001)
State ownership × unemployment (%)							0.007 (0.004)
Log (sales)	– 0.009 (0.004)	– 0.007 (0.004)	– 0.007 (0.001)	– 0.007 (0.004)	– 0.008 (0.004)	– 0.005 (0.005)	– 0.009 (0.004)
ROA	0.026 (0.028)	0.037 (0.030)	0.016 (0.018)	0.015 (0.029)	0.012 (0.030)	0.075 (0.036)	0.026 (0.029)
Cash holdings	– 0.126 (0.042)	– 0.167 (0.042)	– 0.149 (0.020)	– 0.148 (0.041)	– 0.157 (0.041)	– 0.183 (0.055)	– 0.123 (0.044)
Fixed assets	– 0.143 (0.028)	– 0.133 (0.027)	– 0.168 (0.011)	– 0.161 (0.026)	– 0.159 (0.026)	– 0.183 (0.029)	– 0.147 (0.029)
Sales growth	– 0.017 (0.008)	– 0.018 (0.008)	– 0.024 (0.007)	– 0.020 (0.008)	– 0.023 (0.008)	– 0.029 (0.009)	– 0.015 (0.008)
Gross profit margin	0.043 (0.018)	0.043 (0.021)	0.057 (0.009)	0.051 (0.019)	0.050 (0.019)	0.048 (0.024)	0.037 (0.019)

Table 4 (Continued)

Variables	Hypothesis 2.1 Financial environment		Hypothesis 2.2 Legal environment	Hypothesis 2.3 Information environment	Hypothesis 3.1 Political environment	Hypothesis 3.2 Cultural environment	Hypothesis 3.3 Social environment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
D/E ratio	0.000 (0.009)	− 0.003 (0.010)	0.002 (0.005)	0.000 (0.010)	0.001 (0.010)	0.019 (0.014)	0.001 (0.009)
Log (GDP per capita)	0.032 (0.021)	− 0.030 (0.040)	0.004 (0.002)	0.004 (0.005)	0.004 (0.005)	− 0.002 (0.009)	0.035 (0.021)
Private credit	0.000 (0.000)	0.000 (0.000)	− 0.000 (0.000)	0.000 (0.000)	− 0.000 (0.000)	− 0.000 (0.000)	0.000 (0.000)
Constant	− 0.063 (0.184)	0.523 (0.359)	0.088 (0.028)	0.019 (0.073)	0.120 (0.068)	0.453 (0.123)	− 0.082 (0.190)
Country fixed effects	Yes	Yes	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5503	3826	5503	3798	5488	3024	5150
Adjusted R^2	0.389	0.420	0.308	0.319	0.316	0.335	0.387

The table shows the regression results considering the potential moderating role of macro-level boundary conditions on the effect of state ownership on trade credit. The dependent variable is 100 times the ratio of trade receivables to total sales. Trade receivables equals amounts on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business. We lag all independent variables by one year. The "Appendix" provides variable definitions and sources. The full sample contains 5503 firm-year observations from 574 firms privatized in 64 countries. We winsorize all financial variables at the 1% level in both tails of the distribution. Regressions include country dummy variables, industry dummy variables (based on 48 industry groupings in Fama & French, 1997), and year dummy variables. Robust standard errors in parentheses below each coefficient are clustered at the firm level.

Consistent with our expectation, the coefficient on the interaction between *State Ownership* and *Private Credit* loads negatively and is statistically significant (p value < 0.01). This suggests that state ownership is associated with more trade credit in countries where borrowers have less access to private credit. These results are also economically significant: A decrease in private credit from the 75th (112) to the 25th (36.4) percentile is associated with a 12% increase in the provision of trade credit by a firm with a mean level of state ownership.²³

The pervasiveness of government-owned banks (GOBs) may also affect the supply of trade credit provided by SOEs. Specifically, Sapienza (2004), La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2002), and Barth, Caprio, and Levine (2001) identify that widespread state ownership of banks contributes to a less efficient allocation of capital. Such imperfections in a country's financial markets may limit access to lending and heighten the need for alternative financing sources (such as trade credit provision by SOEs). Furthermore, La Porta et al. (2002) document that GOBs are frequently conduits through which funding is channeled to SOEs. Because the financing advantage theory (e.g.,

Petersen & Rajan, 1997) holds that firms with better access to finance offer more trade credit, a more substantial presence of GOBs should increase the opportunity for SOEs to grant trade credit. Therefore, we expect SOEs to extend more trade credit in economies where state ownership of banks is greater.

In Model 2 of Table 4, we explore whether a greater prevalence of GOBs explains why NPFs with higher residual state ownership provide more trade credit. We identify that the coefficient on *State Ownership* $\times$ *Government Ownership of Banks* is positive and statistically significant (p value < 0.05). This finding offers additional support for the financing advantage theory by confirming that the provision of trade credit by SOEs is higher in countries with greater government ownership of banks.²⁴ This result is also economically significant: Increasing government ownership of banks from the 25th (0.18) to the 75th (.408) percentile is associated with a 5% increase in trade credit provision by firms with mean-level state ownership.²⁵

To provide further evidence of the robustness of our findings, we explore two other measures of financial market development. Internet Appendix

Table IA1 presents the results. First, we replace our measure of private credit with *Firms with a Bank Loan or Line of Credit* (%). This variable, which we obtain from the Global Financial Development Database (GFDD), measures the percentage of firms with a line of credit or a loan from a financial institution. Higher values indicate better access to bank credit for all firms in a country. We find that the interaction term between *State Ownership* and *Firms with a Bank Loan or Line of Credit* (%) loads negatively and is statistically significant (p value = 0.008). Consistent with the financing advantage theory, this suggests that SOEs (having a comparative advantage in access to finance relative to private firms) are more likely to extend trade credit in economies where private firms have less access to bank credit.

Second, we measure access to finance with another variable from GFDD, *Loan from a Private Lender* (%). This variable identifies the percentage of respondents who report borrowing from a private lender (rather than from a formal financial institution). Offering a different measure of availability of funding than *Private Credit*, *Loan from a Private Lender* (%) reflects borrowers' access to non-bank loans. A higher value indicates better opportunities for financing through private lenders (besides banks). Our results remain similar (p value = 0.009) and are also presented in Internet Appendix Table IA1.

Overall, the Data Support Hypothesis 2.1: State Ownership Plays a More Important Role in Allocating Funds in Countries with Less Developed Financial Markets

In Model 3 of Table 4, we examine how legal environment may impact the effect of state ownership on trade credit by using a variable for the strength of creditor legal protection (*Creditor Rights*). We include *Creditor Rights* and its interaction term with *State Ownership* in the regression. The coefficient of *State Ownership* $\times$ *Creditor Rights* is negative and statistically significant (p value = 0.005). Providing support for Hypothesis 2.2, the results in Model 3 of Table 4 indicate that strong creditor protection has a negative impact on the relation between state ownership and the provision of trade credit.

In Model 4, we examine the effect of cross-national differences in the informational environment on the relation between state ownership and trade credit. To measure the extent of information asymmetry between suppliers and customers (and

thus identify circumstances where the state is likely to have an information advantage), we denote a variable indicating whether a public registry or a private bureau of customer information exists within a country (Djankov et al., 2007). While we continue to find that state ownership is positively associated with trade credit provision, the nation's informational environment also plays a critical role. In particular, the interaction term between *Information Sharing* and *State Ownership* is negative and statistically significant. The p value is smaller than 0.001. These results are consistent with Hypothesis 2.3, indicating that the contracting-based advantages of state ownership diminish when information sharing is more pervasive.

Model 5 investigates the effect of political environment on the association between state ownership and trade credit. We include the political orientation variable *Left* and its interaction term with *State Ownership*. The positive and significant coefficient of the interaction term (*State Ownership* $\times$ *Left*) indicates that SOEs in countries with left-wing governments appear to take greater advantage of favorable access to finance and engage more aggressively in credit-granting to channel more cash into the economy (p value = 0.018). These findings support Hypothesis 3.1.

Similarly, Model 6 includes a measure of collectivism from Hofstede (1984). Adding this variable allows us to examine the role of cultural environment. Consistent with Hypothesis 3.2, we find a positive and significant coefficient for the interaction term between *State Ownership* and *Collectivism* (p value = 0.036). The data show that SOEs are likely to grant larger amounts of trade credit when the nation's cultural environment suggests that government involvement in economic activity should be greater.

In Model 7, we identify the level of unemployment in each nation (*Unemployment*) as a proxy for a country's social environment. In Hypothesis 3.3, we predict that, if governments direct SOEs to use trade credit to fulfill social goals, we should find that SOEs offer more trade credit when unemployment is high. Providing support for this prediction, the interaction term in Model 7 identifies that SOEs grant more trade credit when unemployment is higher (p value = 0.044).

Overall, the results in Table 4 reinforce our contention of a positive relation between state ownership and trade credit provision. Moreover, Table 4 contributes to an enhanced understanding of how country-level boundary conditions affect

that relation. Specifically, the data indicate that the effects of government ownership on trade credit are more pronounced in countries where the institutional environment suggests that the state should have stronger motivations to extend trade credit.

Role of Firm-Level Boundary Conditions on the Relation between State Ownership and Trade Credit

In Table 5, we empirically test the moderating role of firm-level boundary conditions. Models 1 and 2 consider how different amounts of state ownership affect credit-granting by SOEs. We expect SOEs to have differing opportunities and motivations to provide trade credit to customers according to whether the government is a majority or minority investor. As predicted in Hypothesis 4.1, the results in Model 1 verify that a firm with the state as a majority investor tends to increase its trade credit provision by 3.3 points (p value < 0.001). In Model 2, our variable of interest is *State as a Minority Investor*. The coefficient is statistically insignificant. The results in Models 1 and 2 suggest that different levels of state ownership play an important role in trade credit provision.²⁶

In Models 3 and 4 of Table 5, we investigate how the extent of internationalization affects the relation between state ownership and trade credit. First, to consider the presence of foreign investors, Model 3 includes a dummy variable, *Cross-listing*, and its interaction term with *State Ownership*. In line with Hypothesis 4.2, the interaction term *State Ownership* $\times$ *Cross-listing* is negative and statistically significant (p value < 0.05). Holding everything else constant, being cross-listed in the U.S. reduces trade credit provision by 6.8%.

Similarly, in Model 4 of Table 5, we examine whether the firm's amount of foreign sales affects the association between state ownership and trade credit. We include a dummy variable (*Foreign Sales*) as another indicator of the extent of a firm's international orientation. Consistent with Hypothesis 4.2, international activities reduce trade credit provision by 9.4%, holding all else constant (p value < 0.05).

Robustness Checks and Other Tests

Difference-in-differences analysis

To further mitigate endogeneity concerns and provide out-of-sample evidence, we next employ a difference-in-differences (DiD) approach. During the Great Recession, government bailout programs

aimed at rescuing financially distressed firms led to a global surge in state ownership. These increased levels of state ownership create a natural experiment that allows us to use a DiD framework to compare trade credit provision before and after government acquisition.

To rule out any pre-existing effects of government ownership, we focus solely on privately owned firms acquired by governments. We use the SDC Platinum M&A database to identify these firms, which represent our treatment group. We then match these firms with other privately owned firms (that are not acquired by governments) on size, industry, and country.²⁷ The matching sample represents our comparison group. Thus, the primary difference between the two groups is the onset of state ownership in the treatment group. We estimate the effect of government acquisition by using a panel regression with firm and year fixed effects. Table 6 reports the results.

Post-Acquisition (a dummy variable indicating whether the focal firm is acquired by a government) captures the effect of government acquisition and provides a means of comparing trade credit provision before and after acquisition. The coefficient of *Post-Acquisition* is positive and significant (p value of 0.037), suggesting that firms are likely to extend more trade credit after government acquisition. This further supports our main results.

Alternative estimations

We conduct several additional tests to ensure that our main results are robust across different estimation techniques. We report the results in Internet Appendix Table IA2. First, we adjust standard errors by clustering according to firm and year (Petersen, 2009). The data indicate that *State Ownership* enters positively and is statistically significant (p value < 0.001). Second, we use Newey–West and Prais–Winsten regressions, respectively, to account for autocorrelation and heteroskedasticity in standard errors. In both models, *State Ownership* continues to be positively associated with *Trade Credit* (p value < 0.001). Third, given that our dependent variable is left-censored at 0 and right-censored at 1, we use a Tobit regression. We again find that the coefficient for *State Ownership* is positive and statistically significant (p value < 0.001). Fourth, to account for the hierarchical structure of our data (i.e., firms nested within countries), we apply a hierarchical generalized linear model.²⁸ We continue to find a positive relation between state ownership and trade credit

Table 5 Testing firm-level boundary conditions on the relation between state ownership and trade credit: level of state ownership and extent of internationalization

Variables	Hypothesis 4.1		Hypothesis 4.2	
	Level of state ownership		Extent of internationalization	
	(1)	(2)	Cross-listing (3)	Foreign sales (4)
State as a majority investor	0.033 (0.010)			
State as a minority investor		– 0.011 (0.009)		
State ownership			0.081 (0.024)	0.083 (0.019)
Cross-listing			0.000 (0.013)	
State ownership × cross-listing			– 0.068 (0.028)	
Foreign sales				0.018 (0.014)
State ownership × foreign sales				– 0.094 (0.037)
Log (sales)	– 0.008 (0.004)	– 0.008 (0.004)	– 0.006 (0.005)	– 0.009 (0.004)
ROA	0.023 (0.029)	0.023 (0.029)	0.022 (0.029)	0.025 (0.029)
Cash holdings	– 0.122 (0.042)	– 0.125 (0.043)	– 0.133 (0.043)	– 0.128 (0.042)
Fixed assets	– 0.142 (0.028)	– 0.142 (0.028)	– 0.137 (0.029)	– 0.148 (0.028)
Sales growth	– 0.018 (0.008)	– 0.018 (0.008)	– 0.023 (0.008)	– 0.018 (0.008)
Gross profit margin	0.046 (0.018)	0.050 (0.018)	0.043 (0.019)	0.045 (0.018)
D/E ratio	– 0.000 (0.009)	– 0.002 (0.009)	– 0.003 (0.009)	0.001 (0.009)
Log (GDP per capita)	0.030 (0.021)	0.026 (0.021)	0.025 (0.023)	0.024 (0.021)
Private credit	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Constant	– 0.060 (0.187)	– 0.004 (0.185)	– 0.028 (0.196)	0.006 (0.187)
Country fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	5503	5503	5224	5458
Adjusted R^2	0.384	0.378	0.397	0.393

The table shows the regression results for investigating the moderating roles of firm-level boundary conditions on the relation between state ownership and trade credit. Trade receivables equals amounts on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business. We lag all independent variables by 1 year. The “Appendix” provides variable definitions and sources. The full sample contains 5503 firm-year observations from 574 firms privatized in 64 countries. We winsorize all financial variables at the 1% level in both tails of the distribution. Regressions include country dummy variables, industry dummy variables (based on 48 industry groupings in Fama & French, 1997), and year dummy variables. Robust standard errors in parentheses below each coefficient are clustered at the firm level.

provision. Finally, our main evidence holds when we estimate a firm random effects regression to account for the panel structure of the data.

Additional controls

By impacting access to financing, barriers to foreign investors may also affect the relation between state ownership and trade credit provision. Bell,

Table 6 Difference-in-differences: government acquisition and trade credit

Variables	(1)
Post-acquisition	0.049 (0.024)
Log (sales)	– 0.007 (0.015)
Return on sales	– 0.002 (0.003)
Cash holdings	– 0.090 (0.084)
Fixed assets	– 0.092 (0.062)
Sales growth	0.004 (0.006)
Gross profit margin	0.020 (0.016)
D/E ratio	0.001 (0.030)
Log (GDP per capita)	0.028 (0.081)
Private credit	– 0.001 (0.001)
Constant	0.011 (0.752)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	713
Adjusted R^2	0.054

Table reports difference-in-differences (DiD) regression results relating government acquisition and trade credit. The dependent variable is 100 times the ratio of trade receivables to total sales. Trade receivables equals amounts on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business. *Post-Acquisition* is a dummy variable that equals 1 for firms experiencing government acquisition. We lag all independent variables by 1 year. The “Appendix” provides variable definitions and sources. We winsorize all financial variables at the 1% level in both tails of the distribution. Robust standard errors in parentheses below each coefficient are clustered at the firm level.

Filatotchev, and Rasheed (2012), Cumming, Knill, and Syvrud (2016), and Chan, Covrig, and Ng (2005) label the difficulties faced by firms seeking access to financing in other countries as the capital markets liability of foreignness (CMLOF). These authors identify that the costs resulting from the CMLOF are driven by factors such as institutional distance, information asymmetry, and unfamiliarity. Therefore, our subsequent analysis (presented in Internet Appendix Table IA3) includes controls for each of these factors. Our first set of controls reflects institutional barriers that may hinder foreign investment. Specifically, we account for a country-level measure of the extent to which

foreign investors are free to acquire control in domestic companies (*Restrictions on Foreign Control*) from the World Competitiveness Yearbook (WCY). As an additional measure of institutional characteristics affecting foreign investment (or barriers to foreign investors), we include the investment freedom index (*Investment Freedom*) from the Heritage Foundation. This metric reflects a variety of investment restrictions (such as national treatment of foreign investment, sectoral investment restrictions, foreign exchange controls, and capital controls). Furthermore, Errunza and Senbet (1981), identifying additional measures of institutional environment that may affect the likelihood of foreign investment, note that the possibility of government misappropriation poses another risk for international investors. To capture the effect of this type of institutional factor, we include variables measuring the prevalence of corruption and the likelihood of expropriation. Specifically, we include the corruption index (*Corruption*) from the International Country Risk Guide (ICRG) and the risk of expropriation index (*Expropriation*) from La Porta et al. (1998).

An additional barrier to international investors may result from informational asymmetry (Bell et al., 2012; Chan et al., 2005; Kingsley & Graham, 2017). Accordingly, we control for a country’s information environment by including the country median level of earnings management (*Opacity*) in the regression.

Unfamiliarity also contributes to the CMLOF and thus represents another barrier to international investors. Identifying how important unfamiliarity may be to the asset allocation decisions of international investors, Grinblatt and Keloharju (2001) find that investors are more likely to purchase the stock of companies that are most well-known. Based on the Grinblatt and Keloharju argument that familiarity breeds investment, we assess the degree of familiarity with a variable designating whether English is a commonly spoken language in a country (*English Speaking*). Sarkissian and Schill (2004) contend that foreign investors will find firms from English-speaking countries to be more approachable because English is the most commonly spoken language by international portfolio managers. Therefore, we include a dummy variable indicating whether the country’s dominant language is English. Internet Appendix IA3 shows that adding these controls does not affect our main results.

Another potential concern relates to firms' preferences for different sources of external financing, which may affect their reliance on trade credit supplied by SOEs. To address this concern, we use the World Business Environment Survey (WBES) to more directly gauge the severity and implications of limited access to capital. The WBES assesses cross-national differences in business conditions and identifies whether and how financing availability hinders operations in a country. Accordingly, we follow Beck et al. (2008), and obtain the WBES measure of the country-level likelihood that firms consider inadequate access to funding as a significant obstacle to successful operations (*% of Firms Identifying Access to Finance as a Major Constraint*). Internet Appendix Table IA4 suggests that adding this control does not affect our main results.

Alternative samples

In Table 7, we use out-of-sample data to further confirm the robustness of our main findings. Using a sample of 2457 non-privatized firms from 46 countries over the 2007–2012 period, we re-examine the role of state ownership on trade credit.²⁹ In Model 1 of Table 7, we find that, in line with our main result, *State Ownership* is positively associated with trade credit provision. The *p* value is 0.023. The magnitude of the coefficient on *State Ownership* is similar to that in Model 1 of Table 3. In Model 2, instead of using a continuous measure of state ownership, we employ a dummy variable that indicates whether the state is the controlling shareholder (*State Control*). The data indicate that those firms provide significantly more trade credit on average than non-state-controlled firms. The coefficient for *State Control* has a *p* value of 0.007.

Table 7 State ownership and trade credit: out-of-sample evidence

	(1)	(2)
State ownership	0.054 (0.024)	
State control		0.034 (0.012)
Log (sales)	– 0.018 (0.002)	– 0.018 (0.002)
Return on sales	– 0.001 (0.003)	– 0.001 (0.003)
Cash holdings	– 0.182 (0.027)	– 0.182 (0.027)
Fixed assets	– 0.147 (0.020)	– 0.147 (0.019)
Sales growth	– 0.008 (0.004)	– 0.008 (0.004)
Gross profit margin	– 0.007 (0.025)	– 0.007 (0.025)
D/E ratio	0.004 (0.009)	0.003 (0.009)
Log (GDP per capita)	0.081 (0.059)	0.078 (0.059)
Private credit	0.000 (0.000)	0.000 (0.000)
Constant	– 0.494 (0.634)	– 0.456 (0.635)
Country fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	8592	8592
Adjusted <i>R</i> ²	0.367	0.368

Table presents regression results relating state ownership to trade credit. The dependent variable is the ratio of trade receivables to total sales. Trade receivables equals the amount on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business. We lag all independent variables by 1 year. The “Appendix” provides variable definitions and sources. The sample contains 2457 firms from 46 countries over the 2007–2012 period. We winsorize all financial variables at the 1% level in both tails of the distribution. Regressions include country dummies, industry dummies (based on the 48 industry groupings of Fama & French, 1997), and year dummies. Robust standard errors in parentheses below each coefficient are clustered at the firm level.

The findings using out-of-sample data provide further evidence that state ownership is positively associated with trade credit provision.

We also consider various subsamples. In unreported tests, we exclude countries with few observations or firms. Forming these subsamples allows us to rule out the possibilities that outliers from countries with few observations or few firms are driving our results. Specifically, we exclude countries with less than 100 observations, less than 150 observations, less than 10 firms, and less than 15 firms. Although the number of countries in these regressions varies between 10 and 19 (compared to the full sample of 64 countries in Table 3), we continue to observe a positive relation between state ownership and trade credit.

Comparison of trade credit between NPFs and always-private firms

To provide a more complete picture of how state ownership affects trade credit provision, we next compare the trade credit granted by NPFs with that that provided by always-private firms (APFs, or firms that have never had any level of state ownership). If state ownership is positively associated with credit-granting because of financing advantages (due to the soft budget constraint and other connections to the government), NPFs should consistently extend higher levels of trade credit than APFs. Using Bureau Van Dijk's Osiris database, we identify firms that have no state ownership. Our results are in Table 8. In Model 1, we find that *NPFs* (an indicator for NPFs) loads positively (p value of 0.008). This suggests that, on average, NPFs provide significantly more trade credit than APFs.

In Models 2 and 3 of Table 8, we use samples matched by (1) size and country, and (2) all explanatory variables, respectively. We obtain propensity scores from the first-stage probit model, where the dependent variable is an NPF indicator. This model controls for all explanatory variables from the main regression (i.e., Model 1 of Table 3), including the industry, year, and country dummies. We then match each NPF with the APF that has the closest score. Using the matched samples, we re-estimate our regressions. Consistent with our expectations, the data indicate that NPFs are associated with higher trade credit provision than APFs (p value of 0.006 from Model 2; p value of 0.001 from Model 3).

Taken together, the results in Table 8 indicate that NPFs provide more trade credit than their always-private peers, in line with the financing advantage theory of state ownership.³⁰

Costs of trade credit provision by SOEs

While trade credit provision by SOEs may have political and social benefits, there may also be economic costs. Accordingly, we recognize the "dark side" of credit-granting by SOEs. Adalet McGowan, Andrews, and Millot (2018) note that state-sponsored financial support may hinder a nation's aggregate productivity growth. Chen et al. (2018), Jaslowitzer, Megginson, and Rapp (2016), and Chen, El Ghouli, Guedhami, and Wang (2017) additionally conclude that non-economic motivations of SOEs contribute to suboptimal investment efficiency. These authors note that SOEs' investment policies are frequently motivated by a desire for stability. Therefore, they may cause economic damage, consistent with the "quiet life" perspective (as described by Bertrand & Mullainathan, 2003).³¹

For example, Jaslowitzer et al. (2016) assert that state ownership may be associated with "quiet life" decision-making because governments frequently appear to implement stability-seeking capital expenditure policies, especially during economic downturns. We extend this notion to capture another form of SOEs' investment decisions, and argue that they may formulate trade credit provision to "keep the peace" (such as by granting the additional trade credit necessary for full employment).³² The financial inefficiencies wrought by an SOE's additional provision of trade credit can be thought of as an economic price the state is willing to pay to preserve political and social serenity.

To explicitly estimate the economic cost of this more liberal granting of trade credit, we consider how it affects the market valuation of SOEs. By measuring the valuation impact, we assign a financial value to the "dark side" of SOE credit policy. To do so, we regress *Market to Book* on *State Ownership*, *Trade Credit*, and the interaction term between *State Ownership* and *Trade Credit*. We include all control variables (lagged by one period), as well as country, industry, and year effects. To account for within-firm correlations, we estimate robust standard errors adjusted for clustering at the firm level.

The results in Table 9 show that the market interprets the trade credit provided by SOEs as a value-reducing endeavor. The coefficient of *State Ownership* $\times$ *Trade Credit* is negative and

Table 8 Comparison of trade credit between newly privatized firms and always-private firms

	Full sample (1)	Matched by size and country (2)	Matched by all explanatory variables (3)
NPFs	0.023 (0.009)	0.023 (0.008)	0.026 (0.008)
Log (sales)	− 0.014 (0.001)	− 0.011 (0.003)	− 0.011 (0.003)
Return on sales	− 0.003 (0.002)	0.003 (0.005)	− 0.012 (0.019)
Cash holdings	− 0.123 (0.015)	− 0.160 (0.030)	− 0.128 (0.031)
Fixed assets	− 0.147 (0.012)	− 0.112 (0.026)	− 0.101 (0.021)
Sales growth	− 0.006 (0.002)	− 0.000 (0.004)	− 0.001 (0.005)
Gross profit margin	0.003 (0.007)	0.004 (0.017)	0.015 (0.016)
D/E ratio	0.011 (0.005)	0.007 (0.007)	0.002 (0.008)
Log (GDP per capita)	0.039 (0.014)	0.015 (0.028)	− 0.000 (0.028)
Private credit	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Constant	0.013 (0.122)	0.108 (0.296)	0.224 (0.290)
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	39,509	7142	7142
Adjusted R^2	0.306	0.320	0.311

Table presents regression results comparing the trade credit provision between newly privatized firms (NPFs) and always-private firms (APFs). The dependent variable is the ratio of trade receivables to total sales. Trade receivables equals the amount on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business. We lag all independent variables by 1 year. The “Appendix” provides variable definitions and sources. The sample contains 574 NPFs with 5503 firm-year observations, and 2236 APFs with 34,006 firm-year observations. We winsorize all financial variables at the 1% level in both tails of the distribution. Regressions include country dummies, industry dummies (based on the 48 industry groupings of Fama & French, 1997), and year dummies. Robust standard errors in parentheses below each coefficient are clustered at the firm level.

statistically significant (p value = 0.036). For an NPF with mean state ownership of 0.27, an increase in trade credit from the 25th (7.65%) to the 75th percentile (21.16%), holding all else equal, will lead to a 0.055 ($-1.511 \times (21.16\% - 7.65\%) \times 0.27$) decrease in an SOE's market-to-book ratio. Since the mean of the market-to-book ratio is 1.85, this corresponds to a 3% decline. These findings suggest that the granting of trade credit by state-owned companies is more likely to be viewed as a form of loss-making subsidization, rather than as a positive-NPV business decision.

The non-economic motivations of SOEs may contribute to this “dark side.” For example, if state-owned firms allowed social/political considerations to impact credit-granting decisions, we would expect

a lengthier average collection period (ACP) for firms with state ownership versus that for always-private firms. Our data provide evidence of this source of value destruction. In Internet Appendix Table IA6, the coefficient of the NPF variable represents the additional number of days in the average collection period for NPFs vs. APFs. We identify that NPFs take 8–9 days longer to collect on accounts receivable. Our finding that the ACP decreases as state ownership decreases suggests that greater private ownership discourages the granting of trade credit that is not value-enhancing. More broadly, this finding supports the contention (from the privatization literature (e.g., Megginson & Netter, 2001)) that changes from state to private ownership sharpen the privatized firm's focus on profit maximization.

Table 9 State ownership, trade credit, and valuation

Dependent variable	Market to book	
	(1)	(2)
State ownership	0.098 (0.151)	0.380 (0.210)
Trade credit	– 0.659 (0.302)	– 0.194 (0.405)
State ownership $\times$ trade credit		– 1.511 (0.720)
Log (sales)	– 0.102 (0.032)	– 0.104 (0.032)
Return on sales	0.682 (0.239)	0.691 (0.237)
Cash holdings	0.459 (0.296)	0.503 (0.298)
Fixed assets	– 0.135 (0.168)	– 0.118 (0.168)
Sales growth	0.002 (0.066)	0.008 (0.066)
Gross profit margin	0.166 (0.122)	0.151 (0.120)
D/E ratio	– 0.073 (0.063)	– 0.075 (0.063)
Log (GDP per capita)	0.297 (0.180)	0.298 (0.180)
Private credit	– 0.003 (0.001)	– 0.003 (0.001)
Constant	– 0.998 (1.896)	– 1.098 (1.902)
Country fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	4636	4636
Adjusted R^2	0.278	0.282

Table reports regression results relating state ownership, trade credit, and valuation. The dependent variable is Market to Book. We lag all independent variables by 1 year. The “Appendix” provides variable definitions and sources. We winsorize all financial variables at the 1% level in both tails of the distribution. Regressions include country dummy variables, industry dummy variables (based on 48 industry groupings in Fama & French, 1997), and year dummy variables. Robust standard errors in parentheses below each coefficient are clustered at the firm level.

DISCUSSION AND CONCLUSION

Key Findings and Theoretical Contributions

We contribute to the international business literature on the firm-level implications of state capitalism by examining the impact of state ownership on the provision of trade credit. Based on the financing advantage theory of trade credit, our expectation is that firms with greater amounts of state ownership should capitalize upon financing advantages (i.e., due to the soft budget constraint) and “share” those financing advantages by more liberally extending trade credit. Consistent with our theoretical prediction, we find that state ownership is positively related to the supply of trade credit.

This result is robust to multiple endogeneity tests, and to using alternative measures of state control, considering various samples, applying different estimation techniques, and including additional controls.

More importantly, by exploring linkages between the domains of finance and international business, we provide evidence as to how country-level institutional context affects the relation between state ownership and trade credit provision. Drawing from the international business literature, we identify country-level boundary conditions expected to shape the relation between state ownership and trade credit. These conditions relate to a nation’s financial, legal, informational, political, cultural, and social environments. We further identify how

these institutional factors affect the opportunities and motivations for the SOEs to extend trade credit. We find that SOEs offer more trade credit if the nation's financial markets are less developed, if the nation's culture is more collectivist, if the nation's social needs are more dire, if the nation's information environment is less comprehensive, and if the nation's political orientation is more leftist.

In another set of predictions, we study the role of firm-level factors in affecting the credit-granting decisions of SOEs. From a firm-level perspective, we determine that the proportion of state shareholdings and the firm's extent of internationalization weigh significantly on the SOE's trade credit policy.

Our study contributes to a more nuanced delineation of the potential benefits of state ownership. Kornai (1988) and Megginson and Netter (2001) note that the "soft budget constraint" (i.e., government-directed funding to provide explicit economic sustenance for less-prosperous SOEs) is frequently criticized as a costly source of inefficiency for state-owned firms. However, we contend that it may be shortsighted to condemn this as simply an enabler for dysfunctional SOEs. Our analysis suggests that funding from soft budgets helps SOEs fulfill an important role of providing liquidity in less liquid financial markets. Policymakers are especially cognizant of mechanisms that can provide liquidity, especially during economic crises. Levine, Lin, and Xie (2016) noted that, in 1999, Alan Greenspan referred to the nation's stock market as providing a "spare tire" for the financial system (because the ability to alternatively raise capital by issuing equity may offset the negative repercussions of a banking crisis). We argue that the granting of trade credit by SOEs may serve a similar function. Reducing that source of funding through privatization may weaken an important line of defense against the next financial crisis. Therefore, policymakers should consider such favorable and perhaps redeeming qualities when contemplating any "hardening" of the soft budget constraint.

Extending the "spare tire" analogy also allows us to offer further insights regarding financing choices, especially the choice to use trade credit as a source of funding. From Cosh et al. (2009) and Robb and Robinson (2014), we know that trade credit may not always be a firm's primary choice for financing. However, from Beck et al. (2008) and Rajan and Zingales (1995), we know that trade credit is pervasive around the world. Our institutions-based framework proposes a means of

reconciling these seemingly contradictory findings. In this paper, we identify that institutional conditions (such as the level of development of the nation's financial markets) affect the amount of trade credit granted by SOEs and that SOEs provide trade credit as a source of supplemental liquidity or as a "spare tire" for firms seeking capital. The spare tire serves an important purpose. While we may not want to have to drive on a spare tire (i.e., use of trade credit from SOEs may not be the firm's first choice for financing), we are certainly glad to have that spare tire when it is needed (i.e., trade credit from SOEs provides liquidity when other funding may be unobtainable).

Furthermore, unlike prior studies, our analysis involves examining whether the more liberal granting of trade credit by SOEs has economic costs. Specifically, our study presents evidence that trade credit provision by SOEs may be spawned by the state's political and social welfare-enhancing motivations (which may contribute to credit-granting decisions that are inconsistent with value maximization). Providing verification of this contention, the data indicate that increases in trade credit provision are associated with decreases in the SOE's market value (as reflected by the market-to-book ratio). This finding is supported by the state ownership literature, which holds that markets generally discount the politically/socially motivated endeavors of SOEs.

Building upon this potential contribution, we identify sources of this value destruction. First, if state-owned firms allowed non-economic motivations to impact credit-granting decisions, we would expect a lengthier average collection period for firms with state ownership versus that for always-private firms. Our data provide evidence of this source of value destruction. Second, we contend that non-economic motivations of SOEs contribute to suboptimal investment efficiency. Credit-granting by SOEs may be motivated by the state's objective to promote stability (such as by ensuring employment security). Trade credit policies driven by a desire for stability may have negative economic implications, consistent with the "quiet life" perspective (as described by Bertrand & Mullainathan, 2003). Overall, by presenting specific evidence of the costs of state ownership, our analysis offers a more comprehensive and more balanced perspective regarding trade credit provision by SOEs.

More broadly, by delving deeply into the relation between institutional environment and decision-

making by SOEs, our study provides interesting insights regarding important constructs that span the IB and finance literatures. Consider the concept of “patient” capital (as discussed by Inoue et al., 2013; Lazzarini & Musacchio, 2018; Musacchio et al., 2015; Redding, 2015). Ownership by the state is generally thought to be a form of “patient” capital. Providing further nuance, our study suggests that the institutional environment affects the level of “patience” shown by state-shareholders. For example, as a provider of “patient” capital, state-shareholders should support full employment and economic stability. Our analysis indicates that such support is stronger in institutional contexts in which the nation’s political orientation is more leftist, its financial markets are less developed, and its cultural predisposition is more collectivist. Overall, these findings suggest that, at least for the providers of capital, “patience” is more virtuous in some institutional settings than in others.

Additionally, while prior studies have considered trade credit policies at state-owned firms (largely focusing on China), it appears that there is still much to be learned. First, the extant literature, focusing predominantly on China, paints an unclear picture regarding the association between state ownership and trade credit provision. Results of these studies range from a non-significant relation between state ownership and trade credit (e.g., Fabbri & Klapper, 2016), to a positive and significant relation (Guariglia & Mateut, 2016), to a negative and significant relation (Wang, Wu, Yin, & Zhou, 2019). Furthermore, while a very important and interesting economy, China also has a unique institutional environment. Following Grøgaard et al. (2019) and Inoue et al. (2013), we similarly recognize that single-country studies may provide findings that are less universal (due to idiosyncratic features of a specific setting). Our paper, by considering determinants of trade credit policy across 64 diverse economies, provides broader and more generalizable insights, especially regarding the effect of heterogeneous institutional environments.

Implications

Our study (considering how institutional context affects the relation between state ownership and trade credit) has important policy implications. Cumming, Lopez-de-Silanes, McCahery, and Schwienbacher (2020), Gande, John, and Senbet (2008), Kingsley and Graham (2017), and Senbet and Wang (2012) note that a “financial

development gap” may exist between countries. A “financial development gap” is based on differences in the opportunities for firms to access financial resources (which is a reflection of the level of development of a nation’s credit and stock markets). Regarding the specific magnitude of a “financial development gap”, the nation’s institutional environment affects the size of the chasm (Kingsley and Graham, 2017; Senbet and Wang, 2012). Our data indicate that SOEs respond to poorly developed financial markets (i.e., markets with large “financial development gaps”) by more liberally offering trade credit. That is, credit-granting by SOEs is a way that a government may attempt to rectify a nation’s capital market weakness and close its “financial development gap”. Therefore, our study suggests that government-initiated efforts to facilitate the provision of trade credit may help resolve liquidity constraints in countries that lack financial development. As such, we caution that an unintended consequence of privatization may be that the reduction in state ownership could contribute to a reduction in the provision of trade credit. This type of contraction in liquidity may be especially problematic in countries with limited access to bank credit and other sources of formal financing.

Furthermore, a prominent benefit of privatization is its contribution to the development of a nation’s financial markets (e.g., Megginson et al., 2004; Megginson & Netter, 2001). Therefore, it is somewhat ironic that our study suggests that privatization may inadvertently hinder the flow of liquidity within a country in the short term. Therefore, another of our policy contributions is calling attention to this short-term pain (i.e., reduction in trade credit provision by privatized firms) that may precede one of privatization’s long-term gains (i.e., enhanced financial market development).

Overall, our findings highlight the benefits and costs of the trade credit that is provided by SOEs. Because state ownership decisions involve a trade-off between the benefits and costs, our development of a more thorough understanding of the relation between state ownership and trade credit should be especially valuable as future policymakers contemplate the optimal level of government involvement in national economies.

Future Research Directions

As policymakers scramble to mitigate the effects of the unprecedented economic shock from the

coronavirus pandemic, options are limited as already very low interest rates create a liquidity trap that may render aspects of monetary policy ineffective. Providing economic stimulus may help reignite economic activity, but its scope and efficacy are dependent upon government's deep pockets and political will. Trade credit granted by SOEs may be a viable complement or alternative element of the economic stimulus tools available for governments.³³ Our paper provides guidance for studying the role of trade credit extended by SOEs as a means to stimulate the economy during and after the coronavirus pandemic.

Our institution-focused framework offers interesting predictions as to government responses to the liquidity crisis engendered by the pandemic. As we note in this paper, we know that the standard playbook for governments during prior crises calls for increasing the extent of credit-granting by SOEs. Therefore, based on the financing advantage hypothesis, another increase in state-sponsored trade credit should be now expected to inject liquidity into faltering economies. Additionally, our findings regarding the role of political and social institutions further suggest a crisis-inspired acceleration in credit-granting by SOEs. Specifically, Lazzarini and Musacchio (2018) identify that extreme economic events motivate governments to accentuate social and political goals. Clearly, recent government endeavors to preserve jobs have been driving the unprecedented degree of recently enacted state-mandated economic stimulus (Megginson & Fotak, 2020). Providing another tool to better understand policy reactions (and better understand cross-national differences in policy reactions), our framework specifies the mechanics to formally consider how such political/social motivations are likely to affect a government's response to the ongoing crisis.

Suggesting further avenues for future research, our analysis has focused on SOEs as suppliers of trade credit. However, we have yet to fully evaluate the demand side of the equation. Due to data limitations, we are unable to extensively consider the perspective of the recipients of trade credit. It may be that SOEs allocate capital better than other financial intermediaries (i.e., private banks, debt and equity capital markets), thereby relieving the borrowers' financial constraints. Thus, the extent to which the recipient firms benefit from trade credit by SOEs remains an open question.

Another such question that our study raises involves the net valuation impact of credit-

granting by SOEs. We show that the action of extending trade credit hurts the valuations of SOEs, but is there an equal and opposite reaction with respect to the valuation of the recipient? That is, what is the valuation impact for the customer firm receiving trade credit from the SOE? Does the net effect of the transaction ultimately create or destroy value?

Other interesting questions involve the credit terms offered by SOEs. How do the SOEs' credit terms (such as time to pay, amount of discount for early payment, size of credit limits) differ from those of private firms? Since our study identifies how features of the nation's institutional environment weigh on credit-granting decisions by SOEs, we may further apply our institutional perspective to consider whether the terms of trade credit offered by SOEs are predictably affected by institutional characteristics. For example, our institutions-based framework offers predictions regarding answers to such questions as: Are SOEs' credit terms more generous in collectivist societies or are SOEs' credit terms different for trade credit offered to cross-border customers?

We may also consider how the desirability of trade credit granted by SOEs is perceived by the recipient. Are there signaling implications for the recipient firm? That is, is the state considered a "trade creditor of last resort"? For many firms, is trade credit from a state-owned firm a preferred source of financing or is it the only choice? In a world in which state-sponsored financing is common, where does trade credit received from SOEs fit into a "pecking order" of sources of capital? Addressing these demand-side questions in a multinational setting would build upon the insightful work of Cosh et al. (2009) and Robb and Robinson (2014).³⁴

More broadly, our paper provides a comprehensive framework to analyze the SOE's decision to grant trade credit. We identify theoretically and test empirically the boundary conditions (e.g., financial, legal, informational, political, cultural, and social environments) that affect trade credit offered by SOEs. However, trade credit provision is only one of the SOE's many financial policy decisions. This framework can be applied to other SOE outcomes (e.g., investment, financing, and/or payout policies). Thus, we call for future research to apply our framework (i.e., the boundary conditions) to analyze other aspects of financial decision-making by SOEs, decisions that should only

increase in importance as the role of the state in each nation's economy continues to evolve.

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NOTES

¹Our analysis as to how institutional differences impact financial decision-making answers the call for such additional research by Eden (2010) and Jackson and Deeg (2008). Thus, while we know that institutions matter (North, 1990; Williamson, 2000), we follow Eden (2010) and Jackson and Deeg (2008) and seek to better understand how they matter.

²The significance of "institutional voids" has been examined in influential international business research (see, for example, Child & David, 2001; El Ghoul, Guedhami, & Kim, 2017; Inoue et al., 2013; Khanna, Palepu, & Sinha, 2005; Musacchio et al., 2015; Peng, Wang, & Jiang, 2008).

³Further highlighting the importance of institutional context, Kingsley and Graham (2017) also identify that "institutional voids" affect FDI decisions.

⁴Price discrimination theory (Petersen & Rajan, 1997) asserts that selling firms with high gross profit margins may use trade credit as a tool for price discrimination. Monitoring/credit enforcement theory (Burkart & Ellingsen, 2004; Cunat, 2007; Giannetti, Burkart, & Ellingsen, 2011; Longhofer & Santos, 2003) proposes that trade credit is more likely in contexts where suppliers have an advantage over financial institutions with respect

to assessing the credit quality of buyers and monitoring/enforcing repayment. Implicit warranty theory (Burkart & Ellingsen, 2004; El Ghoul & Zheng, 2016; Giannetti et al., 2011; Lee & Stowe, 1993; Petersen & Rajan, 1997) focuses on the information asymmetry between suppliers and buyers that may affect the provision of trade credit. Buyers are exposed to moral hazard if they make payment before verifying the quality of the product. Sellers may therefore use trade credit to certify product quality. Finally, transaction cost theory (Ferris, 1981) holds that trade credit may be used to reduce transaction costs by allowing buyers to separate the payment cycle from the delivery schedule.

⁵It may be more informative to consider the alternative scenario in which the firm's financing choices are limited (such as when a nation's financial markets are less developed). Robb and Robinson (2014) note that firms are more inclined to access capital from sources that are most plentiful. When capital is not plentiful, the firm must seek alternatives (i.e., "second choices" for sources of financing). We contend that, when alternatives are limited, the state steps up to provide another choice by directing SOEs to offer trade credit. Therefore, it may or may not be that trade credit from an SOE is a firm's preferred financing choice. The bottom line is: in markets where there are fewer choices, a bad choice is better than no choice. While not specifically considering trade credit from SOEs, Cosh et al. (2009) offer support for our contention by concluding that firms may not always acquire funding from the preferred source, but they are typically successful in obtaining some form of financing. In our subsequent empirical analysis, we control for firms' access to alternative sources of financing.

⁶Boubakri et al. (2016), Filatotchev, Poulsen, and Bell (2019), and Li et al. (2011) highlight the importance of considering how "informal" institutions (such as national culture) impact decision-making.

⁷Benito et al. (2016) and Benito, Lunnan, and Tomassen (2011) emphasize that the SOE's non-economic goals (e.g., social and/or political) are usually specific to its domestic market.

⁸Our main findings are not sensitive to sequentially excluding each industry from our analysis.

⁹Our main results continue to hold when we sequentially exclude each country from our analysis.

¹⁰Compustat Global separates trade receivables from other receivables.

¹¹In unreported results, we use $\log(1 + \text{trade receivables})$ as an alternative dependent variable and find that our results remain statistically the same.

¹²Cumming, Filatotchev, Knill, Reeb, and Senbet (2017), Gagnon and Karolyi (2013), and Karolyi (2006) document that the process of cross-listing is synonymous with internationalization. Cumming et al. (2017) identify that cross-listing facilitates a broader channel to enhanced globalization while Gagnon and Karolyi (2013) note that cross-listing furthers the integration of international capital markets.

¹³We collect state ownership and financial information prior to privatization from each firm's IPO prospectus, which we obtain by directly contacting stock exchanges, government privatization agencies, and SOEs.

¹⁴To ensure that our evidence does not simply reflect an overall global reduction in trade credit, we plot the time series of the mean levels of trade credit in all of our countries and find that trade credit provision has been stable over our sample period. This figure is not presented here but is available from the authors upon request.

¹⁵The *State Ownership* coefficient is 0.069. All else equal, a change in state ownership from 0.00 to 0.51 is associated with an increase of 0.0352 ($= 0.069 \times (0.51 - 0.00)$) in *Trade Credit*, and a 20.7% ($= 0.0352/0.17$) increase in trade credit relative to its mean (0.17).

¹⁶As a robustness check, we test the effect of state ownership on trade credit after excluding all control variables (except for country, industry, and year fixed effects). In subsequent regression models, we add the country-level control variables, which are less likely to be driven by firm-level trade credit provision or state ownership. We then add firm-level financial variables in successive regression models. We find that state ownership loads positively and is statistically significant in all models. Importantly, the magnitude of the coefficients of our variables of primary interest remains stable over all specifications. We present these results in Internet Appendix Table IA5.

¹⁷Petersen and Rajan (1997) find that firms in financial trouble may extend more trade credit to preserve sales, and customers are often reluctant to repay these suppliers. Both effects would lead to higher trade credit balances for firms that are struggling financially.

¹⁸Jiang (2017) surveys 255 finance papers that use instrumental variables (IV) and finds that the average magnitude of IV estimates is nine times that of OLS estimates. Our IV estimate of state ownership is about 9.14 times that of the OLS estimate. We acknowledge that the magnitude of reduced-form estimates may be inconsistent with OLS estimates due to, for example, confounding factors that may be correlated with the residual. To mitigate this concern, we include control variables identified by theory and in prior literature as relevant. We also use other methods to address endogeneity, which we discuss later.

¹⁹Our results, available from the authors upon request, remain when we estimate an IV-GMM regression.

²⁰Our results continue to hold if we use an indicator for whether the government retains any share of the privatized firm (i.e., *State Ownership* > 0) as the dependent variable in the first stage.

²¹We obtain statistically similar results when we match firms that are partially privatized (i.e., *State Ownership* > 0) with firms that are fully privatized (i.e., *State Ownership* = 0).

²²We examine the decomposition of variance components. The resultant *F*-statistic is 14.59 (*p* value = 0.000), rejecting the hypothesis that between-country variance is irrelevant.

²³The *State Ownership* $\times$ *Private Credit* coefficient is -0.001 . For a firm with a mean level of state ownership (0.27), a change in *Private Credit* from 112 to 36.4 is associated with an increase of 0.020 ($= 0.27 \times (-0.001) \times (36.4 - 112)$) in *Trade Credit*, and a 12% ($= 0.020/0.17$) increase in trade credit relative to its mean (0.17).

²⁴This relation may not be immediately intuitive because GOBs are frequently considered explicit pipelines for channeling cash to politically connected firms. Our interpretation, empirically confirmed above, is that GOBs may provide a more implicit conduit by first providing financing to SOEs (which then act as intermediaries and pass through cash to other firms in the form of credit-granting).

²⁵The *State Ownership* $\times$ *Government Ownership of Banks* coefficient is 0.140. For a firm with a mean level of state ownership (0.27), a change in *Government Ownership of Banks* from 0.18 to .408 is associated with an increase of 0.009 ($= 0.27 \times (0.140) \times (.408 - 0.18)$) in *Trade Credit*, and a 5% ($= 0.009/0.17$) increase in trade credit relative to its mean (0.17).

²⁶These findings continue to hold when we use always-private firms (i.e., firms never having any state ownership) as the benchmark.

²⁷We undertake this careful matching process because Meyer (1995) asserts that the DiD framework provides the most convincing evidence of a causal relation if the comparison sample is most similar to the treatment sample.

²⁸All inferences remain when we use this model to examine our other predictions. The results are available upon request.

²⁹We obtain state ownership information for this sample from NRG Metrics. Due to data limitations, most of the observations correspond to private firms. Moreover, for firms with government shareholdings, the change in state ownership over time is relatively small (compared to our primary sample of NPFs).

³⁰Banking crises present another opportunity to consider how access to finance affects the relation between state ownership and trade credit provision. A crisis restricts the normal bank lending channel (Cornett, McNutt, Strahan, & Tehranian, 2011). Access to trade credit could partially offset any reduction in bank loans and ameliorate the effect of the crisis (Campello, Graham, & Harvey, 2010). Accordingly, we expect a stronger relation between state ownership and trade credit provision during

banking crisis periods. To test this prediction, we obtain data on banking crises from 1970 to 2011 from Laeven and Valencia (2013). We then construct the dummy variable *Banking Crisis*, which equals 1 if a country experienced a systemic banking crisis during the last three years. In unreported results, we confirm that state-owned firms extend more trade credit during a banking crisis than do privately owned firms.

³¹"Quiet life" behavior is a form of agency cost whereby managers avoid contentious, albeit economically advantageous, decisions to preserve social stability and tranquility. See Bertrand and Mullainathan (2003) and Capron and Guillen (2009).

³²Our assertion is similar to that of Fisman and Raturi (2004), who propose that the credit-granting decisions of monopolists can be partially explained by the "quiet life" hypothesis.

³³Especially if political will for extensive state intervention begins to wane, the "stealth" aspect of credit-granting by SOEs should increase its desirability as an instrument for government-sponsored economic stimulus.

³⁴We thank an anonymous reviewer for identifying these important potential extensions.

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APPENDIX: VARIABLE DEFINITIONS AND SOURCES

Variable	Definition	Source
<i>Panel A: Dependent variables</i>		
Trade credit	Ratio of trade receivables to total sales. Trade receivables equals the amount on open account (net of applicable reserves) owed by customers for goods and services sold in the ordinary course of business	Compustat Global
Market to book	Market value of equity divided by book value of equity.	As above
Average collection period (ACP)	ACP is 360/(sales/trade receivables)	As above
<i>Panel B: Ownership and state control variables</i>		
State ownership	Percentage of shares held by a government	Firms' annual reports and offering prospectuses
State control	Dummy variable that equals 1 for firms in which the government owns more than 50% of shares, and 0 otherwise	As above
State as a majority investor	Dummy variable that equals 1 if government owns more than 50% of shares, and 0 otherwise	Firms' annual reports and offering prospectuses
State as a minority investor	Dummy variable that equals 1 if any shareholder holds more shares than the government, and 0 otherwise	As above

Variable	Definition	Source	Variable	Definition	Source
NPFs	Dummy variable that equals 1 if a firm is newly privatized, and 0 otherwise	As above	Post-acquisition	Dummy variable that equals 1 if a firm is acquired by the government, and 0 otherwise	SDC M&A Database
APFs	Dummy variable that equals 1 if a firm is 100% privately owned and has never had government ownership, and 0 otherwise	Authors' calculations	Turnover	Ratio of sales to difference between total assets and accounts receivable	Compustat Global
<i>Panel C: Firm-level control variables</i>			<i>Panel D: Industry- and country-level control variables</i>		
Log (sales)	Natural logarithm of total sales in U.S.\$ millions	Compustat Global	Log (GDP per capita)	Natural logarithm of GDP per capita in constant 2000 U.S.\$	World Development Indicators
Return on sales	Ratio of income before extraordinary items to total sales	As above	Private credit	Private credit by deposit money banks and other financial institutions to GDP (%)	As above
Cash holdings	Ratio of cash and short-term investments to total assets	As above	Left	Dummy variable that equals 1 if the ruling party's economic orientation is communist, socialist, social democratic, or left wing, and 0 otherwise	Database of Political Institutions (2012)
Fixed assets	Ratio of total (net) property, plant, and equipment to book value of total assets	As above	Deficits	Difference between general government total expenditures and revenue, as a percentage of GDP	International Monetary Fund's World Economic Outlook Database
Sales Growth	Growth in total sales in year t , defined as the difference between total sales in year t and total sales in year $t - 1$ over total sales in year $t - 1$	As above	Firms with a bank loan or line of credit (%)	Percentage of firms in the formal sector with a line of credit or loan from a financial institution	Global Financial Development Database
Gross profit margin	Difference between total sales and cost of goods sold over total sales	As above	Loan from a private lender (%)	Percentage of respondents who report borrowing money from a private lender in the past 12 months	As above
D/E ratio	Ratio of book value of total debt to book value of equity	As above	Government ownership of banks	Government ownership of banks, divided by 100	Barth et al. (2013)
Cross-listing	Dummy variable that equals 1 for firms undertaking cross-listings on a U.S. equity exchange, and 0 otherwise		% of firms identifying access to finance as a major constraint	Percentage of firms identifying access to finance as a major constraint, divided by 100	World Business Environment Survey
Foreign sales	Dummy variable that equals 1 if a firm has positive foreign sales, and 0 otherwise	FactSet

Variable	Definition	Source
Credit rights	Dummy variable that equals 1 if secured creditors are able to seize collateral after the reorganization petition is approved (i.e., there is “no automatic stay”), and 0 otherwise	Djankov et al. (2007)
Information sharing	Dummy variable that equals 1 if either a public registry or a private bureau operates in the country in a given year, and 0 otherwise	Djankov et al. (2007)
Banking crisis	Dummy variable that equals 1 if a country experienced a systemic bank crisis during the past 3 years, and 0 otherwise	Laeven & Valencia (2013)
Collectivism	100 minus Hofstede’s cultural index for individualism	Hofstede (1984)
Unemployment (%)	Unemployment rate	EIU Country Data
Restrictions on foreign control	The extent to which foreign investors are free to acquire control in domestic companies	World Competitiveness Yearbook (WCY)
Investment freedom	An index that evaluates a variety of investment restrictions (such as sectoral investment restrictions, foreign exchange controls, and capital controls)	Heritage Foundation
Corruption	An assessment of corruption within the political system (with a higher value indicating less corruption)	International Country Risk Guide (ICRG)

Variable	Definition	Source
Expropriation	The likelihood of expropriation (with a higher value indicating less risk of expropriation)	La Porta et al. (1998)
Opacity	Country-level measure of extent of earnings management, which is calculated using Modified Jones’s model (Dechow, Sloan, & Sweeney, 1995)	Compustat Global and authors’ calculation
English speaking	A dummy variable that equals 1 if English is an official language, and 0 otherwise	CIA World Factbook

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