Trust, Credit Divergence, and Financial (De)Regulation*

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Abstract

We model trust as the collective reputation of borrowers and explain the persistence in trust across societies with the co-existence of multiple equilibria, consequently leading to divergent credit and economic growth. Our theory demonstrates distrust to be a self-fulfilling curse: lenders believe borrowers are more likely to default and raise interest rates, reducing borrowers' incentive to repay loans and thus fulfilling the expected low trust environment. Financial deregulation spurs faster economic growth in high-trust countries as trust nurtures good behaviors without incurring additional social costs for regulation enforcement. The informal credit market further inhibits formal credit market development in the low-trust economies. Empirically, distrust persistently predicts less formal borrowing, lower credit card ownership, and lower GDP growth with 50% predictability attributed to slower credit expansion. Financial liberalization fosters higher GDP growth in high-trust countries but the opposite in low-trust countries.

JEL: *G28, O16, O17, Z13*

Keywords*: Trust, Credit to Private Sector, Financial Development, Financial Regulation, Informal Finance*

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> *"Trust is an important lubricant of a social system. It is extremely efficient; it saves a lot of trouble to have a fair degree of reliance on other people's word. Unfortunately this is not a commodity which can be bought very easily. If you have to buy it, you already have some doubts about what you have bought."*
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> Kenneth J Arrow (1974), *The Limits Of Organization*.

1. Introduction

Trust can fundamentally affect financial development (e.g., Guiso, Sapienza and Zingales, 2004, 2008, 2009; Alesina and Giuliano, 2015), and the persistent variation in trust over many decades may yield dramatic gaps in financial development across societies.[1] Whereas literature has established many shaping forces of initial social trust levels and their subsequent evolution (e.g., historical shocks, geographical endowments and institutions, Tabellini, 2010; Nunn and Wantchekon, 2011; Moscona, Nunn and Robinson, 2017; Giuliano and Nunn, 2021), we attempt to address a further thought: were any varying trust levels all attributed to these crucial forces, or could they potentially endogenously arise from the same environment? For example, do high-trust societies just inherit more trustworthy individuals from history, or do they to some extent self-incentivize citizens to be trustworthy who are supposed to be untrustworthy in a low-trust environment?

In this paper, we highlight that social trust itself can play a similar role to institutions in incentivizing behaviors. As a result, trust becomes a self-fulfilling prophecy: people in low-trust economies expect others to be untrustworthy in economic activities, and the wariness generates a cost that makes others incentivized to be untrustworthy. In particular, an economy can have different trust levels within the same given economic and non-economic conditions and even regulatory policies. As a result, the self-fulfilling prophecy makes it difficult for societies to increase from their initial trust levels during ongoing economic activities, once those levels are shaped by historical or geographical factors.

We analyze how trust endogenously interacts with economic activities in the context of private-sector credit provision. In this simple and tractable model, borrowers (e.g., entrepreneurs and individuals) make loans with randomly matched lenders (e.g., banks)

[1] A large literature documents the persistence of culture (e.g., Guiso, Sapienza and Zingales, 2004, 2016; Giuliano and Nunn, 2021). Meanwhile, despite the new trend of economic convergence around the world (Patel, Sandefur and Subramanian, 2021; Kremer, Willis and You, 2022), credit to the private sector is seen to be the only divergent force among twenty growth correlates (Kremer, Willis and You, 2022). Our paper uses trust to explain this remarkable divergence.

to allow them to engage in profitable tasks or address emergency needs, and a regulator can partially detect fraud. In infinite and discounting periods, each borrower has a given probability to stay in the economy for the next period; otherwise she is replaced by a new entrant. There are three borrower types in the population: honest borrowers who always repay the principal and interest, fraudulent borrowers who always default (i.e., take away the principal and are excluded once detected by the regulator), and opportunistic borrowers who face a trade-off between defaulting and repaying. A tight regulation increases the detection probability but requires larger social costs for implementation.

The social trust level is concretely defined in this context. Borrowers' types are imperfectly observed, either because of undetected defaults or new entrants without records. Lenders are in a competitive market and set interest rates to compensate for losses to defaults. To do so, a lender has to estimate the group's default risk based on the group's *collective reputation* (Tirole, 1996), i.e., the default probability of all eligible borrowers. The social trust level is defined as the average probability that individuals believe a person they meet for the first time is likely to behave honestly (not cheat).

Our central model's implication is that, with the same composition of borrowers, the equilibrium of a high-trust collective reputation and a low-trust reputation can both exist. That is, distrust can be a self-fulfilling prophecy — lenders believe borrowers are more likely to default on average and thus raise the interest rate under information asymmetry, which reduces opportunistic borrowers' incentive to repay loans, fulfilling the expected low trust environment. The second implication is that regulation yields heterogeneous, even opposite effects on economic growth in low- and high-trust economies — financial liberalization is the ideal strategy in high-trust societies, while tight regulation is the better strategy in low-trust societies.

We further incorporate an informal credit market (e.g., family or friends) as an alternative means of credit access, where borrowers get credit based on in-group trust rather than the collective reputation of the society as a whole. Good borrowers are more inclined to take advantage of their social capital in their community without being represented by the collective reputation, even knowing that the private lender could have the monopoly power to claim a profit margin. Then fraudulent borrowers drive honest borrowers out of the formal credit market, and in the process further deteriorate the credibility of borrowers in that market. This adverse selection is exacerbated in the low-trust scenario, generating a greater negative impact on the credit scale than in the high-trust equilibrium. As a result, our third implication explains that there is a larger informal credit scale under the low-trust equilibrium.

The inference is crucial: the substantial disparities in credit scale and growth are not solely attributable to the demand side — in low-trust countries, there could also be a great demand for investable projects or household financing, yet a large part of borrowing is absorbed by the informal lending market rather than the modern financial systems, which undermines economic growth. In particular, such a reduced formal credit scale is driven by high-quality borrowers who bear a negative externality of distrust and turn to the informal credit market.

We provide three extended discussions. First, in the long run, tight regulation may rule out the low-trust equilibrium and reshape social trust. Deregulation, on the other hand, may keep the economy growing at a high rate for a long time, yet leave room for distrust levels to change. This echoes typical cases in financial history (e.g., the 2008 crisis, Akerlof and Shiller, 2010). Second, the model helps us understand the importance of building a credit history, which serves as a supplemental means of reducing the societal cost of enforcing tight regulation. Third, we revisit the formal lender's information set and allow for additional knowledge about the client's personal characteristics. This leads to a narrower financial inclusion in the low-trust economy. However, we highlight that even complete knowledge cannot replace the role of collective reputation, as information about new clients is always imperfect.

Our empirical tests comprise three parts. First, we investigate the relationship between trust and borrowing activities. High trust is associated with high initial (1985) private-sector credit and also substantial credit expansion, which highlights the impact of trust variations and their persistence. Consider the informal market. Countries with a one standard deviation lower trust level have about a 36% percentage point greater share of individuals who borrow from family or friends instead of financial institutions. That is, low-trust societies exhibit greater fractions of informal borrowing over formal borrowing than high-trust societies. This pattern has been even stronger despite the catch-up effects of financial inclusion in low-trust countries. Credit card coverage exhibits similar patterns. One possible explanation is that lower trust is associated with a lower development level as a result of underdeveloped financial systems. However, after controlling for the development of financial infrastructure, we find that the coefficient of the GDP is no longer significant, but trust still has a strong explanatory power, implying a unique direct channel that is not explained by GDP growth.

The second empirical part analyzes the micro mechanism using nearly 200,000 observations from World Bank FINDEX micro-survey data. We estimate probit models and present evidence that an individual's choice of financing source is influenced by social

trust levels. Put differently, in low-trust countries, people are more likely to switch to informal channels due to the burden of the collective low-trust reputation, even when those people are not identified as risky clients by their individual characteristics. In our most general specification, individuals in countries with a one standard deviation lower trust level are about 4.5% percentage points less likely to receive funds from financial institutions. The negative spillover of distrust explains a huge shortfall in the lowest-trust country's formal credit market relative to high-trust countries: about 20% of its entire population . Meanwhile, about 14% of its nationals flow into informal channels due to the low-trust environment.We increase the rigor of the above baseline estimate in three ways. We use a society's level of trust in strangers as a proxy to better capture trust's role in financial institutions' decisions. Our results remain robust and distinct from GDP's role. Then we alternatively hypothesize that trust affects individuals' choice of funding source by interacting with personal characteristics. The interaction terms dominate the individual controls. Surprisingly, well-qualified individuals in low-trust countries prefer informal channels more than those in high-trust countries. This aligns with the adverse selection mechanism illustrated in our model. Additionally, we address potential specification challenges: the alternative informal channel may have different meaning for those who have access to institutions and those being rejected, and thus violate the independence of irrelevant alternatives (IIA) assumption in probit choice models. We use a multinomial probit (MNP) model and find that our results remain robust. Based on the MNP estimation, we calibrate a representative individual from a given environment and analyze the predicted probabilities of her choice of funding sources.[2] Solely by varying social trust from the sample's lowest level to the highest, her probability of prioritizing financial institutions rises from about 24% to 51%, while her probability of choosing to borrow from family or friends drops from about 41% to 22%. The simulation shows the mechanism from a micro perspective: even in the same economic environment, individuals' borrowing choices depend on the aggregate trust levels, demonstrating the economy in different equilibria.

Our third empirical test links to economic growth and financial regulation. We find that the relationship between trust and credit is economically significant. Trust persistently predicts higher GDP growth, as originally documented by Knack and Keefer (1997); Zak and Knack (2001). We further note that 50% of predictability is explained by credit expansion. Therefore, persistent trust variations constitute a counterforce against global

[2]We simulate under sample medians. On non-numerical controls, we let the representative individual be a woman living in 2021. See Section 4.C for details and the online appendix for simulations under comprehensive scenarios.

convergence documented by Patel, Sandefur and Subramanian (2021); Kremer, Willis and You (2022). Importantly, financial regulations generate heterogeneous effects in low- and high-trust countries. Following Barth, Caprio and Levine (2013)'s index construction, we extend the sample set based on the Bank Regulation and Supervision Survey, and focus on *overall restrictions on bank activities* from 1999 to 2019. There is no significant unconditional correlation between the tightening of regulation and economic growth. However, with a simple sorting by trust levels, a one standard deviation increase in regulation tightening significantly yields about a 1.0 percentage point lower annual GDP p.c. growth rate in countries in the top 50% of the trust level list, but a 0.6 percentage point higher rate in low-trust countries. This is particularly crucial for developing countries: while financial liberalization in high-trust countries leads to a vibrant formal credit market, low-trust countries will benefit from tightening regulations rather than mimicking the financial deregulation of developed countries (many of which are high-trust countries) and falling into the larger negative externalities of default.

Literature. Our paper relates to several strands of the literature. First, we propose a perspective from the classic banking literature to understand the link between credit divergence and persistent variation in trust across societies. The classic credit rationing model suggests that adverse selection under information asymmetry — specifically, the effect of attracting riskier borrowers who pay higher interest rates — could lead to a hump-shaped supply curve of funding, especially when combined with borrowers' moral hazard of choosing to be "risky" (e.g., Stiglitz and Weiss, 1981; Arnold and Riley, 2009; Su and Zhang, 2017). This creates the potential for diverging credit supplies between economies. Revisiting borrowers' actions in the context of social morality, we note that the long-lasting polarization of individuals' risk levels and moral hazard naturally reflects and underpins social (dis)trust. On the other hand, the cultural literature highlights the important roles of historical events and institutions in shaping social trust. For example, Nunn and Wantchekon (2011) shows that the varying trust levels across Africa can be traced back to the slave trades, while Guiso, Sapienza and Zingales (2016) demonstrates that Italian cities that were self-governing in the Middle Ages possess greater social capital today. Many works identify other factors that influence trust, including shared religious beliefs (e.g., Guiso, Sapienza and Zingales, 2009), historical constraints on the executive (e.g., Tabellini, 2010), ethnicity (e.g., Moscona, Nunn and Robinson, 2017), and the tightness/looseness of kinship ties (e.g., Enke, 2019). All of these factors affect the level and scope of trust. A few works have explored the important question of why and how trust persists. For instance, Giuliano and Nunn (2021) shows that cultural norms are

more persistent in societies whose ancestors lived in stable natural environments. Other works indicate that cultural factors can be not only inherited but also inculcated by institutions (e.g., Tabellini, 2008; Bidner and Francois, 2011; Lowes et al., 2017). In this strand, we emphasize that in the context of economic interactions, trust can play a similar role as institutions and thus be self-fulfilling: even with given anthropological, economic, and regulatory environments, an economy may remain in either a low- or high-trust equilibrium for an extended period.

Second, this paper contributes to the growing literature on the importance of culture in influencing policy effects (e.g., Tertilt, 2005; La Ferrara and Milazzo, 2017; Nunn, Qian and Wen, 2018; Ashraf et al., 2020). The wide variation and lack of significant convergence in bank regulatory and supervisory policies (Barth, Caprio and Levine, 2013) suggests that different countries favor different policies. We are especially interested in the question of why the same policy causes different, even opposite effects in different economies. Bosio et al. (2022) shows that tighter regulations only benefit economies with low public-sector quality. We offer the novel perspective that tighter rules particularly benefit low-trust economies but may hurt high-trust countries, indicating an underlying effect of culture. Literature also shows that policy changes, even ones relatively smaller than historical shocks and polity variations, may change culture (e.g., Gruber and Hungerman, 2007; Bau, 2021). Our model explores the idea that tight regulations change the low-trust equilibrium in the long run.

This paper also contributes to the literature on informal finance by connecting the roles of social relationship and culture. Informal finance plays a unique role that introduces the possibility of social enforcement (e.g., Kandori, 1992; Banerjee, Besley and Guinnane, 1994; Allen, Qian and Qian, 2005; Ayyagari, Demirgüç-Kunt and Maksimovic, 2010), especially in underdeveloped economies (e.g., Udry, 1994; Banerjee and Duflo, 2007) and scenarios with weak legal enforcement (e.g., Guiso, Sapienza and Zingales, 2004). We analyze how social trust affects people's utilization of social relationships. Two empirical papers are the most relevant here. Hasan et al. (2017) shows evidence that firms located in lower social-capital regions are perceived as less trustworthy and therefore borrow at higher interest rates with more restrictive loan terms and rely more on private debt. Nicolas, Tarazi and Danisman (2023) investigates 34 countries and finds that the influence of in-group trust on bank lending depends on the level of informal lending. Our theory echoes all of these findings and offers an answer the puzzle raised by Allen and Qian (2024): family loans are often much cheaper, even if lenders know little about the business. We show that social distrust leads to adverse selection in formal finance, in-

creasing formal borrowing costs and the number of good borrowers in the informal market. This also adds to theories on interactions between informal and formal finance (e.g., Madestam, 2014; Allen, Qian and Xie, 2019).

Finally, our paper adds to the literature on how social trust affects financial development and economic growth.[3] In particular, Knack and Keefer (1997); Zak and Knack (2001) document evidence that trust predicts economic growth. Guiso, Sapienza and Zingales (2004, 2008) develop the roles of trust in determining attitudes toward financial transactions and market developments. As concluded in Alesina and Giuliano (2015), financial institutions cannot "cause" financial development if cultural variables work against it. We show that distrust imposes externalities on individual credit access. Importantly, distrust can endogenously arise from and remain under equilibrium credit activities. As a result, distrust persistently explains dampened credit and economic growth. This further connects to the literature on economic convergence (e.g., Barro, 1991; Barro and Sala-i Martin, 1992) and the role of financial development (e.g., Greenwood and Jovanovic, 1990; King and Levine, 1993*a*,*b*). Despite the new pattern of unconditional economic convergence along with nearly twenty converging growth correlates (e.g., Patel, Sandefur and Subramanian, 2021; Kremer, Willis and You, 2022), we explain why private-sector credit appears a remarkable diverging counterforce (Kremer, Willis and You, 2022), as it is highly determined by persistently differing trust levels.

The remainder of this paper is structured as follows. Section 2 introduces the theoretical framework and presents model implications. Section 3 summarizes data and variables. Section 4 presents empirical results. Section 5 concludes.

2. Theory

We first develop a baseline model to formally analyze the role of trust in the process of accessing credit. The lender (financial institutions) can only track borrowers' probability of default based on the *collective reputation* in light of Tirole (1996). Section 2.B solves two equilibria with different trust and steady states of credit growth, which can coexist under the same parameter space. In Section 2.C, we consider the existence of an alternative informal credit market in which lenders have private information about borrowers. Section 2.D revisits the baseline assumptions and suggests the potential to rule out the low-trust

[3]For example, La Porta et al. (1997); Guiso, Sapienza and Zingales (2006); Gennaioli, Shleifer and Vishny (2015); Desmet, Ortuño-Ortín and Wacziarg (2017); D'Acunto, Prokopczuk and Weber (2019); Gennaioli et al. (2022). For micro-evidence, Duarte, Siegel and Young (2012); Moro and Fink (2013); Bottazzi, Da Rin and Hellmann (2016) provide important relevant evidence that trust matters in financial activities, especially in lending decisions.

equilibrium with financial regulations.

A. Model Setup

Imagine an infinite-period economy with discount factor δ with a continuum of borrowers (investors or entrepreneurs) borrowing from a randomly matched lender (say, a bank) for profitable opportunities or personal aims.

Borrowers and borrowing choices. Borrowers are in unit measure. We assume three types of borrowers: honest borrowers (α) never cheat, fraudulent borrowers (γ) always cheat, and opportunistic borrowers (β) decide the optimal borrowing amounts and whether to default. $\alpha + \beta + \gamma = 1$. The borrower's type remains unchanged over generations. Each borrower exists in the next period with probability E and leaves or dies with probability $1 - E$. A borrower who leaves is replaced by a new borrower with no previous record. Each new borrower has the same probabilities of being honest (α), opportunistic (β), or fraudulent (γ).

In each period, each borrower faces a unit measure of investment projects R with return $r \geq 0$, where r follows the probability density function $f(r)$. Naturally, $\mathbb{E}(R) < \infty$, i.e., the total investment return is finite.[4]

If a borrower chooses to be "good," she will invest in all projects with r larger than the interest rate r_X offered by the lender. If a borrower cheats, she takes the principal away in the current period and takes the risk of being detected by the regulator with probability τ in each following period. That is, in period t, a new fraudulent borrower can survive with probability $[E(1-\tau)]^t$ and keep extracting principal until caught by the regulator, whereupon the borrower derives zero utility and leaves the economy.[5] Fraudulent borrowers do not pay back any money, so they want to borrow as much as possible. However, they need to pretend to be honest borrowers and only borrow as if they do not intend to default.

Lender and trust as a collective reputation. All lenders are identical and risk-neutral, so that in a competitive lending market, no lender can earn positive profit — the interest

[4] If we also consider personal borrowing, e.g., access to health care and education, the investable projects can include personal aims, where borrowing is for emergency funds instead of investments, and r essentially reflects the extent that the project "requires" money.

[5] One implicit assumption is that the regulator reviews the full transaction history with a constant detection rate τ. That is, fraudulent borrowers are always under the same risk of being detected. It can be proved that defaulting in each future period dominates any alternative strategy with "honest" periods, since being honest does not allow the borrower to avoid being detected by the regulator. The same logic also applies in Tirole (1996).

rates are just sufficient to cover losses to default. Importantly, we assume the lender does not have private information about any of their borrowers. This simplification allows us to focus on the role of collective reputation. We later extend our model to allow the lender to have borrowers' private information in Section 2.D, where the lender still more or less relies on the collective reputation because there are always new entrants with no records. The lender suffers a loss from the D share of borrowers who default. Then r is determined to compensate for the default loss in equilibrium, i.e.,

$$r(1-D) = D. \tag{1}$$

Consider the lender's estimate of D. First, the lender has no reason to reject borrowers with clean records, denoted as $S_c = S_c(E, \tau, \beta, \gamma)$. However, clean borrowers are mixed with two types of potential defaulters: hidden fraudulent borrowers who have not been caught and new fraudsters, denoted S_h and S_n, respectively. Since the lender cannot identify the borrower's type or history, she estimates $S_x = S_x(E, \tau, \beta, \gamma)$ $(x \in \{h, n\})$ based on the population-average expectation. Then the estimated default share reads

$$D_X = \mathbb{E}_X \left[\frac{S_h + S_n}{1 - S_c} \right], \tag{2}$$

where $\mathbb{E}_X$ denotes the lender's expectation under equilibrium X. At the same time, we define the social trust level as follows.

Definition 1. ***Social Trust Level.***

Denote the level of social trust in equilibrium X as $\mathcal{T}_X$. Then $\mathcal{T}_X$ is the average probability that a person met (matched) for the first time can be trusted (to behave as an honest borrower).

Then by definition,

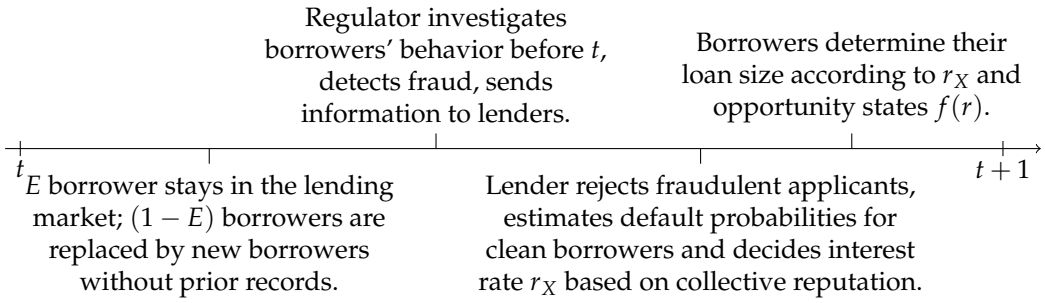
$$\mathcal{T}_X = 1 - \frac{\mathbb{E}_X[S_n]}{1 - E}. \tag{3}$$

That is, the trust level $\mathcal{T}_X$ and $\mathbb{E}_X[S_x]$ $(x \in \{h, n\})$ are different views of borrowers' *collective reputation* under X.

Timeline. The timeline in each period t is characterized as follows:

B. Equilibria

We start by solving two pure-strategy equilibria. One is a high-trust economy where all opportunistic borrowers choose to be good. The other is a low-trust equilibrium in



which all opportunistic borrowers choose to default. Importantly, we show that the two equilibria can co-exist under the same parameter space and yield heterogeneous regulation effects.

High-trust equilibrium. Consider the benchmark high-trust (good) equilibrium G without distrust inefficiency — only γ borrowers cheat and the trust level is $\mathcal{T}_G = \alpha + \beta$. To maintain this equilibrium, opportunistic borrowers must have sufficient incentive to invest and pay interest rather than cheat and risk being caught by the regulator. The incentive constraint (IC) reads

$$\int_{r_G}^{\infty} f(r) r \mathrm{d}r \frac{\delta}{1-\delta E(1-\tau)} \leq \int_{r_G}^{\infty} f(r)(r-r_G)\mathrm{d}r \frac{\delta}{1-\delta E}, \tag{4}$$

which can be rearranged as

$$\frac{1-\delta E}{\delta E \tau} r_G \leq \mathbb{E}(r - r_G | r > r_G) \equiv MRR(r_G), \tag{5}$$

where r_G is the equilibrium interest rate under such a good equilibrium. $\mathbb{E}(r - r_G | r > r_G)$ is denoted as the mean-residual-return (MRR) function w.r.t. r_G.[6]

Remark 1. *The IC eq.(5) is interpreted as follows: the R.H.S. captures the nature of investment opportunities. $MRR(r_G)$ can be interpreted as the economic surplus (after paying the interest back) of the projects that survived under interest r_G. The L.H.S. can be considered as the forgone value of the opportunity cost of default. Consequently, β opportunistic borrowers choose to be honest if and only if the opportunity cost is lower than the economic surplus. Note that borrowers consider the average return rather than marginal return, since once they default, they also default on all future loans.*

Consider the determination of r_G. In each period, $S_c = E\gamma\tau$ fraudulent borrowers are

[6]We use the terminology MRR in light of the well-known mean-residual-life (MRL) function in survival analysis (e.g., Elandt-Johnson and Johnson, 1980), where $MRL(x) = E(X - x | X > x)$ provides the expected remaining lifetime given that an individual has survived up to time x.

detected in Step 1. The lender believes that there are still $\mathbb{E}_G[S_h] = E\gamma(1-\tau)$ fraudulent borrowers with clean records and $\mathbb{E}_G[S_n] = (1-E)\gamma$ new fraudulent borrowers entering the economy. Then the combination of eq.(1) and eq.(2) yields

$$D_G = \frac{E\gamma(1-\tau)+1-E\gamma\tau}{1-E\gamma\tau} = \frac{\gamma-E\gamma\tau}{1-E\gamma\tau}, \quad r_G = \frac{\gamma}{1-\gamma}(1-E\tau). \tag{6}$$

Low-trust equilibrium. The low-trust (bad) equilibrium B is achieved if and only if the effective interest is higher than the average return,

$$\frac{1-\delta E}{\delta E\tau} r_B \geq MRR(r_B). \tag{7}$$

Compared with the IC of equilibrium G, eq.(5), eq.(7) involves not only an opposite inequality sign but also a varying equilibrium interest, r_B. In this equilibrium, $\mathbb{E}_B[S_h] = E(\beta+\gamma)(1-\tau)$, $\mathbb{E}_B[S_n] = (1-E)(\beta+\gamma)$, and the trust level $\mathcal{T}_B = \alpha < \mathcal{T}_G$. The interest rate and estimated default share solve

$$D_B = \frac{(\beta+\gamma)-E(\beta+\gamma)\tau}{1-E(\beta+\gamma)\tau}, \quad r_B = \frac{\beta+\gamma}{1-\beta-\gamma}(1-E\tau). \tag{8}$$

Intuitively, $r_B > r_G$ under the same parameter space, as the lender needs higher interest to cover greater default losses; under the low-trust equilibrium, there are only α economic agents engaging in the productive tasks. The $\beta+\gamma$ borrowers who are not funded or who defaulted do not deliver economic growth, and they offset the interest payments made by successful borrowers. This implies that in a low-trust economy, borrowers suffer higher interest rates, which is consistent with the empirical findings in Hasan et al. (2017).

Coexistence of the equilibria. IC eq.(5) and eq.(7) show the existence of equilibria is determined by the parameter space and the investment environment, $f(r)$. In particular, there is potential for the coexistence of the two equilibria. Proposition 1 gives the sufficient condition for coexistence.

Proposition 1. ***Multiple Equilibria.***

With any parameters (δ, E, τ) and distribution of returns r, define $MRR(x) = \mathbb{E}(r-x|r>x)$. There exists (β,γ), s.t. eq.(5) and eq.(7) simultaneously hold, provided

$$\lim_{x\to 0^+} MRR(x) > 0, \ \textit{and} \ \lim_{x\to\infty} \frac{MRR(x)}{x} < \infty. \tag{9}$$

In particular, with exponentially distributed opportunities, $f(r) = \lambda e^{-\lambda r}$, $r \geq 0$ and $\lambda > 0$, the economy can be either high-trust or low-trust when

$$r_G \leq \frac{\delta E \tau}{\lambda(1-\delta E)} \leq r_B, \quad \Leftrightarrow \quad \frac{1}{\frac{\lambda(1-E\tau)(1-\delta E)}{\delta E \tau} + 1} \in [\gamma, \gamma + \beta]. \tag{10}$$

Remark 2. *Mathematically, eq.(9) transforms eq.(5) and eq.(7) into constraints on the distribution of investable projects given other states fixed, which we see is loose enough that it holds for a large family of common distributions with a bounded or semi-infinite support (detailed in Online Appendix OA-A). Economically, the former equation in eq.(9) rules out the case where most projects do not make profits other than interest, so that the good equilibrium does not exist, and the latter rules out infinite expected excess returns, which certainly precludes the bad equilibrium.*

To obtain a better understanding of the above-described coexistence and to generate further analytical discussion, we pin down $f(r)$ as an exponential distribution in Proposition 1, capturing the following characteristics: (i) $f'(r) < 0$, i.e., fewer business opportunities can survive as the required payoff increases; (ii) the (inverse) scale parameter λ approximately captures the overall business payoff, as $\mathbb{E}(R) = 1/\lambda$, whereas a higher λ indicates that there are relatively more low-return opportunities.

Figure 1, Panel (a) compares low-trust and high-trust economies. The economic surplus shrinks to the blue triangle as the interest rate increases from r_G to r_B. The yellow zone captures the economic welfare loss, which comes from two sources: borrowers pay higher interest rates, whereas fewer business opportunities are taken in a low-trust environment. Figure 1, Panel (b) provides a numerical example in which two equilibria coexist.[7] The black dashed line (LHS) refers to r_X, while the blue curve (RHS) refers to $[\delta E\tau/(1-\delta E)]MRR(r_X)$. Then the ICs require that when r_X equals r_G (r_B), the blue curve lies above (below) the black line. The interest rates r_X obtained from eq.(6) and eq.(8) are plotted as dotted lines, showing that they fit the IC.

Proposition 1 uncovers an important observation: trust is a self-fulfilling prophecy: two economies endowed with the same population structure and investment environment could remain at different levels of credit activity for a long time. Under the "bad" equilibrium, low trust induces the lender to charge a higher interest rate to compensate for default-related losses. A higher interest rate makes cheating relatively more attractive than keeping a clean record. Once borrowers' collective reputation is poor, a new-entry borrower suffers from the spillover from the low-trust environment and so inherits the

[7] Online Appendix OA-A examines a richer set of common distributions using the same visualization method.

preference for defaulting.

Equations (6), (8) and (9) bring an additional observation: r_G and r_B are not affected by $f(r)$ (and thus λ). Therefore, a large scale λ could rule out the high-trust equilibrium by making $r_G > \delta E\tau/[\lambda(1-\delta E)]$. The intuition is that when most businesses do not earn enough money, people realize that maintaining a good record with financial institutions is less meaningful than the gains of defaulting. Thus, the economy falls into the low-trust scenario. In contrast, a society with more profitable businesses for most borrowers tends to rule out the low-trust equilibrium.

Regulation and its effects on economic growth. Consider the role of the regulator — in our model, we characterize it as the probability of detecting fraud in the past record $\tau \in [0,1]$: if a borrower is detected and signaled as fraudulent, she will lose access to the lending market and derive zero utility thereafter. Otherwise, she can still run the business as a clean borrower with probability $(1-\tau)$ in the next period (conditional on her survival). A higher τ implies tighter regulation and naturally reduces default losses, but its implementation requires greater social costs. We assume only trustworthy borrowers actually invest in all projects and deliver economic growth, whereas default borrowers misappropriate the money rather than investing it. Lenders do not contribute to economic growth as all revenue is used to offset default losses.

Therefore, the general effect of tight regulation on economic surplus can be proxied by the average profitability minus the social cost:[8]

$$g_X(\tau) = \int_{\text{Good Borrower } i} \int_{r_X}^{\infty} f(r)(r - r_X)\mathrm{d}r \, \mathrm{d}i - \tau C. \tag{11}$$

The effect of regulations on economic growth can be compared with eq.(11), which suggests the economy might respond to regulation changes differently under high- and low-trust equilibria. Proposition 2 details this prevision.

Proposition 2. ***Heterogeneous Effects of Regulation.***

Tighter regulation benefits a low-trust economy more than a high-trust economy, i.e., $g'_B(\tau) > g'_G(\tau)$. *In particular, for any given* (E, C, λ, τ), *there exists a unique threshold* $\bar{\gamma} = \bar{\gamma}(E, C, \lambda, \tau) \in$

[8] One might solve an τ that optimizes g_X from eq.(11), while we treat τ as exogenous. The reasons are twofold: in practice, regulation design may be subject to various considerations, e.g., political party preferences, regional coherence, and policy continuity. On the other hand, eq.(11) is not used as accounting for economic growth, but to abstract two opposing effects of credit-related regulation on growth, implying that the value of $g(\tau)$ is less practically meaningful than comparative statics over τ. In addition, for simplicity's sake eq.(11) assumes that the social cost is linear with τ.

$(0,1)$, *s.t. a tighter policy spurs growth in a low-trust economy but discourages growth in a high-trust economy when* $\gamma < \bar{\gamma} < \beta + \gamma$.

The intuition for the first half of Proposition 2 is obvious: tighter regulations can detect more fraud so that a smaller share of borrowers default, and lenders can charge a lower equilibrium interest rate to enable higher economic growth. The low-trust economy, with an inherently greater default probability, detects more fraud, and thus achieves greater improvements under the tighter regulatory environment. The second half of Proposition 2 highlights the costs of enforcing tight regulations. In a high-trust economy, the regulator can potentially liberate the financial sector while maintaining the high-trust equilibrium to cut administrative costs, so that opportunistic entrepreneurs can find cheaper credit and more investment opportunities for economic development. Therefore, best regulatory practices depend on the society's trust level, especially when there is a sufficiently large population of opportunistic borrowers.

C. In-Group Trust and Informal Access to Credit

People generally have different levels of trust in members of their society in general and those close to them; the latter is referred to as in-group trust in the literature (e.g., Enke, 2019). In our baseline definition 1, trust mainly refers to out-of-group trust as borrowers and lenders are randomly matched. We further introduce in-group trust and alternative informal access to credit, e.g., through community or friends or other borrowing channels utilizing social capital. We denote the in-group trust of each borrower as $q \in [0,1]$. q can be interpreted as the subjective probability of *not defaulting* conditional on private information or social enforcement. We assume there exists a representative private lender who grants loans based on in-group trust.

In-group trust q is determined and does not suffer from information asymmetry (Guiso, Sapienza and Zingales, 2008). Therefore, opportunistic borrowers would never strategically default in the informal market but would instead be self-enforced (Kandori, 1992).[9] Assume $q \sim \mathcal{U}(0,1)$ and is independent with types.[10] The private lender can require a profit margin of $\bar{r} \geq 0$ as it has monopoly power over the borrower. She optimally chooses $\bar{r}$ to maximize the expected total profit accounting for costs other than default loss (e.g.,

[9] Also, informal lenders can more efficiently monitor and enforce repayment from a class of firms than formal financial institutions can (Ayyagari, Demirgüç-Kunt and Maksimovic, 2010). That means that lower in-group trust refers to a greater risk of being unable to repay loans.

[10] One might think that fraudulent borrowers would have a smaller in-group trust q on average. This character does not qualitatively affect and even enhances the effects discussed below. From another perspective, this assumption ensures that the formal lender has no information about individual's in-group trust.

liquidity loss and the opportunity cost of personal investment), captured as a proportion $\sigma > 0$ of her total lending, i.e.,

$$\max_{\bar{r}} \quad (\bar{r} - \sigma) Q_X(\bar{r}), \tag{12}$$

where Q_X is the total borrowing demand flows from the formal channel to the private lender.

In this kind of borrowing, there is no chance of defaulting without being caught, and the lending process can be viewed as a one-shot deal. Offering personal interest r_P satisfies $qr_P = \bar{r}$. One direct observation arises that more trustworthy borrowers receive lower personal interest rates r_P. When q is high enough, the borrower switches to informal channels as the formal interest rate covers too much spillover of others' defaults and becomes higher than r_P.

Consider the equilibria with the alternative informal credit market. The formal interest rate may also change as the crowd of borrowers changes. Lemma 1 proves the existence and uniqueness of the new high-trust and low-trust equilibria.

Lemma 1. ***Equilibrium with Informal Channels.***

With the existence of an informal credit market, there are still unique equilibria in the high- and low-trust cases. The formal lender (a financial institution) faces a larger share of default borrowers relative to the baseline — there exists a unique $\rho_X > 1, \forall X \in \{B, G\}$ s.t. (i) in the new high-trust equilibrium $\tilde{G}$, the shares of three borrower types faced by the formal lender are

$$\frac{\alpha}{1 + (\rho_G - 1)\gamma} < \alpha, \frac{\beta}{1 + (\rho_G - 1)\gamma} < \beta, and \ \frac{\rho_G \gamma}{1 + (\rho_G - 1)\gamma} > \gamma;$$

(ii) in the new low-trust equilibrium $\tilde{B}$, the shares are

$$\frac{\alpha}{1 + (\rho_B - 1)(\beta + \gamma)} < \alpha, \frac{\rho_B \beta}{1 + (\rho_B - 1)(\beta + \gamma)} > \beta, and \ \frac{\rho_B \gamma}{1 + (\rho_B - 1)(\beta + \gamma)} > \gamma;$$

(iii) the new interest rate $\tilde{r}_X$ is independent of the private market $\bar{r}$ and satisfies

$$\tilde{r}_X = \rho_X r_X > r_X. \tag{13}$$

Remark 3. *The informal alternative is less attractive for borrowers who plan to default, since they value the excess opportunity cost of undetected default in formal channels. Consequently, the lender needs to increase the interest rate to cover the increased default losses due to the relative decrease in good borrowers. In line with the practical intuition, the determination of the interest*

rate is not influenced by the informal channel, because in-group trust is decoupled from collective reputation.[11]

Lemma 1 indicates that the formal (baseline) channel with informal alternatives can be turned into a "smaller" economy under the same mechanism, where "smaller" refers to the overall reduction in the borrower base. Therefore, Propositions 1 and 2 still hold.[12] Consider the reduction in the formal borrower base: Q_X borrowing demands flow to the informal credit market, which causes a loss of economic growth since private lenders have monopoly profits. We further obtain Proposition 3, showing that this additional effect performs differently under different trust levels.

Proposition 3. ***The Informal Channel Under Different Equilibria.***

In the low-trust equilibrium, more borrowers adopt the informal channel,

$$Q_{\tilde{B}} > Q_{\tilde{G}}. \tag{14}$$

The informal channel amplifies the heterogeneous effect of regulation changes, i.e.,

$$g'_{\tilde{B}}(\tau) - g'_{\tilde{G}}(\tau) > g'_{B}(\tau) - g'_{G}(\tau). \tag{15}$$

Informal credit markets generate adverse selection for the formal market. In particular, although financial institutions in both high- and low-trust equilibria suffer from the outflow of good borrowers, those in low-trust economies are affected more, since there are more default borrowers in the lending market. As such, they need to raise interest rates more sharply. This forces more good borrowers to turn to informal channels, as the spillover compensation in the interest rates exceeds the informal rates, especially for borrowers with no default preferences.

The existence of informal finance enhances the vicious cycle of distrust. A larger number of honest borrowers do not borrow from financial institutions as they receive unfair interest rates, leaving the formal credit market rife with default losses. In practice, the informal credit market may generate lower efficiency for economic growth, as private lenders have a pricing power of $\bar{r}$ to maximize private earnings. The continuously existing, substantial outflow of borrowers decreases the credit scale and economic growth. In

[11] When financial institutions partially obtain information about in-group trust, the two interests may be jointly related to the distribution of in-group trust, which is beyond our focus.

[12] The type shares of this new formal economy have changed to $(\tilde{\alpha}, \tilde{\beta}, \tilde{\gamma})$, and the new interest rate is adjusted by a fixed ρ_X. Nevertheless, these changes still apply to the propositions in the baseline that widely hold for the parameter spaces.

addition, the heterogeneous effect of tightening regulations in low- and high-trust equilibrium is amplified, implying that when accounting for informal markets, countries are more likely to obtain opposite effects from deregulation.

D. Discussion

Regulation tightness and equilibrium. Can the low-trust equilibrium be structurally avoided under a given parameter space? Yes, but not always. Recall Proposition 1, eq.(9) can be rearranged as

$$\frac{\gamma}{1-\gamma} \leq \frac{\delta E \tau}{\lambda(1-\delta E)(1-E\tau)} \leq \frac{\beta+\gamma}{1-\beta-\gamma}, \tag{16}$$

where the satisfaction of the first (second) inequality is equivalent to the potential for a good (bad) equilibrium. Tighter regulation τ increases the threshold monotonically and reduces the applicable interval of the bad equilibrium.

Corollary 1. *The low-trust equilibrium can be ruled out if the regulation τ is tight enough s.t.*

$$\tau > \frac{1}{E + \frac{\alpha\delta E}{\lambda(1-\alpha)(1-\delta E)}}. \tag{17}$$

Remark 4. *The threshold in eq.(17) decreases by three means: (i) a greater share of honest borrowers, α; (ii) more profitable business opportunities, i.e., a smaller λ; (iii) more traceable credit records, i.e., a larger E, which is non-straightforward and discussed below. These three social characteristics all lead to lower default rates naturally without regulation. However, since τ is defined as the probability of detection, there may be cases where the threshold exceeds 1 so that any regulation fails to help, and the low-trust economy is the unique equilibrium.*

The core intuition is that tighter regulation identifies more fraudulent borrowers, improving the average quality of borrowers while decreasing inclusion. Take the low-trust equilibrium as an example. The expected amount of hidden fraudsters $\mathbb{E}_B[S_h] = E(\beta+\gamma)(1-\tau)$ decreases, whereas $S_c = E(\beta+\gamma)\tau$ indicates that more borrowers are excluded. In all, tight regulation might temporarily limit the credit supply and bring significant social costs, yet it benefits the economy in the long run as it can potentially nurture good behavior in opportunistic borrowers. Sufficiently tight regulations penalize defaults heavily, gradually improve the collective reputations of borrowers, and consequently generate higher growth.

The role of regulation tightening coincides with what we learn from financial history. For example, loose regulation might lead an economy to a low-trust equilibrium with a

large default scale. Akerlof and Shiller (2010) discuss the US's deregulation before the 2008 crash. In 1999, the Gramm-Leach-Bliley Act, also known as the Financial Services Modernization Act, repealed the Glass-Steagall Act of 1933 and allowed banks to use deposits to invest in derivatives. The following year, the Commodity Futures Modernization Act exempted credit default swaps and other derivatives from regulations.[13] These changes unleashed an acquisition spree because they allowed the combination of traditional bank lending with trading, securities and insurance activities; this led to instances of fraud, e.g., subprime mortgages given to borrowers with poor credit and even motives to strategically default. These deregulation practices led to the 2008 crash. To recover from the crisis, significant regulatory reforms were made, including the Dodd-Frank Wall Street Reform and Consumer Protection Act. After this act came into effect in 2010, The US's financial trust appears to increase slowly but continuously, as reported by the Financial Trust Index, even after the partial repeal in 2018.[14][15] These suggest the long-term interaction of regulation and multiple equilibria.

Building credit history. Another way to increase identification precision is to track credit history. By definition, $(1 - E)$ indicates the share of new entrants with no previous borrowing record. If the social credit system is more robust, the lender can retain and review more previous information, leading to a higher E. Recall Corollary 1, a sufficiently tight regulation τ could rule out the low-trust equilibrium, during which higher E reduces the lower limit of τ. In particular, E enters the denominator in eq.(17) in two terms, $\alpha\delta E/[\lambda(1-\alpha)(1-\delta E)]$ and E. In the former term, E bundles with the discount δ, as it relates to the length of the discrete period. The latter term suggests that E also affects the economy as cross-sectional knowledge of credit records — repeat borrowers have lower conditional probabilities of default than new borrowers, since they have survived one round of detection. A higher E corresponds to a larger share of repeat borrowers, and is thus associated with lower expected default losses. Therefore, a larger E decreases banks' interest rates in the high- and low-trust equilibria, and consequently reduces the externality of fraudulent borrowers, although it does require extra enforcement.

Private information about borrowers. In practice, lenders can request more private information to contain their default losses — they review loan applications and only provide credit to trustworthy applicants. This requires formal lenders to obtain at least par-

[13]The detailed report is also seen in press releases, e.g., https://bettermarkets.org/newsroom/dodd-frank-and-deregulation-some-lessons-history/.

[14]For details about the index, please see http://www.financialtrustindex.org/index.htm.

[15]This also suggests that changes in trust take significantly longer than credit growth does.

tial information about the borrowers' in-group trust instead of purely judging by the collective reputation. In practice, profiles such as occupation, educational background, relatives, etc. may inform inferences.

Therefore, there could be two effects that cause $Q_B > Q_G$, one using collective reputation and the other private information. By utilizing partial private information about borrowers, the formal lender could winnow the borrowers, excluding the most risky ones. These riskier borrowers are then forced into the private credit market. However, it is hard to fully identify an individual's default possibility, and importantly, it is impossible to review brand-new borrowers. Therefore, the collective reputation is inevitably used by lenders to estimate "unidentifiable" default losses. Good borrowers still pay more to cover the losses caused by defaulting borrowers and thus suffer unfair charges relative to their in-group trust. The presence of these two effects stems from the fact that the lender combines two types of information for lending decisions. This drives the lender's and the borrower's initiative choices in accessing the credit market.

In summary, lenders suffer fraud losses and pass these losses through to well-behaved borrowers through interest rates. Even if lenders rely solely on collective reputation, there is still a chance to maintain low default levels by relying on tighter regulations to rule out the low-trust equilibrium. During this process, greater credit history tracking coverage, e.g., more fintech tools or data sharing, serves as a supplement to decrease the required regulatory effort. On the other hand, formal lenders in practice may not only lean on collective reputation; they have the ability to reject a fraction of high-risk borrowers by evaluating their backgrounds or requiring additional collateral for loans. As a result, there are two effects that explain Proposition 3, i.e., the borrower winnowing of lenders and the self-selection of borrowers. Both drive borrowing demand to the informal credit market and hence limit economic growth. In a low-trust economy, both effects are amplified. However, we emphasize that the use of private information cannot fully resolve the externality from collective reputation — even if identification is absolutely precise, the collective reputation is still the only information lenders have about new borrowers, so the multiple equilibria can still co-exist.

3. Data and Variables

Our data for empirical tests come from three widely used surveys and databases: the World Values Survey, the Global Financial Inclusion (Global Findex) Database, and the Bank Regulation and Supervision Survey.

World Values Survey. The World Values Survey (WVS) consists of questionnaires from individual respondents in 108 countries. Following a common approach (e.g., Knack and Keefer, 1997), we calculate the country-level (economy-level) *general trust* as the pooled average of respondents' answers to the question "do you agree or not that most people can be trusted?" To maximize our sample size, we pool all seven waves of WVS up to 2022, as well as the latest wave of the European Values Survey (EVS).[16] Given the persistence of trust, as Figure 2 shows, and following the common approach in literature, we treat trust level as a persistent country-level characteristic and use the pooling averages across waves. The resulting sample set contains 108 economies with an applicable general trust level. In addition, WVS includes six subquestions on respondents' trust in specific kinds of people. Following Enke (2019), we compute *in-group trust* as the average level of respondents' trust in families, friends, and people they know, whereas *out-group trust* is based on respondents' trust in people they meet for the first time, people from other regions, and foreigners. Table 1 shows the statistics of these proxies.[17] The general trust and the in/out group trust range from 0 to 1 and, importantly, show great variation across economies (e.g., the economy-level trust ranges from 0.04 (Trinidad) to 0.77 (Denmark) with a standard deviation of 0.16 throughout the world).

Global Financial Inclusion Database. The World Bank has published four waves of the Global Financial Inclusion Database (FINDEX) from 2011 to 2023, providing comprehensive data on global access to financial services based on country-level datasets and individual-level surveys. Table 1 reports the main variables.

The country×wave panel contains 402 observations. We summarize the shares of adults who borrowed from financial institutions (FI) and family / friends (FF) during the past year, as well as the share of those who owned a credit card. Since each respondent can borrow from both FI and FF, the two population shares within an economy could have common trends related to the economy's general development and the aggregate borrowing demand increments. Therefore, we also test *borrowing difference*, where for country k in wave (year) t,

$$\text{Borrowing Difference}_{k,t} = \text{Borrowing from FI}_{k,t} - \text{Borrowing from FF}_{k,t}. \tag{18}$$

As our model illustrates, people who have borrowing demands but, either by choice or

[16] We collect WVS Time Series (1981-2022) and Joint EVS/WVS 2017-2022 to obtain our data set as approved and suggested by the official guidelines. See https://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp.

[17] Online Appendix Figures OA-4 and OA-3 visualize the worldwide distribution of trust.

because of disqualification, do not borrow from institutions can switch to informal channels. The borrowing difference then captures such phenomena separately from the common trend of borrowing demands. As Table 1 shows, the economy×wave observations of borrowing difference range from -0.53 to 0.69, showing huge worldwide variation in people's borrowing choices.

Our individual-level analysis focuses on a single-choice question in FINDEX surveys. Each respondent reports their best possible source of emergency funds among six options, including *impossible*, *financial institutions (FI)*, *family or friends (FF)*, *working*, *selling assets*, and *others*. We turn the answers into dummy variables and obtain an individual-level repeat cross-sectional sample set with 194,707 observations.[18] The economy×wave level averages (summarized in brackets in Table 1) also imply large variations across the world, leaving room to be explained by individual-level controls (e.g. education and income level) as well as country-level characteristics, especially social trust.

Bank Regulation and Supervision Survey. We further obtain regulation data from the Bank Regulation and Supervision Survey (BRSS) by the World Bank. This is a cross-sectional and chronologically comparable country-level survey on how banks are regulated and supervised in over 180 countries. Barth, Caprio and Levine (2013) make in-depth efforts to compile hundreds of questions from four BRSS waves up to 2011 and then construct a set of indices of the major categories of bank regulatory and supervisory policies. We follow their approach to extend the index set to the latest wave in 2019. The updated sample set allows us to observe the changes in regulation over a 20-year period.[19] In our main analysis, we focus on the most relevant indices, *overall restrictions on bank activities*, ranging from 0 to 12 with higher values indicating more restriction. This index is defined as the extent to which banks may engage in several aspects of investment activities, thus relating to the general incentive strength to initiate lending.[20]

[18]These questions only appear in the latest two waves of FINDEX. In wave 2017, the question is separated. Respondents first answer if they believe it would be possible for them to gain emergency funds within 30 days. The respondents who answer "Yes" are then to indicate their most possible source. In wave 2021, these two questions are combined into one, where "impossible" appears as an option. We convert them into a uniform format following wave 2021. The raw options include credit and withdrawal from financial institutions, which we have combined as from FI.

[19]Thanks to the online database provided by Barth, Caprio and Levine (2013), we directly obtain the indices from the first four waves (1999, 2002, 2006, and 2011). Then we follow their construction approach and update the indices to incorporate the fifth wave of BRSS, completed in 2019.

[20]In Online Appendix OA-E, we also extend our discussion on *official supervisory power*, *bank capital regulations*, *entry into banking requirements*, and *fraction of bank entry applications denied*.

Additional variables. *Credit* (domestic credit to the private sector, % of GDP) and GDP per capita are obtained from the Word Development Indices (WDI) by the World Bank. Throughout the text, GDP refers to GDP per capita unless otherwise noted. Historical values and growth rates are used in specific discussions. Additional country-level (time-varying and historical) controls, including infrastructure and geographic and human factors (e.g., the average amount of ATMs / bank branches per 1,000 km^2 / 10,000 adults), are from the Financial Access Survey (FAS) published by the International Monetary Fund. *Region*, used for fixing regional effects, is categorical and defined by the World Bank.

4. Empirical Evidence

A. Trust Persistence and Credit Divergence

We start from implications on country-level macroeconomic indices: high-trust countries have greater private-sector credit scales, and with financial development, this predicts greater credit growth, which generates credit divergence documented in Kremer, Willis and You (2022).

Figure 2 (a)-(c) plots the relationship between trust and credit.[21] As Subfigure (a) shows, there is no significant positive correlation between the initial credit level in 1985 and its subsequent growth, with an R-squared of only 0.03. This suggests the potential for other factors to play a role in shaping differences in credit growth across countries. Subfigures (b) and (c) link trust to credit. We observe a 14% correlation between credit in 1985 and trust levels. Furthermore, trust strongly explains credit growth from 1985 to 2015, with an R-squared of 0.5, implying that trust is a significant factor influencing credit dynamics over this period.

These implications correspond to the impact of persistent trust variations. We further visualize the persistence of trust in Figure 2 (d). Over the four decades since 1981, there have been seven waves of WVS data. Most in-sample countries participated in more than one wave, allowing us to observe changes in trust within the country. We plot the trust in wave t_1 and the corresponding trust in the next applicable wave t_2 for the same country. The resulting scatters stay close to the 45-degree line, regardless of the values of t_1 and $t_2 - t_1$. This implies that a country's trust level is strongly persistent.[22]

[21] We use the same data as in Kremer, Willis and You (2022), ranging from 1985 to 2015, to document the diverging credit growth affected by trust levels.

[22] The outliers are mainly from countries that experienced significant political shocks or wars. For example, Iran is an extreme outlier in 2009 relative to the previous survey in 2004, which straddles the Iranian Green Movement. In addition, other outliers, while not necessarily immediate, have likewise appeared after incomplete reforms or wars, e.g., Indonesia, Kyrgyz Republic, Vietnam, Albania, etc.

B. Trust and Private Credit Activities

Our theory implies that the low private-sector credit in low-trust countries is not solely attributable to the demand side, but, importantly, to the flow into informal markets. We then test the role of trust in shaping average private credit activities, e.g., borrowing and credit card ownership.

Borrowing. We first visualize the key observations and then perform rigorous panel regressions. Figure 3 visualizes the country-level relationship between out-group trust and average borrowing activities. There are three key observations: (i) people in low-trust countries are less inclined to borrow from financial institutions (FI), as suggested by the positive slopes in Panel (a). In particular, in 2011, about 16% of people in high-trust countries borrowed from FI on average, compared to only 8% in low-trust countries.[23] (ii) As an alternative, more people in low-trust countries (about 26%) borrowed from family or friends (FF) compared to those in high-trust countries (15%), as shown by the negative slopes in Panel (b). (iii) Financial inclusion has been significantly expanded in high-trust countries, so that about 53% of people borrowed from FI in 2021, according to the blue line in Panel (a), compared with only 12% in low-trust countries.

Observations (i) and (ii) corroborate our model implication, Proposition 3, and the mechanisms. In particular, the small scale of private sector credit in low-trust countries is largely due to significant demand flows to informal channels, rather than solely due to insufficient demand for relevant financial activities. The persistence of this phenomenon is achieved on the basis of the coexistence of high- and low-trust equilibria. Furthermore, when we compare 2021 to 2011, we find that this mechanism is more pronounced and leads to greater global growth inequality with the expanding financial inclusion: when there is a greater share of population with potential access to financial institutions, more people are exposed to the negative spillover of the collective low-trust reputation.

We test the above findings more rigorously based on country×wave (year) panel regressions. Consider the following general specification:

$$\textit{Borrowing Difference}_{k,t} = a_k + b_t + c\textit{Trust}_k + d\log(GDP_{k,1985}) + K'_{k,t}\lambda + \epsilon_{k,t}, \tag{19}$$

where *Borrowing Difference* is defined by eq.(18), to mitigate the influence of the fact that people can use both channels simultaneously. *Trust* is proxied either by the general trust

[23] The estimation is based on the yellow linear fit in Figure 3, Panel (a), $\textit{Borrow from FI (\%)} = 1.414(se = 2.631) + 32.499(se = 8.600)\textit{Out-group Trust}$, and the out-group trust level of the representative low-trust (high-trust) country is set at 0.2 (0.45). The interpretation process in this paragraph is similar and omitted.

level in Columns (1)-(5) or by out-group trust in (6)-(8). GDP is controlled to account for the overlap between low trust and low development levels. However, trust predicts economic growth in the long run as shown in literature. We therefore control for historical GDP per capita in 1985. In addition, $K'_{k,t}$ controls for physical infrastructure, e.g., the average number of ATMs / bank branches per 1,000 km^2 / 10,000 adults, which may affect the possible maximum inclusion of financial institutions. a_k and b_t are country and wave fixed effects.

Panel A of Table 2 reports the regression results. All estimated coefficients of *Trust* are significantly positive, implying a high trust level is associated with a greater share of borrowing from financial institutions rather than informal channels. Compared to the baseline in Column (1), wave fixed effects have little impact, while the regional effect has considerable explanatory power and partially explains the correlation between the borrowing difference and trust. This is largely because the World Bank's regional classification groups high-income countries together, and a country's development level has a sizable impact on borrowing activities. This is confirmed by Column (4) controlling the historical GDP per capita.[24][25] After controlling for the status of financial infrastructure in Column (5), the coefficient of historical GDP is no longer significant, while trust remains positively correlated with the difference in borrowing. In other words, the country's development level affects private-sector borrowing activities by shaping the physical basis for financial inclusion. The social trust level, however, still has impact beyond this effect. With full controls, a one-standard-deviation lower trust level (0.16) is associated with a 36.19 percentage point greater share of nationals who do not get access to financial institutions and instead flow into the private credit market. In addition, we replace trust with out-group trust in Columns (6)-(8) and repeat the tests from Columns (1), (3), and (5). The results remain robust and have similar economic significance: the estimated coefficients are about twice those in the corresponding columns, given that the standard deviation of out-group trust (0.8) is half that of general trust.

Then we examine the persistent and even enhanced variation in borrowing difference

[24] According to the World Bank, high-income countries are in a separate region category. The rest of the countries are divided into six regions by geography: East Asia & Pacific (EAP), Europe & Central Asia (ECA), South Asia (SA), Sub-Saharan Africa (SSA), Latin America & Caribbean (LAC), and Middle East & North Africa (MENA).

[25] Due to missing data on GDP per capita in 1985, the sample size of Column (4) is reduced. Therefore, the estimated coefficients may not be used for direct comparison with Column (3). However, we test Column (3) on the reduced data and obtain quantitatively similar estimates, which are not reported in our main table.

(BD) using the following specification:

$$\Delta BD_{k,t} = a_k + b_t + c_1 Trust_k + c_2 Trust_k \times BD_{k,t-1} + c_3 BD_{k,t-1} + K'_{k,t}\lambda + \epsilon_{k,t}, \quad (20)$$

where $\Delta BD_{i,t} = BD_{i,t} - BD_{i,t-1}$. Our model shows that countries can remain in different trust equilibria and follow different development paths. Therefore, a low trust level is expected to be associated with a smaller ΔBD. In addition, lag and interaction terms are included for the following considerations. (i) During expanding financial inclusion, the increase of BD is naturally expected to have a diminishing marginal effect, as BD is a proportional concept with an upper limit.[26] From another perspective, it presents the catch-up effect that developing countries should have the chance to eventually have a large population with access to financial institutions. (ii) Combined with the drawback to the catch-up effect, the interaction then captures the role of trust as a counterforce of the diminishing marginal effect.

Table 2, Panel B corroborates these hypotheses. In particular, the coefficients of trust are 1.392 ($s.e.$ =0.263) unconditionally and 1.756 ($s.e.$ =0.339) with interactions and wave fixed effects. Columns (4) and (5) include fixed region effects, which effectively consider the countries' income levels (see footnote 24), and the coefficients of the interaction term $Trust_k \times BD_{k,t-1}$ become significantly positive. Columns (6)-(8) use out-group trust and suggest the results are robust against the formation of trust proxies.[27]

Credit card ownership. The evidence from credit card inclusion confirms the positive relationship between trust and credit activities. As shown in Panel C of Table 2, we test eq.(19) and eq.(20) but replace BD with the credit card ownership rate (CC). Under the most general specifications reported in Columns (2) and (6), a one standard deviation lower trust level is associated with a 27.84 percentage point lower share of adults who own credit cards, and about a 7.78 percentage point lower increase every three years (the interval between two survey waves). That is, in low-trust countries, people are less likely and/or willing to have credit cards to borrow from financial institutions, and this phenomenon is quite persistent. Importantly, this is not because low-trust countries have slower financial development. Figure 4 (a) shows that bank account penetration in low-

[26] The investigation in Table 4 suggests that a larger scale of credit to the private sector predicts higher economic growth. Therefore, we presume that a greater population share borrowing from FF is development-favored. Table 2, Panel A also implies that GDP p.c. positively correlates to BD.

[27] When out-group trust is used, the interaction term is dominated. There are two possible explanations: out-group trust captures the role of trust in our sense more precisely, or, on the other hand, it is more decomposed from income levels. They are not mutually exclusive. Further discussion diverges from our focus.

trust countries has been rapidly catching up over the past decade, indicating increasing financial inclusion. However, the popularity of credit cards has not grown accordingly, causing the relative share decline as shown in Panel (b).

C. Micro Mechanism

So far, country-level tests corroborate the persistent relatively small size and slow growth of formal credit and large-scale informal credit activity in low-trust countries. We then consider the underlying micro-level mechanism. In particular, for those "extra" people in low-trust countries who fail to access to financial institutions, is it because they are identified as high-risk (e.g., there are more people with limited education in low-trust countries) or because they suffer the negative externality of the collective low-trust reputation?

We estimate the association between country-level trust and individuals' sources of funding based on the micro survey data described in Section 3. The baseline probit model specification reads:

$$Pr(Y_{ikt}|X_{ikt}, K_{kt}) = \Phi(a + b_t + cTrust_k + X'_{ikt}\theta + K'_{kt}\lambda + \epsilon_{ikt}), \tag{21}$$

where the dummy $Y_{ikt} = 1$ if and only if the individual i from country k in wave t chooses Y as her most possible source of emergency funds. We are interested in Y representing "impossible," "family / friends" (FF), and "financial institutions" (FI). $Trust_k$ is the general trust level of country k. X_{ikt} includes the following individual-level controls: gender, age, income level, education level, and possession of a personal account. K_{kt} are country-level controls, including log GDP per capita, financial infrastructure controls, and historical characteristics. b_t is wave fixed effects, and the intercept a is interpreted as the average value of the fixed effects. If an individual's financing is determined by private characteristics and national economic and financial infrastructure, the coefficient of *Trust* would be insignificant.

Table 3 reports the average marginal effects for the probit model specification. All coefficients of trust are significant, implying that the spillover of trust affects individuals' private credit activities. In particular, low trust is associated with a high probability of being unable to obtain funds, as well as a high probability of financing through informal channels, but with a low probability of financing through financial institutions. Moreover, with control variables K'_{kt} and X'_{ikt} included, the economic significance of trust is reduced (e.g., for financial institutions in Columns (5)-(6), the coefficient changes from

0.770 to 0.279),[28] yet still economically sizable: a one standard deviation lower trust level (0.16) is associated with a 4.46 percentage point lower average probability of individuals receiving emergency funds from financial institutions.[29] Relative to the countries with the highest trust level (0.77) in our sample, such a negative spillover in the lowest-trust (0.04) countries roughly explains a huge gap in the credit market: about 20% ($= 0.73 \times 0.279$) of low-trust countries' total population are not able and/or willing to access funds from financial institutions because they suffer from the externality of distrust. On the other hand, about 14% of the nationals of these countries enter informal funding channels due to the low-trust environment.

As discussed in Section 2.C, in low-trust countries, good borrowers are the driving force of a greater informal credit scale due to adverse selection. In Online Appendix Table OA-11, we include the interactions between trust and non-dummy individual controls in the baseline specifications. The interaction terms dominate the impact direction of individual controls on financing from informal channels. In particular, in low-trust countries, higher-income and higher-educated individuals are more inclined to the informal credit market than those in high-trust countries.

In addition, as our model illustrates, lenders in practice can also utilize borrowers' private information whenever possible, and rely on collective reputation to help cover the unknown aspects. We further use out-group trust for robustness tests, reported in Online Appendix Table OA-10, that more accurately capture the role of trust in judging new borrowers. The statistical and economic significance are both robust.

Another potential concern is that the above specification implicitly assumes the independence of irrelevant alternatives (IIA).[30] Therefore, we estimate the multinomial probit model (MNP) on the raw categorical dependent. Take *working* as the benchmark among $p(=6)$ possible choices, and define the $(p-1)$-dimensional latent variable $U_{ikt} = (U_{ikt}^1, \cdots, U_{ikt}^{p-1})'$ and the response variable Y_{ikt} for individual i interviewed in wave t

[28] The results may not be directly comparable due to the different sample sizes, but the overall relatively large size partially mitigates this concern.

[29] While there is debate about whether the standard errors of a probit model should be clustered, we report the results after clustering at the country level, which technically increases the standard errors and is a common choice (e.g., D'Acunto, Prokopczuk and Weber, 2019).

[30] For example, the probabilities of entering informal channels are likely to be different for people who initially have access to formal lenders and those who have been rejected by them. The additional informal funding source would alter the value of $\frac{Pr(Impossible|X,K)}{Pr(FI|X,K)}$ and break IIA. Another technical reason is that attributing country-level measures (e.g., $Trust_k$) mechanically induces the correlation of residuals within the country, which is also overcome by MNP. Despite these advantages, we use the probit specification as the baseline, as the coefficients provide a simpler interpretation.

from country k, that satisfy:[31]

$$\begin{cases} U_{ikt} = \mathbf{c}Trust_k + \theta' X_{ikt} + \lambda' K_{kt} + \mathbf{b}_t + \epsilon_{ikt}, \quad \epsilon_{ikt} \sim \mathcal{N}(0, \Sigma); \\ Y_{ikt} = \sum_{j=1}^{p-1} j \mathbb{I}\left\{ \max_{s \in \{1,\cdots,p-1\}} (U^s_{ikt}) = U^j_{ikt}, U^j_{ikt} > 0 \right\}, \end{cases} \tag{22}$$

where the coefficients of *Trust* $\mathbf{c}$ and the time fixed effect $\mathbf{b}_t$ are $(p-1) \times 1$ vectors. Σ is a $(p-1) \times (p-1)$ positive-defined covariance matrix. The controls X_{ikt} and K_{kt} are specified in eq.(21). $\mathbb{I}(X)$ denotes the indicator function, which equals one if and only if event X is true. Y_{ikt} is the individual's response: one will choose option j that corresponds to the maximum positive (better than the benchmark) U^s_{ikt}, $s \in \{1, \cdots, p-1\}$. We use Markov chain Monte Carlo, and in particular the efficient marginal data augmentation approach developed by Imai and Van Dyk (2005), to estimate the MNP model. We interpret the results by calculating the predicted possibilities of the choices.[32]

Figure 5 shows a representative case. We fix all controls but vary trust from 0 to 1 to simulate the predicted probabilities affected by trust. In particular, numerical controls are typically set to the sample median and categorical arguments represent a South Asian woman in 2021.[33] As the figure shows, with trust increasing from sample minimum (0.04) to maximum (0.77), the predicted probability of financial institutions as priority increases from 24.04% to 50.70%, while the probability of using the informal channel drops from 40.82% to 21.52%. Furthermore, the probability of it being impossible to find funding anywhere drops from 18.78% to 2.67%. This micro foundation of switching from institutions to informal channels leads to our main implication: compared to citizens in a high-trust country, people with the same qualifications but in a low-trust economy are more likely to be unable to raise emergency funds or to seek finance from their close networks. They are less likely to borrow from financial institutions. In addition, the probabilities associated with other sources of emergency funds, such as paid work and selling assets, show little influence from trust levels.

We examine the relationship between trust and predicted probabilities in further sce-

[31] The benchmark selection will vary the estimation and interpretation of the coefficients. However, we interpret the results by calculating the predicted probabilities in the following, which are not affected by the benchmark selection. We do not choose our main interests as the benchmark whose latent variable would not be defined.

[32] We report the coefficients and covariance matrix $\hat{\Sigma}$ in Online Appendix Table OA-4, since it only yields indirect interpretation compared to the predicted possibilities.

[33] The only exception among the numerical variables, age, is set to a commonly used 35, instead of the sample median of 40. We chose South Asia as the main showcase because this region contains rich samples with different trust levels to provide good calibration

narios in Online Appendix Figure OA-6. In particular, low-income and less-educated people are much more likely to fall into the "impossible" case in low-trust countries. However, highly qualified borrowers (e.g., high-income and highly-educated ones) almost always have viable funding sources, even in low-trust countries. Interestingly, these borrowers are more flexible in switching from institutions to informal channels, yielding greater variation between different trust levels. This confirms the curse of distrust, i.e., adding relatively more negative spillover to good borrowers. In Online Appendix OA-C2, we explore additional micro-level evidence from other survey questions that show that in low-trust countries, a higher unbanked population reports their distrust in banks as the reason.

Up to now, our findings have corroborated Proposition 1 — persistent cross-country variation in borrowing activities is explained by trust and the implications of the coexistence of multiple trust equilibria. By relating formal borrowing to informal borrowing activities, we find evidence for Proposition 3, and confirm the underlying economic mechanism, in which low-trust citizens suffer from greater distrust externalities and switch to informal credit markets.

D. Trust and Economic Growth

Financial development is crucial in promoting economic growth (e.g., Greenwood and Jovanovic, 1990; King and Levine, 1993*a*,*b*), the relationship between trust and private-sector credit has substantial economic significance, particularly as a counterforce of economic convergence.

First, through the regression result of eq.(23), as Table 4 shows, we find β-convergence of GDP per capita, with a coefficient of -0.102 (*s.e.*=0.052) from $t_1 = 1985$ to $t_2 = 2015$, consistent with Kremer, Willis and You (2022). Regarding trust, Knack and Keefer (1997) and Zak and Knack (2001) show that trust predicts higher economic growth in 1970-1992 and 1980-1992, but with little economic convergence in those periods. We next test eq.(24) and find that, consistent with the literature, trust can still predict higher economic growth — a one s.d. increase in trust corresponds to a 0.179% ($= 1.12\% \times 0.16$, s.d. is reported below in Section 3) higher GDP growth per year. The β-convergence becomes even stronger with a coefficient -0.179 (*s.e.*=0.065). It is well documented that trust positively correlates with the development level, and therefore trust counteracts the economic convergence documented in Kremer, Willis and You (2022).

$$log(GDP_{i,t_2}/GDP_{i,t_1}) = \beta log(GDP_{i,t_1}) + C + \epsilon_i; \tag{23}$$

$$log(GDP_{i,t_2}/GDP_{i,t_1}) = \alpha Trust_i + \beta log(GDP_{i,t_1}) + C + \epsilon_i; \tag{24}$$

$$log(GDP_{i,t_2}/GDP_{i,t_1}) = \alpha Trust_i + \beta log(GDP_{i,t_1}) + \gamma \Delta Credit_{i,t_1 \to t_2} + C + \epsilon_i. \tag{25}$$

We further test eq.(25) to explore the explanatory power of credit growth in the economic growth predicted by trust. Column (3) of Table 4 allows us to draw two new observations: (i) higher credit growth significantly predicts greater economic growth (0.620, $s.e.$=0.346); (ii) after controlling for credit growth, the coefficient of trust drops from 1.522 ($s.e.$=0.618) to 0.728 ($s.e.$=0.645) over the 41 countries with complete data. That is, credit growth during 1985-2015 explains about half of the predictability of trust for GDP growth.[34]

E. Trust and Regulation

Trust affects economic growth, and it acts as an institution with social (or cultural) enforcement, so it should have interactions with law enforcement institutions and policies. As our model illustrates, the same regulation can yield heterogeneous effects under different trust equilibria.

Barth, Caprio and Levine (2013) shows that there is no cross-country convergence in many aspects of bank regulation from 1999 to 2011. We follow their approach and find that this divergence pattern continues through 2019.[35] The varying policy enforcement and changes allow us to test Proposition 2: countries with different levels of social trust may have heterogeneous economic development under the same regulation change.[36] As mentioned in Section 3, we choose the most relevant proxy in Barth, Caprio and Levine (2013), the *overall restrictions on bank activities* (restriction), and use $\Delta_{1999 \to 2019} Restriction \ / \ Restriction_{1999}$ to proxy for regulatory tightening, with greater positive values indicating steeper tight-

[34] Our sample contains 78 countries after merging WVS trust data with WDI credit and GDP per capita data. 37 countries are dropped as the credit to private sector data in 1985 is missing. We retest eq.(24) on this sample as Column (4) shows and find similar results, implying that the intuitions are not from sample variation.

[35] We show this finding in Online Appendix Table OA-5, which includes more indices and reports statistics comparable to Table 16 in Barth, Caprio and Levine (2013).

[36] We presume that the policy changes of the last 20 years have not yet led to a disruptive reassessment of social trust. However, to mitigate this concern in this section, we construct the trust proxy without using the most recent WVS survey released after 2019.

ening, and negative values indicating deregulation.[37]

Figure 6 shows the relationship between regulatory tightening (x-axis) and the average annual growth of GDP per capita from 1999 to 2019 (y-axis). The countries in the top (bottom) 50% of the trust levels are categorized in the high-trust (low-trust) group, shown in yellow (blue).

If we pool all countries in the same plot, we find no statistically significant correlation between tightened regulations and economic growth. However, when we color the points by their trust groups, we note that low-trust countries (blue points) roughly lie in the first and third quadrants with a positive-sloped fit, while high-trust (yellow points) fit a negative-sloped line — tightened regulations have opposite effects on economic growth in low- and high-trust countries. Although high-trust countries achieve an annual GDP p.c. growth rate of about 10% through deregulation, low-trust, developing countries show growth rates of less than 5% under deregulation. On the other hand, low-trust countries that tightened regulations also experienced about 10% annual growth rates, while high-trust countries that tightened their regulations only experienced about a 5% growth rate.

Subfigure (b) focuses on developing countries and reveals crucial information: it is appropriate to mimic developed countries in financial liberalization only for those developing countries with trust levels as high as those of most developed countries.[38]

We alternatively measure regulatory tightening directly using $\Delta_{1999\to2019}$*Restriction* in Table 5. Columns (1)-(2) show the overall irrelevance of restriction change to GDP growth. Columns (3)-(6) interact regulatory tightening with the dummy $\mathbb{1}(\text{Low Trust})$, which equals one if the country is in the low trust group. The results show significant and different coefficients for $\Delta_{1999\to2019}$*Restriction* for the two groups, e.g., after controlling for income levels as shown in Column (6), for low-trust economies, a one standard deviation (0.30) greater tightening of regulations is associated with a 0.57 percentage point $((4.921 - 3.036) \times 0.30)$ higher annual growth rate. In contrast, for high-trust countries, the same regulatory tightening is associated with a 1.01 percentage point lower GDP growth rate.

[37] This approach means we do not capture the fluctuations during the two decades. However, this is not crucial for our main interest, as national policies generally demonstrate continuity and long-term trends, while sudden reversals are often the result of drastic international events that always cause synchronized changes (e.g., the 2008 financial crisis). These common changes have a limited impact on the relative relationships over countries.

[38] Note that in Panel (b), the number of the two groups are different, since the categorization is done on the full sample set, whereas developed countries are placed more in the high-trust group.

In a nutshell, we show that the variation in social trust is one of the reasons for the persistent divergence of regulation, especially bank supervision and restriction policies. Importantly, economic development would be more limited if regulation tended away from the direction appropriate to the trust level: regulatory tightening accelerates growth in low-trust environments, but slows growth in high-trust societies, which is in line with our model predictions. The intuition comes from the role of trust in shaping credit markets: financial liberalization in high-trust countries leads to vibrant formal credit activities, while low-trust countries fall into the expanding negative externalities of default from liberalization.

5. Conclusion

This paper provides a simple theoretical model in which trust arises endogenously and is self-enforced. The model allows us to understand the interconnection of trust, credit, and economic growth. The model suggests the potential co-existence of low-trust and high-trust equilibria in the same state space. In low-trust economies, borrowers choose strategic default, drive up population-average default rates and borrowing costs, and further limit credit market development. In contrast, borrowers in high-trust economies do not need to bear the externality of a bad collective reputation. We complement the model with an alternative informal credit market. The low-trust environment forces good borrowers into informal channels, further limiting the growth of the formal credit market due to adverse selection. By connecting micro-data from the World Bank and WVS surveys, we find strong empirical evidence for diverging credit growth and informal credit adoption explained by trust variation, counteracting the economic convergence.

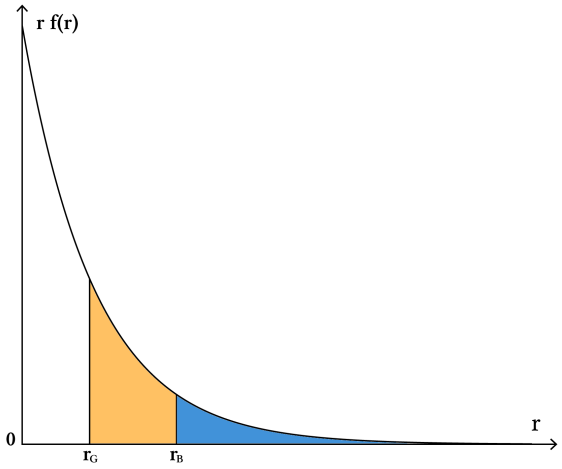
Our model also suggests that financial regulation might have heterogeneous or even opposite effects in low- and high-trust countries. Distrust causes policymakers to tighten regulations to reduce the loss borne by financial intermediaries, yet makes financial credit less accessible to the public. In particular, we show that regulatory tightening positively correlates with GDP growth among low-trust countries but negatively in high-trust economies. Developing countries would therefore benefit from considering trust before mimicking developed countries in financial liberalization.

In general, our model indicates that distrust is a self-fulfilling prophecy, which explains why trust is more challenging to improve than other growth correlates, although policymakers know that trust is a merit in economic activities. Our 35-year datasets are insufficient to test whether stricter rules can break the distrust cycle — further exploration

of optimal regulatory interventions to foster trust and honest behaviors is warranted, and will produce interesting insights into the economic and development consequences of culture and financial activities.

Figures and Tables

(a) Credit Supply and Economic Growth



(b) Incentive Constraints of Equilibria

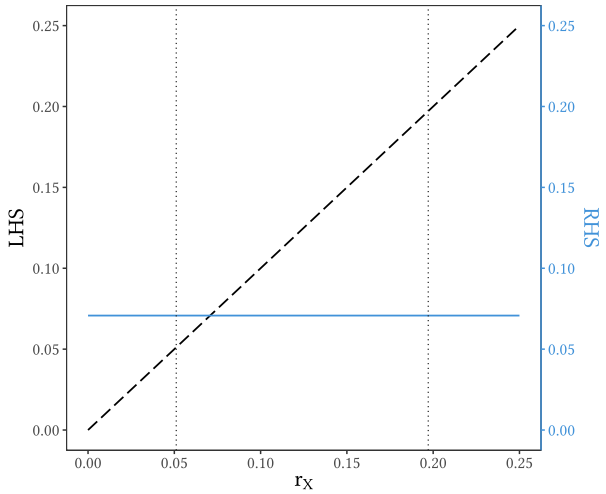


Figure 1: Existence and Comparison of High- & Low-trust Equilibria

Panel (a) plots the interest rates in both good (G) and bad (B) equilibria. Projects with $r \geq r_X$ are invested in under equilibrium X, as the colored regions show. Panel (b) illustrates an example of the coexistence of high-trust and low-trust equilibria. The 45-degree black dashed line (LHS) refers to r_X, while the blue line (RHS) refers to $\frac{\delta E \tau}{1-\delta E} MRR(r_X)$. Then IC (5) and (7) require that when r_X equals r_G (r_B), RHS lies above (below) LHS. Based on parameter values $\alpha = 0.7$, $\beta = 0.2$, $\gamma = 0.1$, $E = 0.9$, $\delta = 0.95$, $\tau = 0.6$, and $\lambda = 50$, we obtain $r_G = 5.11\%$ and $r_B = 19.71\%$ from (6) and (8) and the threshold (intersection of LHS and RHS) $r = 7.08\%$. Panel (b) shows that r_G and r_B satisfy the IC.

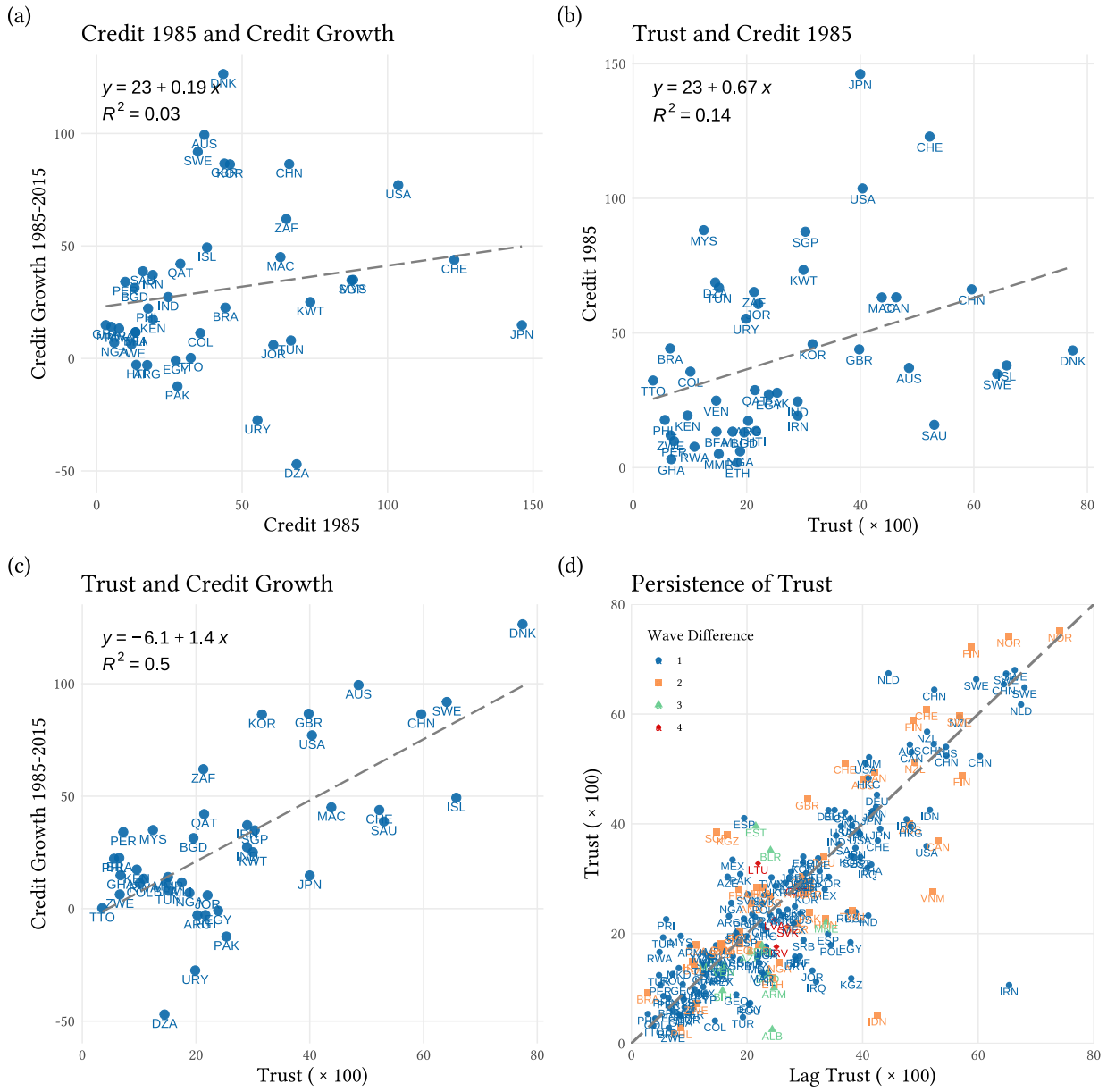


Figure 2: Motivating Facts of Trust and Credit

Panels (a)-(c) plot the relationship among *trust*, domestic credit to the private sector (% of GDP) in 1985 (*credit*), and the changes in domestic credit to the private sector (% of GDP) from 1985 to 2015 (*credit growth*). In Panel (a), the x-axis represents *credit*, and the y-axis is *credit growth*. In Panels (b) and (c), the x-axes represent *trust*, and the y-axes are *credit* and *credit growth*, respectively. Each economy generates one blue point. The sample set encompasses all countries for which trust and credit data for 1985 and 2015 are available. Panel (d) shows the persistence of country trust levels. The x-axis (y-axis) represents the trust level in WVS wave t_1 (t_2). The color and shape of scatters represent different values of $t_2 - t_1$. Each country may generate multiple points: if country i is involved in waves 2, 4, 5, and 7, it generates one blue point and two yellow points. The gray dashed line is the 45-degree line.

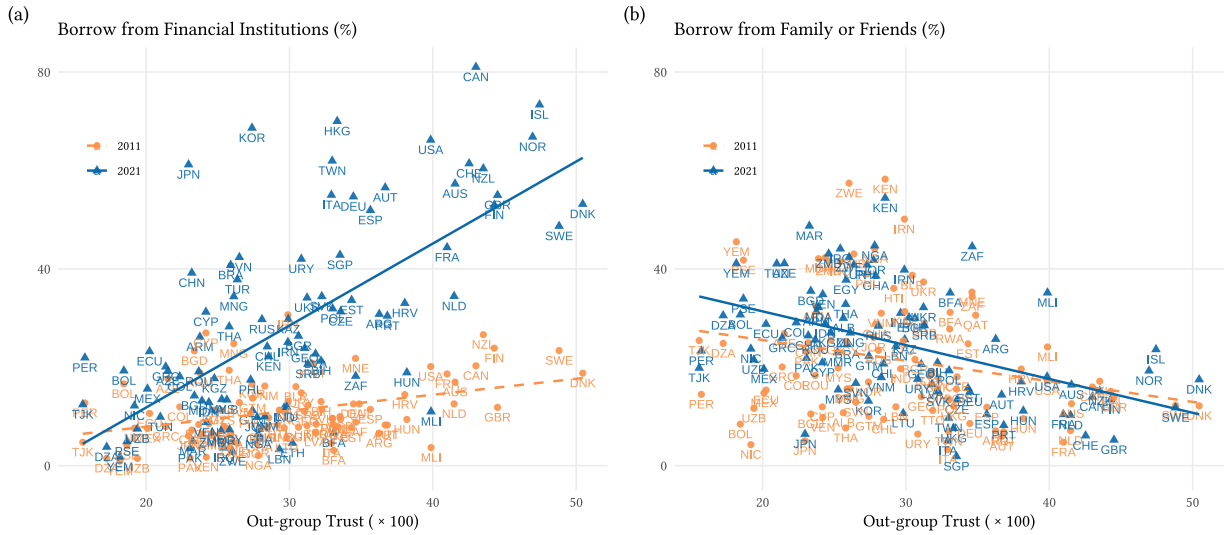


Figure 3: Trust and Borrowing Choices

Note: Panels (a)-(b) show the relationship between a country's out-group trust and the share of adults who borrow from financial institutions (FI) and family/friends (FF), respectively. Each country's observation in wave 2021 (2011) generates a blue (yellow) point with a 3-digit country code. The colored lines show the linear fits.

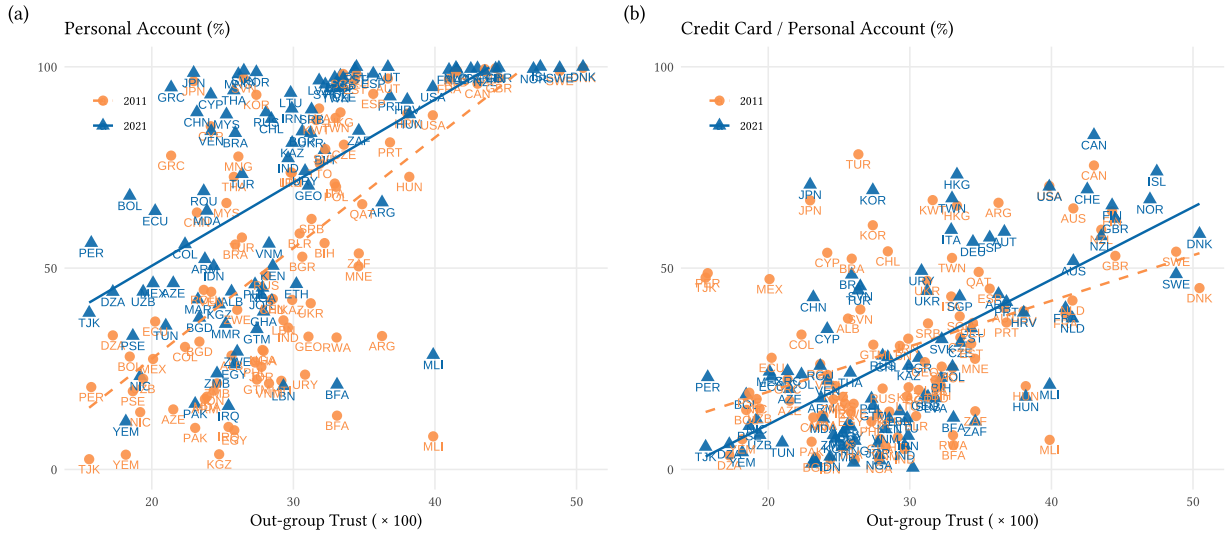


Figure 4: Trust and Credit Card Ownership

Note: Panel (a) shows the relationship between a country's out-group trust and the bank account coverage (%) among adults; Panel (b) shows the relationship between out-group trust and the ratio of the number of people with a credit card to those with a bank account (%). Each country's observation in wave 2021 (2011) generates a blue (yellow) point with a 3-digit country code. The colored lines show the linear fits.

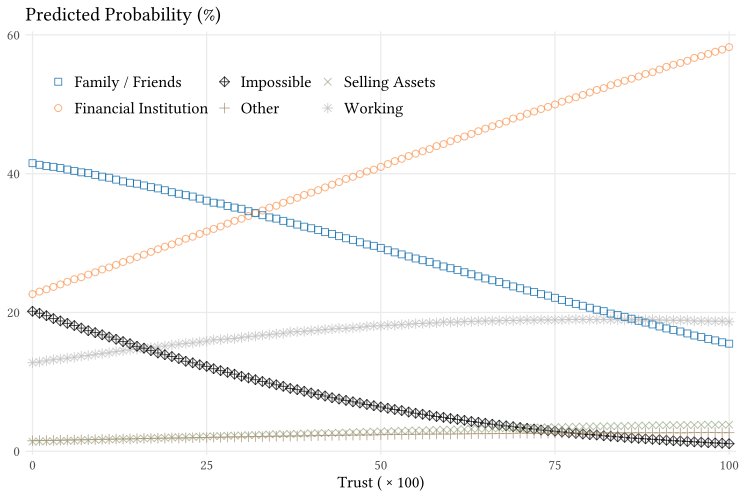


Figure 5: Predicted Probability of Each Source of Emergency Funds

Note: This plot illustrates the relationship between trust and the predicted probabilities (PP) of various sources of emergency funds. These predictions are simulated based on the estimated multinomial probit model. To isolate the impact of trust, all other controls are kept constant while only varying the level of trust from 0 to 1. Then for each source of emergency funds, the PP generates a curve that changes with trust. For any given trust level, the summation of the six probabilities is equal to 1. All the other numerical controls are fixed at their in-sample median (with the only exception, *age*, set to be 35). The categorical arguments are set to be: female, wave (year) 2021, and from South Asia.

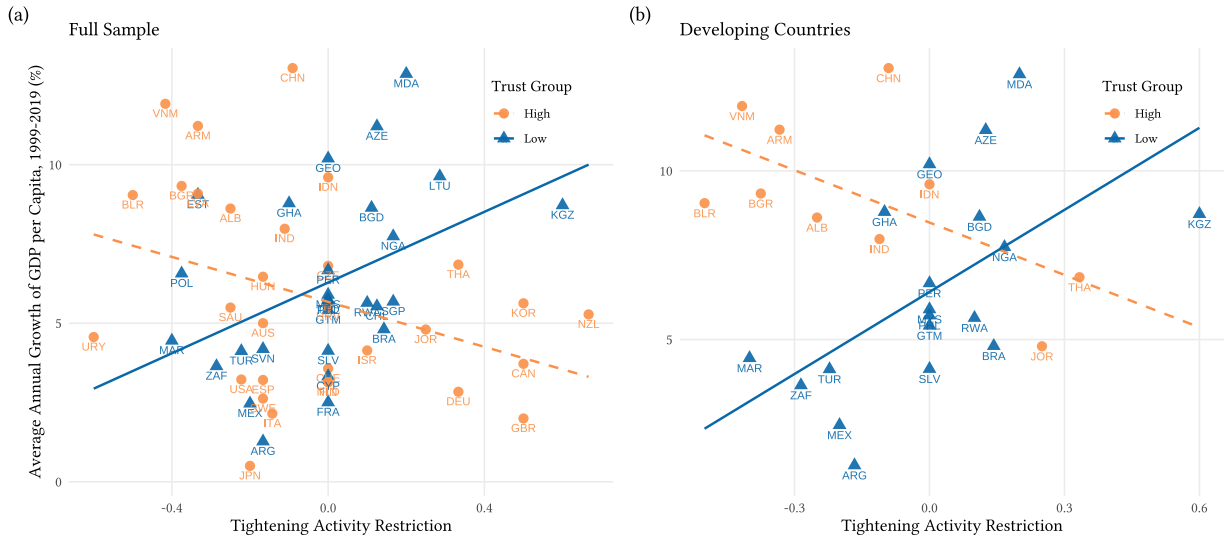


Figure 6: Trust, Tightening Restrictions, and GDP Growth

Note: This plot shows the relationship between regulatory tightening and GDP growth during 1999-2019. The full sample includes 61 countries with the applicable BRSS indices (in waves 1 and 5) and trust indices. Countries are divided into two groups based on the median trust level: low-trust (high-trust) countries are shown in blue (yellow) dots, with Panel A including the full sample and Panel B only including developing countries. For both panels, the x-axis represents the intensity of the tightening of restrictions on bank activities, defined as $\Delta_{1999\to2019}\text{Restriction} \;/\; \text{Restriction}_{1999}$, and the y-axis is the average annual growth rate of GDP per capita. The colored lines show the linear fits of both groups. Two high-influential points are dropped because of abnormally large $|\Delta_{1999\to2019}\text{Restriction}|$; if they were included, the slope of the blue line would be even greater.

Table 1: Summary Statistics

	Obs.	Mean	Std.Dev.	Min	25%	Median	75%	Max
Trust								
Trust	108	0.25	0.16	0.04	0.15	0.22	0.30	0.77
Out-group Trust	102	0.30	0.08	0.16	0.24	0.29	0.34	0.50
In-group Trust	102	0.55	0.05	0.37	0.53	0.56	0.58	0.68
Δ Out/In-group Trust	102	-0.25	0.06	-0.42	-0.29	-0.25	-0.21	-0.07
Economy-Level Credit Activities								
Borrowing from FI	402	0.23	0.18	0.01	0.09	0.19	0.30	0.83
Borrowing from FF	402	0.23	0.12	0.02	0.14	0.20	0.30	0.71
Borrowing Difference	402	0.00	0.26	-0.53	-0.18	-0.03	0.12	0.69
Credit Card Ownership	402	0.22	0.22	0.00	0.04	0.13	0.35	0.83
Individual-Level Characteristics & Sources of Emergency Funds								
Female	194,707	0.49						
Age	194,095	43.04	17.68	15.00	28.00	40.00	56.00	99.00
Education	193,929	0.49	0.34	0.00	0.50	0.50	0.50	1.00
Income	194,707	0.56	0.35	0.00	0.25	0.50	1.00	1.00
Personal Account	194,707 (389)	0.73 (0.66)	(0.28)	(0.06)	(0.40)	(0.70)	(0.95)	(1.00)
Working	194,707 (195)	0.16 (0.15)	(0.09)	(0.02)	(0.10)	(0.14)	(0.19)	(0.53)
Impossible	194,707 (195)	0.24 (0.24)	(0.21)	(0.00)	(0.05)	(0.17)	(0.43)	(0.82)
Financial Institutions	194,707 (195)	0.32 (0.33)	(0.22)	(0.03)	(0.15)	(0.27)	(0.49)	(0.82)
Family / Friends	194,707 (195)	0.23 (0.23)	(0.14)	(0.04)	(0.12)	(0.20)	(0.33)	(0.63)
Selling Asset	194,707 (195)	0.02 (0.02)	(0.03)	(0.00)	(0.01)	(0.01)	(0.03)	(0.17)

Note: Variables obtained from WVS and FINDEX. Variables on the sources of emergency funds are six dummies (the answer "other" is omitted) generated from a single-choice question, e.g., Working $= 1$ means that the respondent's most possible source of emergency funds is working (wages). Then for each applicable individual observation, the sum of the six dummies equals one. Brackets report the statistics on the economy$\times$wave-level averages of the corresponding individual-level dummy.

Table 2: Trust and Borrowing Differences

Panel A	*Borrowing Difference*							
Proxy of Trust	General Trust					Out-group Trust		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trust	4.981***	4.959***	1.523**	1.922***	2.262***	10.940***	4.795***	4.511**
	(0.825)	(0.821)	(0.634)	(0.680)	(0.833)	(1.436)	(1.347)	(1.780)
Log GDP 1985				0.698***	-0.005			0.084
				(0.092)	(0.168)			(0.172)
Controls					Yes			Yes
Wave FE		Yes	Yes		Yes		Yes	Yes
Region FE			Yes		Yes		Yes	Yes
Observations	402	402	402	284	226	378	378	214
R^2	0.210	0.248	0.658	0.463	0.731	0.258	0.683	0.753
Panel B	$BD_{i,t} - BD_{i,t-1}$, *BD: Borrowing Difference*							
Proxy of Trust	General Trust					Out-group Trust		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trust	1.392***	2.052***	1.756***	0.714	0.877	2.814***	2.287**	3.017**
	(0.263)	(0.416)	(0.339)	(0.509)	(0.647)	(0.512)	(1.000)	(1.178)
Trust × $BD_{i,t-1}$		0.032	0.154	0.424*	0.556*		0.340	0.704
		(0.206)	(0.165)	(0.254)	(0.295)		(0.377)	(0.468)
$BD_{i,t-1}$		-0.167***	-0.143***	-0.508***	-0.632***		-0.527***	-0.741***
		(0.056)	(0.053)	(0.087)	(0.106)		(0.138)	(0.176)
Controls					Yes			Yes
Wave FE			Yes	Yes	Yes		Yes	Yes
Region FE				Yes	Yes		Yes	Yes
Observations	294	294	294	294	199	276	276	187
R^2	0.049	0.108	0.226	0.419	0.472	0.050	0.436	0.491
Panel C	*Credit Card Ownership (CC)*				$CC_{i,t} - CC_{i,t-1}$			
Proxy of Trust	General Trust		Out-group Trust		General Trust		Out-group Trust	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trust	3.880***	1.740***	8.433***	3.248***	0.226**	0.486***	0.178	0.853**
	(0.518)	(0.491)	(0.920)	(1.205)	(0.100)	(0.130)	(0.160)	(0.396)
Marginal Effect						Yes		Yes
Controls		Yes		Yes		Yes		Yes
Wave FE		Yes		Yes		Yes		Yes
Region FE		Yes		Yes		Yes		Yes
Observations	402	226	378	214	294	199	276	187
R^2	0.350	0.855	0.421	0.871	0.019	0.176	0.003	0.155

Note: Country×wave panel regressions. In Panels A and B, the dependents are *Borrowing Difference* (*BD*, defined in (18)) and its changes over waves, respectively. The main independent, *Trust*, is proxied by general (out-group) trust in Columns 1-5 (6-8). Historical log GDP p.c. in 1985 is controlled. Omitted controls include the avg. # ATMs / bank branches per 1,000 km^2 / per 10,000 adults in 2010 (before wave 1) and wave and regional fixed effects. Panel B includes $BD_{i,t-1}$ and its interaction with trust to examine the marginal effect that may be affected by trust. Panel C replaces *BD* with *credit card ownership* and tests the main specifications from Panels A and B. Controls including GDP and marginal effects are not reported. Standard errors clustered at country level are shown in parentheses. ***p<1%, **p<5%, *p<10%.

Table 3: Social Trust and Individuals' Sources of Emergency Funds

	Sources of Emergency Funds:					
	Impossible		Family / Friends		Financial Institutions	
	(1)	(2)	(3)	(4)	(5)	(6)
Trust	-0.401^{***}	-0.280^{***}	-0.376^{***}	-0.185^{***}	0.770^{***}	0.279^{***}
	(0.079)	(0.073)	(0.049)	(0.072)	(0.121)	(0.085)
Female		-0.030^{***}		0.023^{***}		0.004
		(0.005)		(0.006)		(0.004)
Age		0.001^{**}		-0.002^{***}		0.002^{***}
		(0.0002)		(0.0003)		(0.0003)
Income		-0.190^{***}		-0.017		0.142^{***}
		(0.008)		(0.011)		(0.008)
Education		-0.154^{***}		-0.022^{**}		0.109^{***}
		(0.008)		(0.011)		(0.010)
Personal Account		-0.081^{***}		-0.044^{***}		0.124^{***}
		(0.008)		(0.013)		(0.014)
Country-level Controls		Yes		Yes		Yes
Historical Controls		Yes		Yes		Yes
Wave FE		Yes		Yes		Yes
Observations	194,707	104,898	194,707	104,898	194,707	104,898
Pseudo R^2	0.018	0.265	0.017	0.065	0.064	0.197

Note: Individual-level probit model. Estimated average marginal effects are reported after estimating the probit specification (21) for individual i in country k in wave t. The sample set is a repeated cross-sectional dataset, where each observation is an adult interviewed by FINDEX between 2011 and 2021. The dependent dummy Y equals one if and only if the adult reports that her most likely source of emergency funds is Y. In Columns (1) and(2), Y refers to "impossible", i.e., it is impossible for the individual to receive emergency funds. In Columns (3) and(4), Y refers to borrowing from family or friends (FF). And in Columns (5) and(6), Y refers to borrowing or withdrawing from financial institutions (FI). The main independent variable is the country trust level. Individual controls include: gender dummy (equals 1 if female), age, individual income level within the country (five levels from lowest to highest, normalized to 0 to 1), education level (three levels from lowest to highest, normalized to 0 to 1), and personal account dummy (equals 1 if the individual has an account). Country-level controls include: log GDP per capita and the average number of ATMs / bank branches per 1,000 km / 10,000 adults in the year of each wave and historical values of these listed variables in 2010. Wave fixed effect is estimated as dummies. Standard errors of the marginal effects are clustered at the country level and reported in parentheses. ***p<1%, **p<5%, *p<10%.

Table 4: Trust, Credit Growth, and GDP Growth

Dependent:	$\Delta_t \log(\text{GDP})$, 1985-2015			
	(1)	(2)	(3)	(4)
$\log(\text{GDP})$, 1985	-0.102*	-0.179***	-0.233***	-0.224**
	(0.052)	(0.065)	(0.085)	(0.088)
Trust		1.121***	0.728	1.522**
		(0.419)	(0.645)	(0.618)
Credit Growth, 1985-2015			0.620*	
			(0.346)	
Observations	78	78	41	41
R^2	0.071	0.159	0.283	0.225

Notes: Country-level OLS estimates. Columns (1)-(3) report the results of regressions (23)-(25), respectively. The sample set of Column (3) is reduced after having credit data merged. Column (4) repeats regression (24) on the merged sample. Heteroskedasticity-robust standard errors in parentheses. ***p<1%, **p<5%, *p<10%.

Table 5: Trust, Regulatory Tightening, and GDP Growth

	Average Annual Growth of GDP p.c. (1999-2019, %)					
	(1)	(2)	(3)	(4)	(5)	(6)
Δ Restriction	-1.027	-0.582	-3.726**	-4.372***	-3.025**	-3.036**
	(1.395)	(1.117)	(1.609)	(1.587)	(1.242)	(1.239)
Δ Restriction $\times$ $\mathbb{1}$(Low Trust)			5.426*	6.214**	4.908*	4.921*
			(2.842)	(2.637)	(2.525)	(2.459)
$\mathbb{1}$(Low Trust)				1.154		0.016
				(0.710)		(0.729)
Low Income		1.071**			0.771	0.760
		(0.446)			(0.515)	(0.756)
Lower Middle Income		3.064***			2.907***	2.900***
		(0.841)			(0.740)	(0.840)
Upper Middle Income		2.848***			2.796***	2.790***
		(0.884)			(0.863)	(0.892)
Observations	61	61	61	61	61	61
R^2	0.011	0.243	0.087	0.122	0.305	0.305

Note: Country-level OLS estimates. The dependent variable is the average annual growth rate of GDP per capita during 1999-2019 (waves 1 and 5 of the BRSS). The main independent variable is the intensity of tightening of the restrictions on bank activities, $\Delta\text{Restriction}_i = \text{Restriction}_{2019,\,i} - \text{Restriction}_{1999,\,i}$, where $Restriction_{i,t}$ is normalized. Countries are divided into two groups, low trust and high trust, based on the median trust level. $\mathbb{1}(\text{Low Trust}) = 1$ if and only if the country is in the low trust group, i.e., below the median trust level of the sample set, which includes 61 countries with applicable data in the BRSS indices (in waves 1 and 5) and the trust index. Country income levels (identified by the World Bank) are controlled as dummies (benchmark: high-income countries). Heteroskedasticity-robust standard errors in parentheses. ***p<1%, **p<5%, *p<10%.

Appendix

Proof of Proposition 1. Combining the two incentive constraints, (5) and (7), the coexistence of equilibria is equivalent to have r_G and r_B that simultaneously satisfy $\frac{MRR(r_G)}{r_G} > \frac{1-\delta E}{\delta E \tau} > \frac{MRR(r_B)}{r_B}$, and $r_G < r_B$. Given any parameter choices of (E, τ) and according to (6) and (8), when $\gamma \to 0^+$, $r_G \to 0^+$. Then if $\lim_{x\to 0^+} MRR(x) > 0$, $\exists \gamma^* \in (0,1)$, s.t. $\frac{MRR(r_G)}{r_G} > \frac{1-\delta E}{\delta E \tau}$. Meanwhile, when $\beta \to 1^-$, $r_B \to \infty$. Then when $\lim_{x\to\infty} \frac{MRR(x)}{x} < \infty$, $\forall E > 0, \tau > 0$, $\exists \gamma^* \in (0,1)$, s.t. $\frac{1-\delta E}{\delta E \tau} > \frac{MRR(r_B)}{r_B}$.

Consider the exponential distributed case. With $f(r) = \lambda e^{-\lambda r}$, we obtain

$$MRR(r_X) = \mathbb{E}(r - r_X | r > r_X) = \frac{\int_{r_X}^{\infty} f(r) r \mathrm{d}r}{\int_{r_X}^{\infty} f(r) \mathrm{d}r} - r_X = \frac{1}{\lambda}, \quad X \in \{G, B\}.$$

Substituting into the IC, (7) and (5), and rearranging the inequalities, we derive $r_G \leq \frac{\delta E \tau}{\lambda(1-\delta E)} \leq r_B$. Substituting the formulas of r_G and r_B, (6) and (8), we obtain $\frac{1}{\frac{\lambda(1-E\tau)(1-\delta E)}{\delta E \tau}+1} \in [\gamma, \gamma+\beta]$.

Proof of Proposition 2. Denote the share of default borrowers as x. That is, in equilibrium G (B), $x = \gamma$ ($x = \beta + \gamma$). Then

$$g(\tau) = \frac{1-x}{\lambda} e^{-(1-E\tau)\frac{\lambda x}{1-x}} - C, \quad g'(\tau) = E e^{-\lambda(1-E\tau)} x e^{\frac{x}{1-x}} - C.$$

Treat $g'(\tau)$ as a continuous function of $x \in [0,1]$, $\frac{\mathrm{d}g'(\tau)}{\mathrm{d}x} > 0$. Therefore, $g'_B(\tau) > g'_G(\tau)$. Note that $\forall C > 0, E \in (0,1), \tau \in [0,1], \lambda > 0$, $\lim_{x\to 0^+} g'(\tau) = -C < 0$, and $\lim_{x\to 1^-} g'(\tau) = \infty > 0$. Therefore, there always exists a unique $\bar{\gamma} = \bar{\gamma}(E, C, \lambda, \tau) \in (0,1)$ s.t., $g'(\tau)|_{x=\bar{\gamma}} = 0$. Then if $\gamma < \bar{\gamma} < \beta + \gamma$, the regulation τ has opposite effects in low- and high-trust equilibria.

Proof of Lemma 1. With the existence of private credit supply, each borrower will firstly compare the maximum possible payoff (either default or being good) from the financial institutions with the payoff from private lenders.[39] On the one hand, the "good" borrowers compare the received two interest rates, $r_P = \bar{r}/q$ and $\tilde{r}_X$. If and only if $q \geq \bar{r}/\tilde{r}_X$, the borrower prefers informal channels. Let $q_X^* = q^*(\tilde{r}_X) = \bar{r}/\tilde{r}_X$. Then *iff* $q \geq q_X^*$, the borrower prefers informal channels.

For the high-trust case, the new high trust equilibrium yields $(1 - q_G^*)(\alpha + \beta)$ borrow-

[39] Recall that we assume borrowers do not strategically default in the private credit market as it brings terrible real-life influence.

ers turn to informal channels. On the other hand, default borrowers would also turn to private market when the private interest is good enough, i.e.,

$$\int_{\tilde{r}_G}^{\infty} f(r) r \mathrm{d}r \leq \int_{r_P}^{\infty} f(r)(r - r_P)\mathrm{d}r, \quad \Leftrightarrow q \geq q^{**}(\tilde{r}_G) \equiv \frac{\bar{r}}{\tilde{r}_G - \frac{1}{\lambda}\ln(\lambda \tilde{r}_G + 1)}.$$

That is, $(1 - q_G^{**})\gamma$ fraudulent also turn to informal channels.

Consider the formal market. Denote q_G^{**}/q_G^{*} as ρ_G, which is larger than one. The lender faces a crowd with $\tilde{\alpha}_G$ honest, $\tilde{\beta}_G$ opportunistic, and $\tilde{\gamma}_G$ borrowers,

$$\tilde{\alpha}_G = \frac{q_G^{*}\alpha}{q_G^{*}\alpha + q_G^{*}\beta + q_G^{**}\gamma} = \frac{\alpha}{1 + (\rho_G - 1)\gamma}, \ \tilde{\beta}_G = \frac{\beta}{1 + (\rho_G - 1)\gamma}, \ \tilde{\gamma}_G = \frac{\rho_G \gamma}{1 + (\rho_G - 1)\gamma}.$$

This implies that the actual share of fraudulent borrowers increases. Similarly, we solve $\tilde{r}_G$ by ensuring the interest return covers the default loss,

$$\tilde{r}_G = \frac{\tilde{\gamma}}{1 - \tilde{\gamma}}(1 - E\tau) = \frac{\rho_G \gamma}{\alpha + \beta}(1 - E\tau) = \rho_G r_G > r_G.$$

Substituting $\rho_G = q^{**}(\tilde{r}_G)/q^{*}(\tilde{r}_G)$, we obtain that $\tilde{r}_G$ satisfies

$$r_G = \frac{\gamma}{1 - \gamma}(1 - E\tau) = \tilde{r}_G - \frac{1}{\lambda}\ln(\lambda \tilde{r}_G + 1).$$

Note that R.H.S. monotonically increases in $\tilde{r}_G$, the equilibrium interest is unique under applicable parameter spaces. In particular, $\tilde{r}_G$ is independent of $\bar{r}$. Therefore, ρ_G and $\tilde{r}_G$ are unique.

Similarly, in the low-trust case,

$$\tilde{\alpha}_B = \frac{\alpha}{1 + (\rho_B - 1)(\beta + \gamma)}, \ \tilde{\beta}_B = \frac{\rho_B \beta}{1 + (\rho_B - 1)(\beta + \gamma)}, \ \tilde{\gamma}_B = \frac{\rho_B \gamma}{1 + (\rho_B - 1)(\beta + \gamma)},$$

where $\rho_B = \frac{\tilde{r}_B}{\tilde{r}_B - \frac{1}{\lambda}\ln(\lambda \tilde{r}_B + 1)}$, and $r_B = \tilde{r}_B - \frac{1}{\lambda}\ln(\lambda \tilde{r}_B + 1)$.

Proof of Proposition 3. First consider the high-trust equilibrium. $Q_G = (1 - q_G^{*})(\alpha + \beta) + (1 - q_G^{**})\gamma$, and the representative private lender's problem reads

$$\begin{aligned}
&\max_{\tilde{r}} \ \ (\bar{r} - \sigma) Q_G = \max_{\tilde{r}} \ \ (\bar{r} - \sigma)\left[1 - \left(\frac{\alpha + \beta}{\tilde{r}_G} + \frac{\gamma}{\tilde{r}_G - \frac{1}{\lambda}\ln(\lambda \tilde{r}_G + 1)}\right)\bar{r}\right] \\
&\equiv \max_{\tilde{r}} \ \ (\bar{r} - \sigma)(1 - k_G \bar{r}) \leq k_G \left(\frac{\bar{r} - \sigma + 1/k_G - \bar{r}}{2}\right)^2 = \frac{(1 - k_G \sigma)^2}{2k},
\end{aligned}$$

where k_G is independent with $\bar{r}$ and the second line comes from the mean-value inequality. The maximum is obtained when $\bar{r} = \frac{1+\sigma k_G}{2k_G}$, and $Q_G = \frac{1-\sigma k_G}{2}$. Similarly, we solve $Q_B = \frac{1-\sigma k_B}{2}$, where $k_B = \frac{\alpha}{\tilde{r}_B} + \frac{\beta+\gamma}{\tilde{r}_B - \frac{1}{\lambda}\ln(\lambda\tilde{r}_B+1)}$. Define

$$r(x) = \frac{x+\gamma}{1-x-\gamma}(1-E\tau), \;\; \tilde{r}(x) - \frac{1}{\lambda}\ln(\lambda\tilde{r}(x)+1) = r(x),$$
$$k(x) = \frac{1-x-\gamma}{\tilde{r}(x)} + \frac{x+\gamma}{\tilde{r}(x) - \frac{1}{\lambda}\ln(\lambda\tilde{r}(x)+1)} = \frac{1-x-\gamma}{\tilde{r}(x)} + \frac{x+\gamma}{r(x)} = (1-x-\gamma)\left(\frac{1}{\tilde{r}(x)} + \frac{1}{1-E\tau}\right),$$

then $k_B = k(\beta)$, $k_G = k(0)$. Note $Q_B \geq Q_G \Leftrightarrow k_G \geq k_B$, then it is sufficient to show

$$k'(x) < 0, \;\; \forall x \in [0, 1-\gamma).$$

Take the first-order derivative w.r.t. x on both sides of $r(x) = \tilde{r}(x) - \frac{1}{\lambda}\ln(\lambda\tilde{r}(x)+1)$,

$$\Rightarrow 0 < r'(x) = \left(1 - \frac{1}{\lambda\tilde{r}(x)+1}\right)\tilde{r}'(x) \;\; \Rightarrow \;\; \tilde{r}'(x) > 0.$$

$$\Rightarrow k'(x) = -(1-x-\gamma)\frac{1}{\tilde{r}(x)^2}\tilde{r}'(x) - \left(\frac{1}{\tilde{r}(x)} + \frac{1}{1-E\tau}\right) < 0 \;\; \Rightarrow \;\; Q_B > Q_G.$$

Consider the heterogeneous effects of regulation tightening. Recall that $g'(\tau)$ is increasing and convex in x. Also note that $\tilde{\gamma}_G > \gamma$, $\tilde{\beta}_B + \tilde{\gamma}_B > \beta + \gamma$. Then one sufficient condition to prove eq. (15) is $\tilde{\beta}_B + \tilde{\gamma}_B - \beta + \gamma > \tilde{\gamma}_G - \gamma$

$$\Longleftrightarrow \frac{(\rho_B-1)(\beta+\gamma)}{1+(\rho_B-1)(\beta+\gamma)} > \frac{(\rho_G-1)\gamma}{1+(\rho_G-1)\gamma} \underbrace{\Longleftarrow}_{\rho_G<\rho_B} \frac{(\rho_B-1)(\beta+\gamma)}{1+(\rho_B-1)(\beta+\gamma)} > \frac{(\rho_B-1)\gamma}{1+(\rho_B-1)\gamma},$$

which obviously holds.

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ONLINE APPENDIX

OA-A. Extended Discussion: Distribution of Return Rates

In our main analysis, we use exponential distribution for simpler analytical solutions. Essentially, a large family of distributions has the same phenomenon. We examine the following commonly used distributions as Figure OA-1 shows. Among these distributions, half-normal and Fréchet distributions (and a series of similar distributions that are not reported) show similar probabilities to satisfy the necessary conditions for the existence of multiple equilibria. The Pareto distribution, however, acts as a threshold, as its corresponding "RHS" is also a linear line from the origin. Thus, except the case when $LHS = RHS$, the parameters of the Pareto distribution will directly determine the unique existence of high-trust or low-trust equilibrium, as panel (d) shows. The underlying explanation is that $\lim_{x\to 0^+} MRR(x) = 0$ for Pareto distributions, and is not included by the sufficient condition (9).

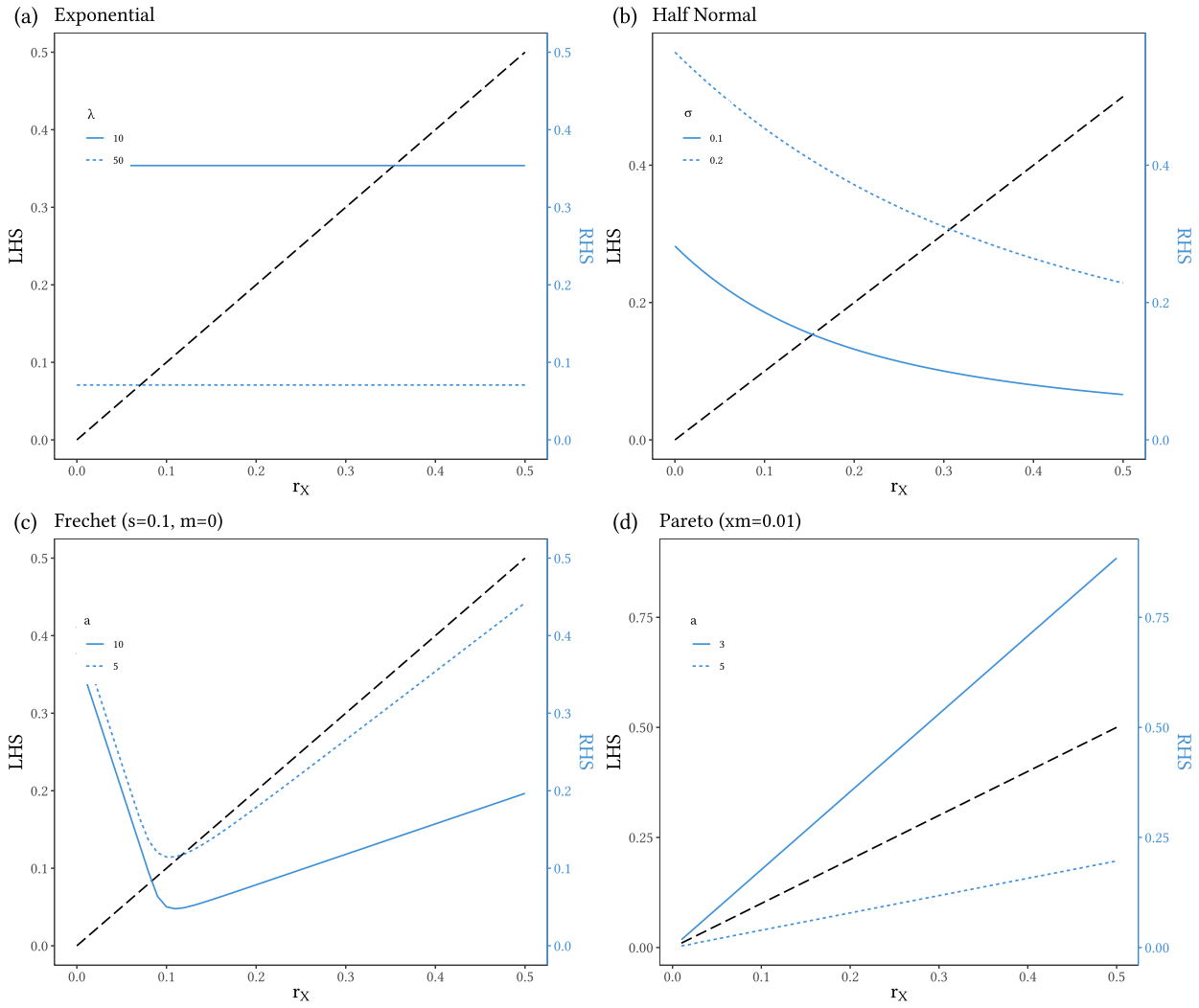


Figure OA-1: Incentive Constraints of Equilibria: Different Distributions

This plot visualizes the same examination as Figure 1 (b) with different distribution $f(r)$. In each panel, the black dashed line (LHS) refers to r_X, while the blue curves (RHS) refer to $\frac{\delta E \tau}{1-\delta E} MRR(r_X)$. Then the incentive constraint of high (low) -trust equilibrium requires that when r_X equals r_G (r_B), the blue curves lie above (below) the black line. Panel (a) uses exponential distributions, i.e., $f(r) = \lambda e^{-\lambda r}$; panel (b) uses half-normal distributions, i.e., $f(r) = \frac{\sqrt{2/\pi}}{\sigma} e^{-r^2/(2\sigma^2)}$; panel (c) uses Fréchet distributions with $m = 0$, i.e., $f(r) = \frac{a}{s}(r/s)^{-1-a} e^{-(r/s)^{-a}}$; panel (d) uses Pareto distributions with $x_m = 0.01$, $r \geq x_m$, i.e., $f(r) = \frac{a x_m^a}{r^{a+1}}$.

OA-B. Additional Statistics of Data and Variables

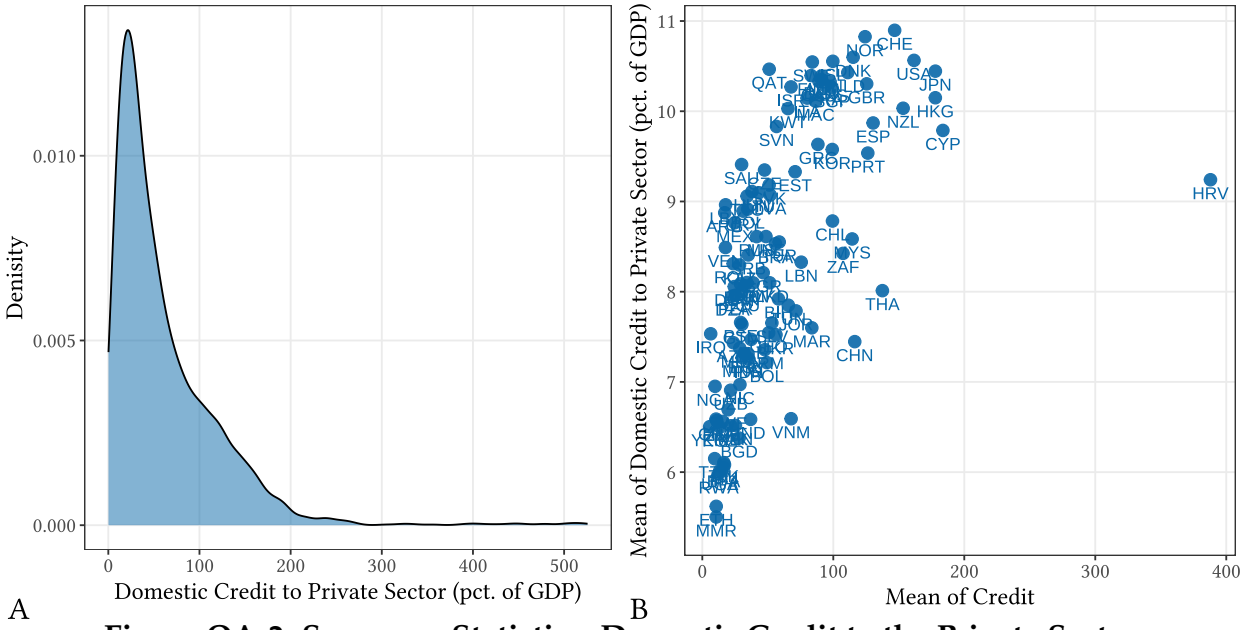


Figure OA-2: Summary Statistics: Domestic Credit to the Private Sector

This figure shows the summary statistics of, *credit*, domestic credit to the private sector (pct. of GDP) in the raw data set. The sample set is an unbalanced panel from 1985 (the in-sample earliest) to 2022. Panel A displays the density function. In Panel B, we calculate the average *credit* and average log GDP per capita within the time span for each country, and draw scatter plots. As it shows, the scatter named "HRV" (Croatia) appears as an obvious outlier due to the too-large average *credit*. Also, Panel A corroborates that values above 300 are apparent outliers.

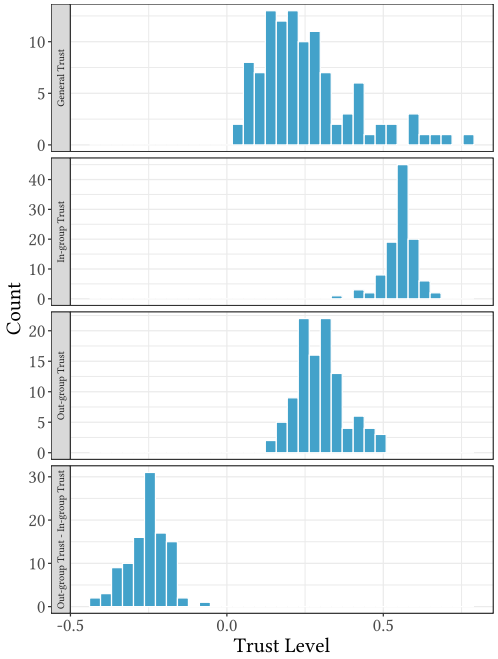


Figure OA-3: Distribution of Trust in Different Groups

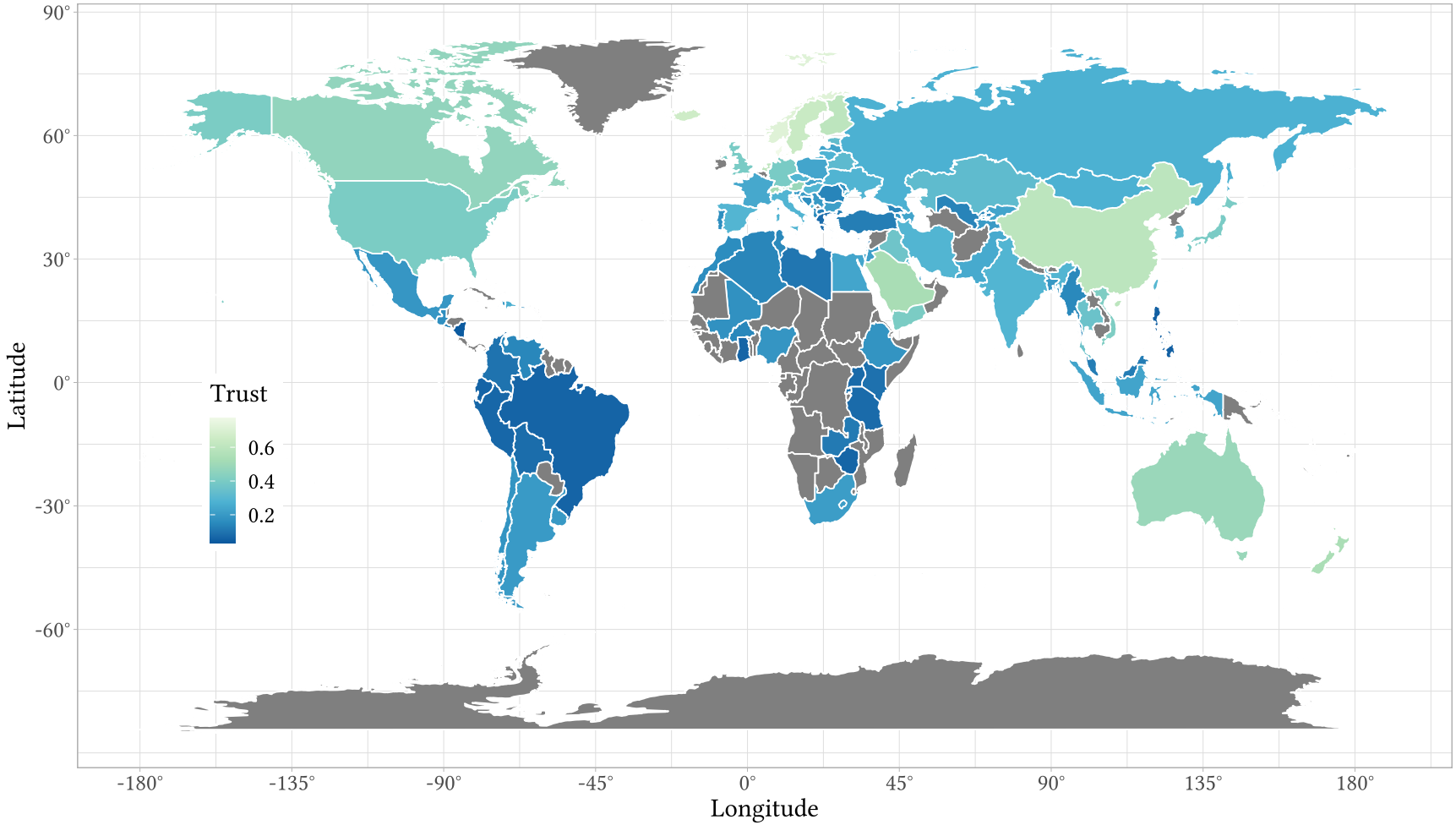


Figure OA-4: Distribution of Trust across the World

OA-C. Other Private Financial Activities Affected by Trust

OA-C1. Country-level Saving Activities

We go on a similar path to explore the relationship between trust and saving choices. Figure OA-5 panel (a) shows significant positive relationship between trust and population share of saving at FI, and such phenomenon expands over years. As for saving at informal channels (e.g., saving club, family/friends, stores), there is an interesting preliminary finding: in several high-trust economies, respondents were not even asked about their participation in informal saving, as evident from the missing data points in panel (b). This occurrence aligns with the questionnaire formulation principles of FINDEX, suggesting that in these countries, informal saving practices are virtually nonexistent or extremely rare. In addition to this, personal safekeeping exists as an implicit alternative that reduces the overall savings needs, making the population share of informal saving is generally relatively small, in line with common understanding. Even then, low-trust economies exhibit notably high shares and significant increments in informal savings. In these economies, a substantial portion of saving needs remains unmet by FI.

Table OA-1: Trust and Saving at Financial Institutions

	Saving at FI (SFI)				$SFI_{i,t} - SFI_{i,t-1}$					
Proxy of Trust	General Trust		Out-group Trust		General Trust			Out-group Trust		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Trust	4.454***	2.305***	9.083***	3.396**	0.333***	0.621***	0.565***	0.677***	1.128***	0.702*
	(0.418)	(0.531)	(0.850)	(1.344)	(0.077)	(0.135)	(0.210)	(0.131)	(0.250)	(0.397)
Trust × $SFI_{i,t-1}$						-0.206**	0.285**		-0.260	0.552
						(0.096)	(0.135)		(0.173)	(0.366)
Log GDP 1985		0.329***		0.483***						
		(0.106)		(0.106)						
$SFI_{i,t-1}$						0.024	-0.346***		0.042	-0.374**
						(0.040)	(0.074)		(0.065)	(0.163)
Controls		Yes		Yes			Yes			Yes
Wave FE		Yes		Yes			Yes			Yes
Region FE		Yes		Yes			Yes			Yes
Observations	402	226	378	214	294	294	199	276	276	187
R^2	0.461	0.807	0.460	0.807	0.026	0.044	0.263	0.028	0.044	0.213

Notes: Country-level OLS estimates. In column (1)-(5), the dependent, *Saving at FI*, is the population share (among adults) of saving at financial institutions. In column (6)-(8), the dependent, Δ_t*Saving at FI*, is the change of *Saving at FI* comparing to the previous wave. Dependent variables are expressed as z-scores. The main independents include general trust level and trust difference between out-group (trust in people met in the first time, other region, and foreigners), and the in-group (trust in family, friends, and people one knows). Country-level historical GDP per capita is controlled. Lag value is used as a control when the dependent is Δ_t*Saving at FI*. Fixed effects include the survey wave (four in total, 2011, 2014, 2017, and 2021), and the region (seven in total, divided by the World Bank). Historical controls include country-level average amount in 2010 of ATMs / bank branches per 1,000 km / 10,000 adults, respectively. These controls are missing for some countries, resulting in a smaller sample size in column (5). Heteroskedasticity-robust standard-errors in parentheses. ***,**,* indicate statistical significance at the 1%, 5% and 10% respectively.

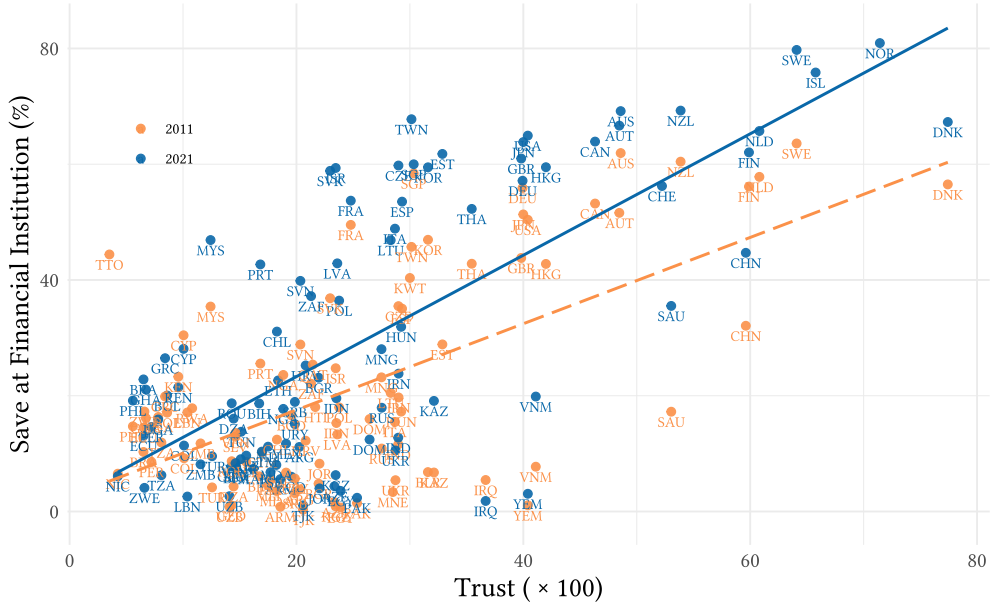
Table OA-1 regresses the share of saving at FI on trust. Unlike borrowing, we do not use *saving difference* as the dependent for two reasons: (i) as Figure OA-5 shows, there are many missing samples of informal saving, and especially cause selection bias with respect to trust levels; (ii) the additional alternative for saving, i.e., personal safekeeping, make it less meaningful to test the difference, as it does not separate switching effects from the aggregate demands. In the online appendix, we also test the relationship between trust and the lack of informal saving questionnaires in Table OA-2. The results show that high-trust economies have greater possibilities of not being asked about informal savings, further inferring that informal savings are more likely to be almost non-existent in these economies. Furthermore, low-trust economies are more inclined to rely on informal alternative of saving. The significant positive estimated coefficients confirm the intuitions obtained from the figure and show robustness with general economic development levels, geographical and human factors, wave and region fixed effects. Furthermore, Table OA-1 shows that out-group trust generates excess predictability to the population share of saving at FI: in economies where people are more likely to trust strangers from the broader society, the individual saving needs are more successfully addressed by FI.

Table OA-2: Country Trust Levels and the Non-applicable Questionnaire for Saving at Informal Places

Dependent variable:	Non-applicable Questionnaire for Saving at Clubs or Friends							
	Wave 2011	Wave 2014	Wave 2017	Wave 2021	All Waves			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trust	1.332***	1.370***	1.465***	1.382***	1.394***	0.381***	0.637***	0.314***
	(0.210)	(0.184)	(0.205)	(0.174)	(0.095)	(0.094)	(0.153)	(0.084)
Log GDP p.c. 2010						0.150***		0.150***
						(0.011)		(0.015)
Account Ownership							0.652***	0.064
							(0.133)	(0.062)
Wave FE								Yes
Region FE								Yes
Pseudo R^2	0.259	0.374	0.352	0.391	0.341	0.705	0.545	0.760
Observations	98	102	104	98	402	398	402	398

Notes: The table aims to show the potential relationship between the main interest, *Trust*, and the sample selection bias in questions about informal savings by an economy-level probit model. Estimated average marginal effects are reported after estimating the probit specification (21). Each observation is an economy k in a specific wave t. The dependent, Y_{it}, is a dummy which equals to 1 if the corresponding index value of *saving at clubs or friends* is NA, i.e., in wave t, no questions about "Save at saving clubs, stores, or friends" are asked to the respondents in economy k. The main independent of interest is the economy trust level. Historical GDP per capita is controlled as a proxy of economic development level. Total account ownership rate of the economy, the wave fixed-effect, and the region fixed-effect are also controlled. The results show that the absence of above-mentioned samples is positively related to trust levels. Heteroskedasticity-robust standard-errors in parentheses. ***,**,* indicate statistical significance at the 1%, 5% and 10% respectively.

(a) Saving at Financial Institutions



(b) Saving at Informal Channels (Clubs, Saving Stores or Friends)

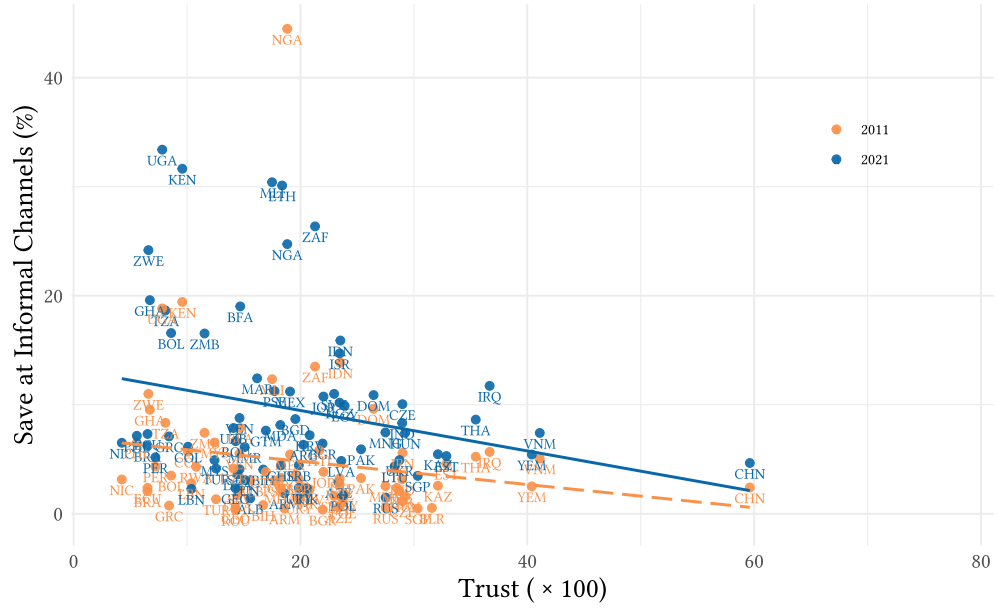


Figure OA-5: Trust and Saving Choices

This plot depicts the relationship between trust and saving choices, and its longitudinal comparison between wave 2011 and 2021. Each economy yields one point for each wave. Points in red and blue refer to the observations from 2011 and 2021, respectively, and the colored lines are the corresponding linear smoothing. The 3-digit code of each economy is labeled below the point. In panel (a), the y-axis indicates the share of respondents in the economy who save money at financial institutions. The y-axis in panel (b) is the share of respondents that save at informal places, such as saving clubs, stores, and friends. Respondents can adopt both choices. Note that panel (b) contains missing points of certain economies, where respondents were not asked about informal saving. In the appendix, Table OA-2 discusses these impact in detail.

OA-C2. Distrust as a Reason for not Applying for a Bank Card

The evidence for the adoption channel is drown from the questions in FINDEX regarding the reasons why respondents do not have an account. One of the options is due to the lack of trust in banks, which directly indicates individuals' refusing adoption, regardless whether other reasons are also selected.[40] We continue to use a general probit specification in the same form as (21) with differences including: (i) the sample set is of all individuals without personal accounts; (ii) the dependent Y_{ikt} is a dummy which equals 1 when individual i of wave t from economy k reports that the reasons for not having an account include distrust in banks. Individual and economy-level controls are the same as tests in Table 3.

Table OA-3 presents the average marginal effects the probit models estimate. Without additional controls as column (1) shows, one standard-deviation decrease in the economy's trust level is associated with a 2.93-point increase in the average probability of individuals without a personal account reporting distrust (in banks) as one of the causes. This percentage value even increases with controls and stabilizes around 4% of the population without accounts. Recall the summary statistics, there are only 18% of the people without accounts chose distrust as one of the reasons, suggesting the fraction associated with general trust is relatively large.

[40]The raw question allows multiple choices. We define the dependent dummy "no account due to distrust of banks" here equals 1 if and only if "distrust" is one of the selected reasons. In addition, there is no further explanations about the precise definition of "trust" in the questionnaire description. Therefore, respondents may select the option due to the lack of trust in the bank's ability to provide fair service or the bank's financial stability. Though distinguishing them is beyond our scope, we only need distrust as a summarized cause.

Table OA-3: Country Trust Levels and Non-adoption of Financial Institutions

Dependent variable:	No Account due to Distrust of Banks					
	(1)	(2)	(3)	(4)	(5)	(6)
Trust	-0.195^{*}	-0.299^{***}	-0.269^{***}	-0.266^{***}	-0.269^{**}	-0.265^{**}
	(0.106)	(0.105)	(0.099)	(0.100)	(0.133)	(0.132)
Account Ownership		0.002	-0.049	-0.055	-0.044	-0.043
		(0.071)	(0.076)	(0.077)	(0.094)	(0.095)
Log GDP p.c.		0.041^{***}	0.050^{***}	0.044^{***}	0.054	0.048
		(0.014)	(0.015)	(0.015)	(0.046)	(0.046)
Female				0.012^{***}		0.012^{**}
				(0.004)		(0.005)
Age				0.001^{***}		0.001^{***}
				(0.0003)		(0.0003)
Income				0.006		0.012^{*}
				(0.005)		(0.006)
Education				0.059^{***}		0.045^{**}
				(0.018)		(0.019)
Country-level Controls					Yes	Yes
Historical Controls					Yes	Yes
Wave FE		Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.003	0.014	0.020	0.026	0.026	0.030
Observations	129,073	128,425	128,425	127,193	87,886	86,829

Notes: Individual-level probit model. Estimated average marginal effects are reported after estimating the probit specification (21). The sample set is a repeated cross-sectional data, in which each observation is an adult who does not own an account interviewed by FINDEX between 2011 and 2021. The dependent, Y_{ikt}, is a dummy which equals to 1 if the adult reports that the reason for not having an account is distrust of banks. The main independent of interest is the country trust level. The individual control, X_{ikt}, includes: gender dummy, age, income level within the country (five levels from lowest to highest, normalized to 0 to 1), and education level (three levels from lowest to highest, normalized to 0 to 1). Country-level control, K_{kt}, includes: population share of owning an account, log GDP per capita, average amount of ATMs / bank branches per 1,000 km / 10,000 adults in the year of each wave, and historical values of these listed variables in 2010. Wave fixed-effect is estimated as dummies. Φ is the standard normal cdf. Standard errors of the marginal effects are clustered at the country level and reported in parentheses. While there are discussions on whether the standard errors of the probit model should be clustered from a model identification perspective, we report the results of clustering, which increase the standard errors technically. The main results are not affected. ***,**,* indicate statistical significance at the 1%, 5% and 10% respectively.

OA-D. Multinomial Probit Model: Estimated Coefficients and Robustness

Table OA-4: Estimated Coefficients of the Multinomial Probit Specification

	Source of Emergency Funds: (Benchmark: Working)				
	Impossible	Financial Institutions	Family / Friends	Asset Selling	Others
	(1)	(2)	(3)	(4)	(5)
Variables					
Trust	-1.052***	0.719***	-0.504***	0.164*	0.387**
	(0.225)	(0.084)	(0.167)	(0.093)	(0.170)
Personal Account	-0.349***	0.240***	-0.188***	-0.053*	-0.021
	(0.056)	(0.024)	(0.039)	(0.032)	(0.045)
Female	-0.119***	-0.052***	-0.020*	-0.047**	-0.023
	(0.017)	(0.014)	(0.012)	(0.020)	(0.021)
Age	0.005***	0.011***	-0.001	0.004***	0.009***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Income	-0.644***	0.258***	-0.253***	-0.298***	0.026
	(0.108)	(0.033)	(0.062)	(0.057)	(0.068)
Education	-0.497***	0.239***	-0.161***	-0.217***	-0.072
	(0.090)	(0.032)	(0.052)	(0.045)	(0.047)
Log GDP p.c.	0.272***	0.305***	0.227***	-0.032	-0.085
	(0.028)	(0.029)	(0.023)	(0.031)	(0.054)
Error Covariance Matrix					
Impossible	0.718***	0.667***	0.514***	0.103	-0.021
	(0.147)	(0.139)	(0.081)	(0.109)	(0.122)
Financial Institutions		2.138***	0.911***	0.008	0.470***
		(0.237)	(0.178)	(0.139)	(0.087)
Family / Friends			0.988***	0.051	-0.033
			(0.166)	(0.162)	(0.158)
Asset Selling				0.339***	0.027
				(0.098)	(0.095)
Others					0.817***
					(0.211)
Country-level Controls: Yes			Historical Controls: Yes		
Observations: 104,898					

Note: Individual-level multinomial probit specification (22). The benchmark source of emergency funds is set to be *working*. The individual controls include: gender dummy, age, income level within the country (five levels from lowest to highest, normalized to 0 to 1), and education level (three levels from lowest to highest, normalized to 0 to 1). Country-level controls include population share of owning an account, log GDP per capita, average amount of ATMs / bank branches per 1,000 km / 10,000 adults in the year of each wave, and historical values of these listed variables in 2010. Wave effect is fixed. Standard errors in parentheses. ***,**,* indicate statistical significance at the 1%, 5% and 10% respectively.

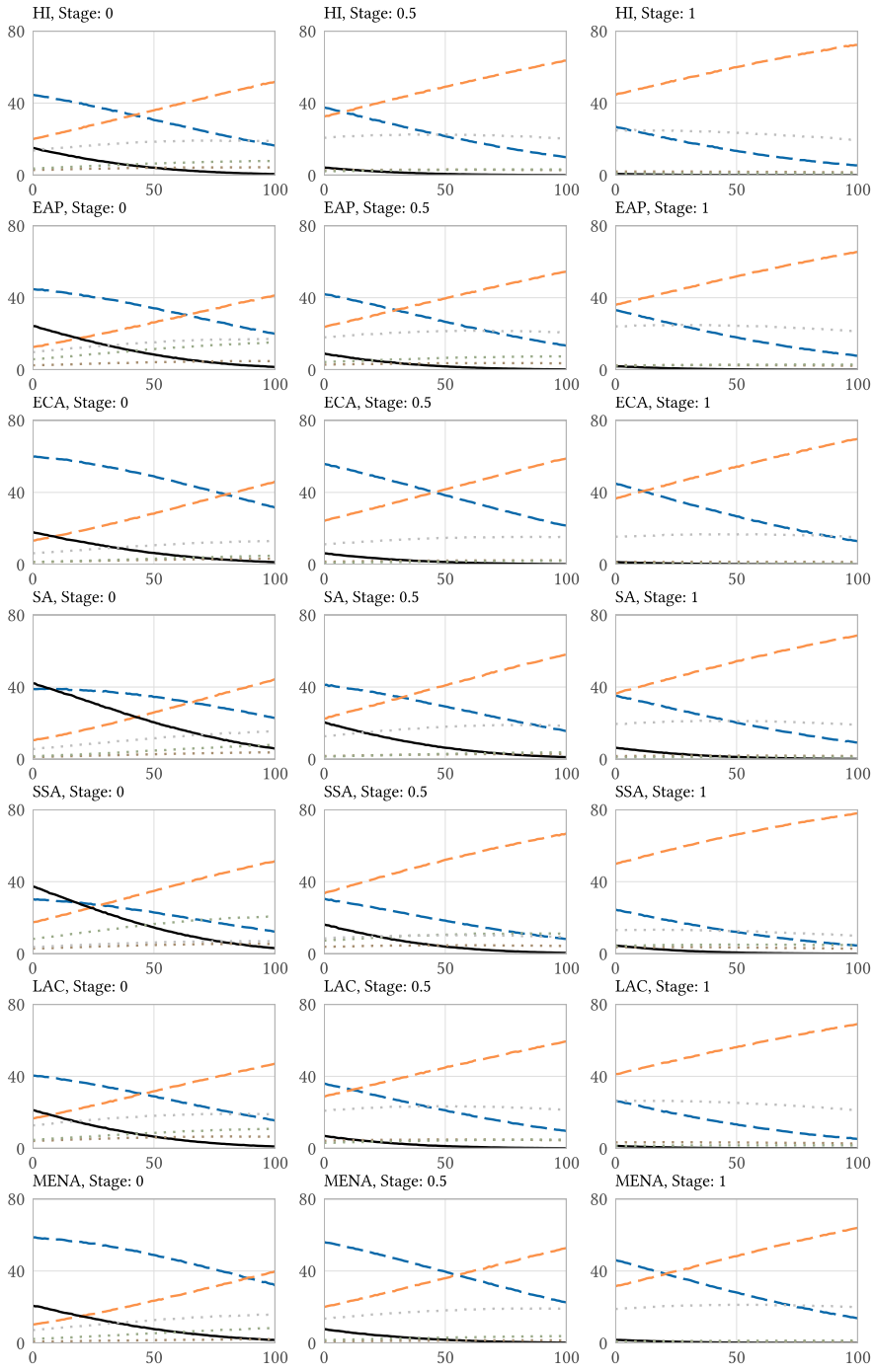


Figure OA-6: Predicted Probability: Robustness and Comparison among Cases

Note: The predicted probabilities of emergency fund sources in different cases, based on the main multinomial probit model, are compared to Figure 5. The table includes seven rows representing various World Bank-defined regions (see Section 3). The stage is denoted as k for income level and education, aiming to capture diverse scenarios.

OA-E. Additional Results: Trust and Regulation

OA-E1. Unconditional Divergence of Regulation Tightness

Table OA-5 presents the summary statistics and comparisons among waves I, IV and V (conducted in 1999, 2011 and 2019, respectively) in light of Barth, Caprio and Levine (2013). Notably, the normalized standard deviations and quantile statistics on dispersion provide evidence for persistent global divergence in these regulatory indices. This table is comparable with Table 16 of Barth, Caprio and Levine (2013), where summaries of 1999 and 2011 are reported. They also conclude that there are no strong convergence, particularly there is no evidence of convergence in ACT, while CAP and ENT show a minimal degree of convergence from 2000 to 2010. We confirm their findings. For example, the percentage (pct) of economies with CAP values that are 10% away from the median decreases from 84.54% to 78.35%, and for a 25% difference, the pct decreases from 15.46% to 12.37%. However, over the next ten years until 2021, these percentages become 74.23% and 22.68%, indicating that even the minimal convergence observed during the previous period did not continue. Note that our sample set is not completely the same as Barth, Caprio and Levine (2013), since we collect economies that have applicable data in three waves. Therefore, the statistic values could have quantitative differences. We divide the sample into two subgroups based on whether the trust value is greater than the global median. Within each group, the regulation tightness reveals no significant evidence of convergence.

The overall divergence leaves potential for different regulation preferences: suppose there exists a global optimum / equilibrium, then policymakers will tend to move closer, even though this may take long transition periods. However, over the twenty-year duration, this trend seems absent. That is, there could be some forces that lead to different optimum / equilibrium for economies.

Table OA-5: Summaries of Regulation Overtime

Indices	Group	N	Range		Median			Normalized Std.Dev.			Pct. of Economies with Values Different from the Median by								
											10%			25%			50%		
			Min	Max	(I)	(IV)	(V)	(I)	(IV)	(V)	(I)	(IV)	(V)	(I)	(IV)	(V)	(I)	(IV)	(V)
Overall Restrictions on Bank Activities	All	90	3	12	7.00	7.00	7.00	0.239	0.221	0.239	82.22	84.44	87.78	30.00	22.22	23.33	1.11	2.22	2.22
	High Trust	30	3	11	6.00	6.00	5.50	0.276	0.266	0.273	73.33	83.33	60.00	26.67	26.67	30.00	3.33	3.33	13.33
	Low Trust	33	3	12	7.50	7.00	7.00	0.229	0.204	0.241	75.76	81.82	87.88	33.33	18.18	21.21	0.00	3.03	3.03
Official Supervisory Powers	All	117	3	14	11.00	11.00	12.00	0.229	0.218	0.199	67.52	58.97	45.30	37.61	31.62	19.66	3.42	0.85	3.42
	High Trust	35	3	14	10.00	11.00	12.00	0.221	0.175	0.195	60.00	42.86	31.43	31.43	14.29	17.14	0.00	2.86	2.86
	Low Trust	40	4	14	12.00	11.00	12.00	0.255	0.260	0.240	77.50	77.50	65.00	15.00	40.00	17.50	7.50	0.00	5.00
Bank Capital Regulations	All	97	2	10	6.00	7.00	7.14	0.221	0.213	0.231	84.54	78.35	74.23	15.46	12.37	22.68	0.00	1.03	0.00
	High Trust	31	2	10	6.00	8.00	8.00	0.202	0.248	0.182	74.19	70.97	70.97	12.90	16.13	12.90	0.00	6.45	0.00
	Low Trust	33	2	10	5.00	7.00	8.00	0.240	0.223	0.216	66.67	75.76	84.85	27.27	15.15	12.12	0.00	0.00	6.06
Entry into Banking Requirements	All	119	0	8	8.00	8.00	8.00	0.125	0.061	0.144	30.25	17.65	20.17	3.36	0.84	3.36	1.68	0.00	1.68
	High Trust	36	0	8	8.00	8.00	8.00	0.168	0.051	0.226	41.67	19.44	19.44	8.33	0.00	8.33	2.78	0.00	5.56
	Low Trust	40	3	8	8.00	8.00	8.00	0.192	0.119	0.167	30.00	20.00	20.00	10.00	2.50	10.00	2.50	2.50	2.50

Note: This table reports the summary statistics of three indices that are related to regulation tightness on banks and other financial institutions, targeting on activities restrictions, capital regulations, and entry requirements, respectively. The generation of the indices are based on three waves of the World Bank BRS survey, following the calculation approach of Barth, Caprio and Levine (2013). For each index, the total sample is the economies for which all three waves are applicable. The high-trust group is the sub-sample with country trust levels above the median, whereas the low-trust group is the lower half. Due to the lack of trust data in some countries, the aggregate number of economies of high and low-group is lower than the totals. For each index, higher values indicate tighter regulation. The range of values and the median of each indicator in each wave for each group are shown. Then the indices are normalized to 0 to 1. To observe the separation among countries for each indicator, we report the standard deviation, as well as the proportion of countries that are separated by a certain distance from the median. These normalized metrics can also be used for comparisons between waves for observing convergence / divergence trends in regulations over time. Columns (I), (IV), and (V) indicate corresponding statistics of the first, fourth, and fifth waves of the World Bank BRS surveys. These three surveys were completed in 1999, 2011, and 2021, respectively.

OA-E2. Additional Regulation Indices

As Proposition 2 implies, low-trust countries should favor tighter rules, while high-trust countries favor to deregulate thus lower down implementation cost and expand investment scale. However, policymakers do not always choose the right regulation decisions, either due to potential non-autonomy (e.g., internal consistency of regional or international cooperation organizations) or simply ignorance. Therefore, we see in practice, countries change their policy tightness, as underlay in Section 4.E. Here we further analyze related indicators in Barth, Caprio and Levine (2013) in addition to *overall restrictions on bank activities* (restriction). In the following, we directly test the inference that low-trust countries prefer strict policies. This does not hold for *restriction*, as it is more aggregated and less likely to be determined by considering the level of trust.

Table OA-6: Trust and Regulation Tightness: Official Supervisory Power

Proxy of Trust	General Trust					Out-group Trust		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trust	-0.298***	-0.266***	-0.299***	-0.298***	-0.298***	-0.605***	-0.835***	-0.937***
	(0.073)	(0.085)	(0.073)	(0.087)	(0.096)	(0.158)	(0.180)	(0.238)
Log GDP 1985		-0.011			0.002		0.001	0.016
		(0.014)			(0.025)		(0.013)	(0.026)
Wave FE			Yes		Yes			Yes
Region FE				Yes	Yes			Yes
Observations	445	334	445	445	334	416	315	315
R^2	0.068	0.097	0.081	0.085	0.132	0.065	0.133	0.164

Notes: The dependent variable is the index of official supervisory power after normalized to $[0,1]$. In columns 1-5 (6-8), the main independent variable is the *general trust* (*out-group trust*). Log GDP p.c. in 1985 is controlled motivated by Table 4. BRSS survey wave (in year 1999, 2002, 2006, 2011, and 2019) and regional fixed effects are included. Standard errors (clustered at country level) in parentheses. ***p<1%, **p<5%, *p<10%.

Table OA-7: Trust and Regulation Tightness: Capital Regulation

	Capital Regulation						
	Full Sample		Wave I	Wave II	Wave III	Wave IV	Wave V
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Trust	-2.310	-3.021	1.456	3.101	-1.394	-9.494**	-10.289***
	(1.623)	(2.059)	(4.296)	(3.247)	(4.428)	(4.295)	(3.359)
Log GDP 1985		0.030	-0.127	-0.346	0.477	-0.206	0.462
		(0.167)	(0.336)	(0.273)	(0.432)	(0.456)	(0.349)
Wave FE		Yes					
Region		Yes	Yes	Yes	Yes	Yes	Yes
Observations	399	300	57	60	60	60	63
R^2	0.009	0.167	0.194	0.140	0.067	0.282	0.228

Notes: The dependent variable is the index of bank capital regulations, of which higher values correspond to tighter regulation. The proxy of trust is the out-group trust level. Log GDP p.c. in 1985 is controlled motivated by Table 4. BRSS survey wave fixed effect is included in column (2), and regional fixed effects are included in columns (2)-(7). Heteroskedasticity-robust standard errors in parentheses are used in columns (3)-(7), and are clustered at country level for columns (1)-(2). ***p<1%, **p<5%, *p<10%.

Table OA-8: Trust and Regulation Tightness: Fraction of Bank Entry Applications Denied

Dependent Variables:	$\mathbb{I}\{DENY > 0\}$		DENY			
Method & Sample:	Probit, Full		OLS, $\mathbb{I}\{DENY > 0\}$		OLS, Full	
	(1)	(2)	(3)	(4)	(5)	(6)
Trust	-1.170**	-0.706	-0.335***	-0.219	-0.263***	-0.054
	(0.486)	(0.676)	(0.115)	(0.208)	(0.060)	(0.112)
Log GDP p.c. 1995		0.031		-0.047**		-0.032*
		(0.106)		(0.023)		(0.017)
Wave FE		Yes		Yes		Yes
Region FE		Yes		Yes		Yes
Observations	267	267	115	115	267	267
R^2			0.039	0.390	0.036	0.217

Notes: Country-level regressions on how trust relates to the fraction of bank entry applications denied. Regarding the large proportion of zero values, we use the dummy, $\mathbb{I}\{DENY > 0\}$, as dependent in columns (1) and (2). The dependent in columns (3)-(6) is the raw value of *DENY*. Columns (3), (4) use a sub sample that only contains non-zero (positive) values of DENY, whereas (5), (6) use the full sample. Columns (1), (2) use probit specification, and (3)-(6) are OLS estimates. Heteroskedasticity-robust standard-errors in parentheses. ***,**,* indicate statistical significance at the 1%, 5% and 10% respectively.

OA-F. Additional Robustness Tests

Table OA-9: Trust, Credit Growth, and GDP Growth: Robustness

Dependent Variable:	$\Delta_t \log(\text{GDP per Cap.})$					
	1985-2000		2000-2020		1990-2020	
Model:	(1)	(2)	(3)	(4)	(5)	(6)
$\log(\text{GDP per Cap.})_t$	-0.014	-0.013	-0.295***	-0.306***	-0.316***	-0.363***
	(0.060)	(0.060)	(0.042)	(0.041)	(0.086)	(0.077)
Trust	1.114***	0.735*	1.269***	1.067***	1.659**	0.832
	(0.370)	(0.399)	(0.405)	(0.357)	(0.762)	(0.584)
Credit Growth		0.442*		0.253**		0.696***
		(0.253)		(0.114)		(0.231)
Fit statistics						
Observations	44	44	51	51	39	39
R^2	0.114	0.147	0.509	0.531	0.408	0.535

Notes: This table shows the robust tests of Table 4. The dependent variable is the log difference of GDP per capita. The independents are the log GDP per capita in 1985, trust level, and the credit growth, i.e., the changes in domestic credit to the private sector. In Column (1)-(2), the starting and ending year are 1985 and 2000, respectively. The time span is reduced to half the baseline. The sample set includes all the countries with available credit and trust data. Similarly, the time period is set to 2000-2020 in Column (3)-(4), and 1990-2020 (same time span but different start year as baseline) in Column (5)-(6). Heteroskedasticity-robust standard-errors in parentheses. ***,**,* indicate statistical significance at the 1%, 5% and 10% respectively.

Table OA-10: Country's Out-group Trust and Individuals' Sources of Emergency Funds

	Sources of Emergency Funds:					
	Impossible		Family / Friends		Financial Institutions	
	(1)	(2)	(3)	(4)	(5)	(6)
Out-group Trust	-0.796^{***}	-0.347^{**}	-0.857^{***}	-0.547^{***}	1.815^{***}	0.576^{***}
	(0.150)	(0.157)	(0.125)	(0.113)	(0.152)	(0.160)
Female		-0.032^{***}		0.023^{***}		0.005
		(0.005)		(0.006)		(0.004)
Age		0.0005^{**}		-0.002^{***}		0.002^{***}
		(0.0002)		(0.0003)		(0.0003)
Income		-0.192^{***}		-0.020^{*}		0.146^{***}
		(0.008)		(0.012)		(0.008)
Education		-0.157^{***}		-0.026^{**}		0.115^{***}
		(0.010)		(0.011)		(0.010)
Personal Account		-0.077^{***}		-0.034^{**}		0.118^{***}
		(0.008)		(0.014)		(0.014)
Country-level Controls		Yes		Yes		Yes
Historical Controls		Yes		Yes		Yes
Wave FE		Yes		Yes		Yes
Observations	183,714	99,374	183,714	99,374	183,714	99,374
Pseudo R^2	0.016	0.260	0.021	0.069	0.076	0.205

Note: This table reexamines Table 3, i.e., the individual-level probit model (21), with out-group trust as the alternative proxy of trust. Estimated average marginal effects are reported after estimating the probit specification for individual i in country k in year (wave) t. The dependent dummy Y equal to 1 if and only if the adult reports that her most likely source of emergency funds is Y. In columns (1)-(2), Y refers to "impossible", i.e., it is impossible for the individual to receive emergency funds. In columns (3)-(4), Y refers to borrowing from family or friends. And in columns (5)-(6), Y refers to borrowing or withdrawing from financial institutions. Individual controls include gender dummy (equal to 1 if female), age, income level within the country (five levels from lowest to highest, normalized to 0 to 1), education level (three levels from lowest to highest, normalized to 0 to 1), and personal account dummy (equal to 1 if the individual has an account). Country-level controls include log GDP per capita, and the average number of ATMs / bank branches per 1,000 km / 10,000 adults in the year of each wave, and historical values of these listed variables in 2010. Wave fixed-effect is estimated as dummies. Standard errors of the marginal effects are clustered at the country level and reported in parentheses. While there is debate whether the standard errors of the probit model should be clustered from a model identification perspective, we report the results of clustering, which technically increases the standard errors. The main results are unaffected. ***p<1%, **p<5%, *p<10%.

Table OA-11: Interaction between Trust and Individual Information

	Sources of Emergency Funds:					
	Impossible		Family / Friends		Financial Institutions	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	−0.030***	−0.032***	0.023***	0.023***	0.004	0.005
	(0.005)	(0.005)	(0.006)	(0.006)	(0.004)	(0.004)
Age	0.001**	0.003***	−0.002***	−0.001	0.002***	−0.002*
	(0.0002)	(0.001)	(0.0003)	(0.001)	(0.0003)	(0.001)
Income	−0.189***	−0.233***	−0.017	0.106***	0.141***	0.146***
	(0.008)	(0.041)	(0.011)	(0.039)	(0.009)	(0.041)
Education	−0.152***	−0.129***	−0.018*	0.038	0.106***	0.094**
	(0.010)	(0.039)	(0.010)	(0.035)	(0.010)	(0.043)
Personal Account	−0.089***	−0.077***	−0.048***	−0.037***	0.131***	0.120***
	(0.008)	(0.008)	(0.013)	(0.013)	(0.014)	(0.014)
Age × Out-group Trust		−0.010***		−0.006***		0.012***
		(0.002)		(0.002)		(0.003)
Income × Out-group Trust		0.142		−0.443***		−0.001
		(0.133)		(0.124)		(0.132)
Education × Out-group Trust		−0.086		−0.223**		0.056
		(0.143)		(0.107)		(0.144)
Country-level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	104,898	99,374	104,898	99,374	104,898	99,374
Pseudo R^2	0.258	0.262	0.062	0.072	0.191	0.207

Note: This table shows the robustness test of Table 3, considering the interaction between out-group trust and individual-level controls. Estimated average marginal effects are reported after estimating the probit specification for individual i in country k in year (wave) t. The dependent dummy Y equal to 1 if and only if the adult reports that her most likely source of emergency funds is Y. In columns (1)-(2), Y refers to "impossible", i.e., it is impossible for the individual to receive emergency funds. In columns (3)-(4), Y refers to borrowing from family or friends. And in columns (5)-(6), Y refers to borrowing or withdrawing from financial institutions. Individual controls include gender dummy (equal to 1 if female), age, income level within the country (five levels from lowest to highest, normalized to 0 to 1), education level (three levels from lowest to highest, normalized to 0 to 1), and personal account dummy (equal to 1 if the individual has an account). Dummies are not interacted with trust. Country-level controls include log GDP per capita, and the average number of ATMs / bank branches per 1,000 km / 10,000 adults in the year of each wave, and historical values of these listed variables in 2010. Wave fixed-effect is estimated as dummies. Standard errors of the marginal effects are clustered at the country level and reported in parentheses. While there is debate whether the standard errors of the probit model should be clustered from a model identification perspective, we report the results of clustering, which technically increases the standard errors. The main results are unaffected. ***p<1%, **p<5%, *p<10%.