

A theory of social capital and trust*

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Abstract: Under what conditions does social capital deter misconduct or facilitate economic growth? We develop a model in which social capital builds trust, decreases misconduct, and facilitates economic transactions. Social capital refers to the value of social and emotional benefits from performing in accord with contractual promises. It reflects a common component via shared culture and an idiosyncratic component reflecting individual moral values. Opportunistic behavior is disciplined by a decrease in social capital, which manifests as social disapprobation and cognitive dissonance. Social capital works as both a substitute and complement with legal and market forces to discipline opportunistic behavior and build trust. Our model provides a framework to interpret the results of prior empirical findings regarding the positive relationship between social capital, trust and economic activity: the model predicts that probability of trade increases with the buyer's trust in the seller and with the expected gains of trade, but decreases with the cost of being cheated. Additionally, the model's findings helps explain buyers' willingness to engage in economic exchange in spite of the possibility of opportunistic behavior by sellers, especially for low-trust activities (e.g., getting a haircut) relative to trust-intensive transactions (e.g., brain surgery). We characterize the conditions under which the expected gains from trade increase with the buyer's trust and with the seller's social capital. Moreover, we discuss the possibility of social capital investment and the factors that facilitate or hinder individuals' social capital formation. The model's findings also guide future research on the influence of social factors on economic outcomes, including fraud, financial market participation, firms' investment behavior, and economic growth.

JEL classifications: A13, G38, K40, Z10

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1. Introduction

The concepts of social capital and trust play prominent roles in finance research. But exactly what do these concepts mean and how do they affect financial outcomes? Previous research provides little coherence or guidance for this question. For example, Guiso et al. (2004) define social capital as “generalized trust” – an average measure of individuals’ willingness to engage with strangers. In contrast, Lins et al. (2017) reference a definition of social capital proposed by Scrivens and Smith (2013) that considers a person’s relationships, social network support, civic engagement, and trust and cooperative norms. Karlan et al. (2009) refer to trust based on social collateral and emphasize the importance of a person’s social network for fostering trust. Carlin et al. (2009) distinguish between public trust, which arises from the law and culture, and private trust, which arises from repeat contracting. Others refer to such overlapping concepts as social norms, cultural trust, culture, and social interaction (e.g., see Stulz and Williamson (2003), Hong et al. (2004), Pursiainen (2022), and Bottazzi et al. (2016)). As these examples illustrate, finance researchers seem to agree that social capital and trust are important, but they do not much agree on what these terms mean, how they are related, or how they affect economic outcomes.

This paper seeks to provide structure to these interrelated ideas by developing a theory of social capital and trust. We take advantage of the term “capital” to propose that social capital is an asset with value equal to the present value of surpluses that arise from mutually beneficial exchange and production activities. In our framework, culture is an input in the development of social capital and trust is the main output. Social capital has a common cultural component that is affected by the actions of its group members and an idiosyncratic component in which an individual can invest. Even though the common component is shared across members of a cultural group, social capital operates at the individual transaction level because it builds trust between counterparties. We also show how social capital can act as either a substitute

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for, or complement of, legal institutions and repeat purchase incentives in building trust. Viewed broadly, our theory helps to understand how legal, market, and social capital interact to build trust among counterparties, overcome the risk of opportunism, facilitate cooperative exchange and production activities, and promote human flourishing.

We begin by considering a simple exchange between a buyer and seller that promises gains for both but in which the seller might act opportunistically in a way that imposes a cost on the buyer. Examples include the purchase of an automobile, a contract to build a commercial building, or the provision of a haircut. In each case, the buyer cannot be certain of the quality of the seller's product or service until after committing to the exchange.

The buyer thus enters a lottery when they agree to the transaction – with probability π the seller performs as promised and the buyer earns a surplus, but with probability $(1-\pi)$ the seller acts opportunistically and the buyer suffers a loss. The probability π , in turn, reflects the likelihood that the seller's benefits from honest dealing exceed their benefits from cheating – benefits that the buyer cannot fully anticipate. In many cases a cheated buyer can seek recourse through legal or regulatory channels, or the seller can be incentivized to perform as promised by the prospect of repeat purchases. We consider such inducements for honest dealing in Section 6 of the paper. But until then, and to focus on the social capital channel, we assume third-party and repeat purchase incentives are not available and the seller's only inducement to honest behavior is through the influence of cultural norms and personal ethics, i.e., social capital.¹

This framework shows how, even in the absence of legal enforcement and repeat purchase incentives, social capital can discipline and deter opportunistic behavior, overcoming Akerlof's lemons problem and facilitating exchange. Our theory helps explain:

¹ We discuss our definition of social capital in Section 3. Third-party (e.g., legal) and repeat purchase inducements to honest dealing are examined by LLSV (1997), Klein and Leffler (1981), and many others. Such inducements frequently are unavailable for technical and cost reasons. E.g., it is difficult for a court to adjudicate a claim that my barista served a bad cup of coffee, or for the prospect of repeat sales to discipline cheaters when the gains from cheating are high (e.g., see Karpoff 2022).

- a) How social capital builds trust and contributes to the value of economic activity;
- b) Why buyers are willing to trust sellers despite the possibility of opportunistic behavior;
- c) How individuals can invest in social capital and the factors that encourage or discourage such investment; and
- d) The conditions in which opportunism and fraud occur despite the presence of social capital.

Our model also yields insights into several aspects of trust-based relationships and economic activity, including:

- e) The characteristics of high trust activities such as brain surgery and bungee jumping, compared to low trust activities such as haircuts and illegal drug purchases;
- f) Why buyers might engage in trades that offer negative expected personal benefits and how such trades still have positive expected societal benefits – except for edge cases in which buyers make perversely self-destructive choices;
- g) The circumstances that lead to a virtuous cycle in which honest behavior, trust, and social capital are self-reinforcing, or a corruption trap in which individuals and communities with low social capital have no incentive to invest in more social capital, and
- h) How social capital acts as both a substitute and complement to legal institutions and market forces (such as repeat purchase incentives) to build trust and facilitate value-increasing exchange and production.

This paper proceeds as follows. Section 2 sketches the development of the concept of social capital and its effect on economic and financial outcomes. A key characteristic of this research is a lack of agreement over the concept and measurement of social capital. Section 3 presents our model of trust and trust formation in which a seller's concerns about social consequences encourages honest dealing and builds trust. Section 4 explores the creation of social capital as the result of both cultural norms and personal investment. Section 5 extends the model to include legal and market considerations in addition to social capital. Legal, market, and social channels can act as substitutes or complements in the formation of trust and in fostering economic activity, complicating inferences from tests that relate social capital to economic

outcomes. Section 6 examines the circumstances that lead to opportunism, negligence, and fraud. Section 7 concludes by summarizing the model's implications for empirical research. In the appendices, we also survey and summarize previous research on social capital and compare our model of trust formation to other concepts of social capital.

2. Social capital in the literature

Economists have long recognized the importance of social influences on economic outcomes. Adam Smith's (1759) central proposition is of the importance of "moral sentiments" – i.e., human beings' sense of right and wrong – for social cohesion, production activity, and trade. Banfield (1958) blamed poor economic conditions in Southern Italy on a lack of social capital, meaning the habits, norms, and attitudes that motivate people to consider the common good. Arrow (1972) argued that "virtually every commercial transaction has within itself an element of trust" and that "...much of the economic backwardness in the world can be explained by the lack of mutual confidence."

Putnam (2000) credits Hanifan (1916) for the first use of the term "social capital," although other claims can be attributed to Dewey (1899), Jacobs (1961), Coleman (1988), Loury (1997), and Bourdieu (1980).² Modern appreciation for the importance of social capital grew significantly with the works of Putnam (1993, 2000) and Fukuyama (1995), entering mainstream economics with the work of Knack and Keefer (1997), La Porta et al. (1997), and Guiso et al. (2004). Subsequent research shows that social capital has meaningful effects on a wide range of economic outcomes, including stock market participation, economic development, corporate fraud, and capital investment.³

² Even Jane Austen uses the term in *Sense and Sensibility*. When asked about a trip to London, Miss Dashwood says, "Well, it was such a social capital," implying that social capital is a stock of reputation, connection, and prestige. Much of Austen's writing was about the acquisition and use of this type of capital.

³ See, for examples, Guiso, Sapienza, and Zingales (2004, 2008), Hong, Kubik, and Stein (2004), Lins, Servaes, and Tamayo (2017), Gurun, Stoffman, and Yonker (2018), and Hasan, He, and Lu (2022).

In all of these uses, “social capital” refers to some aspect of societal norms, values, or networks that generally build social cohesion.⁴ For example, Putnam (2001) defines social capital as “connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them.” Beyond such a broad notion, however, there is little agreement on a more specific definition of the term. In fact, Portes (1998) notes that the term “social capital” is so widely used that “the point is approaching fast in which social capital comes to be applied to so many events and in so many different contexts as to lose any distinct meaning.” Knack and Keefer (1997) make a similar observation: “Trust, cooperative norms, and associations within groups each fall within the elastic definitions that most scholars have applied to the term social capital.”

Not only does the conception of these terms differ widely, so do their measurement, as empirical proxies for trust and social capital include religious affiliation, geographical connections, network connections, and personal background or experience characteristics. Such disparate concepts and measures raise basic questions: Is social capital different from trust? Is it different from culture? Is religion or religiosity the same thing as social capital? Is social capital an umbrella term for a community’s institutions and values, and is it a public good?

The model introduced in the next sections presents a framework to answer these questions. We define social capital as the combination of cultural and idiosyncratic values and norms that motivate empathy, cooperation, honesty, and fair dealing in a person’s interactions with others. It has a cultural component that is common to all members of a cultural group and is largely endowed upon each member, although it is affected by each member’s behavior. The idiosyncratic component reflects the observation that not all members of a cultural grouping are equally trustworthy. Individuals can and do distinguish themselves by investing in this personal component of their social capital.

⁴ Social capital is not always cohesive. Putnam (1993), Aldrich (2012), and others distinguish between bridging capital, which fosters trust across groups, and bonding capital, which strengthens in-group relationships. Satyanath et al. (2017) argue that bonding social capital can work to decrease trust between groups and impede beneficial exchange. We discuss these distinctions in Section 6 below.

In our model, social capital helps to bond contractual performance because non-performance causes a decrease in social capital. This decrease reflects any cognitive dissonance a person experiences from violating their community's or their personal moral code, which can include feelings of shame, guilt, loss of self-esteem, and emotional distress (e.g., see Charness and Dufwenberg, 2006). A decrease in social capital can also manifest as social disapprobation, as a person who violates cultural norms can face disapproval from their peers and exclusion from valued social groupings (e.g., see Butler et al., 2016).

3. Trust

As Adam Smith observed, human beings are prone to “truck, barter, and exchange”, and economics students are taught that mutually preferred trade increases consumption opportunities and individual utility. A problem, however, is that trucking and bartering often require people to risk the consequences of fraud, opportunism, or negligence by their counterparties. As an example, a construction firm might hold up its client partway through the project to obtain better contract terms. The client, in turn, might deny and delay payments to the builder. Shipping firms can demand additional payment after a customer's product leaves port. Even simple exchanges are fraught with peril, such as when you buy a meal at a restaurant or pick up a cup of coffee. You could end up paying for a lousy meal or cup of coffee. Worse, a food vendor that skimps on food safety rules could put your health at risk.

The risk of opportunism – Akerlof's (1970) lemons problem – is present in virtually all exchange and production activities. Buyers and sellers nonetheless do agree to transact – billions of times each day. Viewed in light of the lemons problem, the observation that billions of trades occur *every day in all parts* of the world is extraordinary. Somehow, buyers and sellers establish enough trust to overcome the ever-present threat of counterparty risk, at least in many transactions.

3.a. *Trust as a participation condition*

To capture the role of trust at the transaction level, we consider a potential transaction $\mathcal{Q}$ between a seller A and a buyer B , e.g., the sale of an apple or provision of a haircut. At date 1, B decides whether to

engage in the transaction, in which case $\Omega = 1$, and at date 2, the transaction either is completed as agreed, or A cheats B . If completed as agreed, the transaction generates a surplus g_A for A and g_B for B . The transaction comes at some risk to B because A 's performance is not guaranteed and B cannot determine the quality of A 's performance until date 2, after committing to the transaction. With probability π , A performs as (explicitly or implicitly) promised and both parties earn their surpluses. With probability $(1-\pi)$, however, A acts opportunistically and earns a total gain of $g_A + b$, $b > 0$, and imposes a cost $c > 0$ on buyer B . π is a continuous variable, $0 \leq \pi \leq 1$, that reflects B 's trust that A will perform as promised.⁵

Our designation of A as the “seller” and sole potential cheater is for expositional convenience. In practice, counterparties from either side of a transaction can act opportunistically. We could just as easily consider A 's risk of loss if B were to act opportunistically. The relationship between A and B also need not conform narrowly to that of seller and buyer, as they could just as well be partners in a venture. Put differently, any cooperative activity involves the risk of opportunistic behavior by our counterparties, just as they are at risk from us. So, although the model focuses on A 's potential opportunism and social capital, and B 's trust and risk, it applies to the universal experience of vulnerability, or risk of harm, when we engage in cooperative activities that involve and rely upon other people.

In effect, B engages in a lottery when she enters a transaction with A – she either receives g_A or pays c . We assume c is sufficiently large to pose a meaningful risk for B (and we define “sufficiently large” below). B 's expected gain from the transaction is,

$$E(G_B|\Omega=1) = \pi g_B - (1-\pi) c. \quad (1)$$

Equation (1) defines the minimum required level of trust, π_{min} , for which B 's expected gain is non-negative:

$$\pi_{min} = c/(c+g_B). \quad (2)$$

π_{min} , in turn, is increasing in c and decreasing in g_B :

⁵ This definition of trust is similar to that in Guiso et al. (2008), who define (one minus trust) as “the subjective probability individuals attribute to the possibility of being cheated.” In Appendix B we compare this definition with other philosophical characterizations of trust.

$$\frac{d\pi_{min}}{dc} = \frac{g_B}{(c + g_B)^2} > 0$$

$$\frac{d\pi_{min}}{dg_B} = \frac{-c}{(c + g_B)^2} < 0$$

Note that π_{min} is specific to this particular transaction between A and B . There is no single trust standard that applies to all transactions or people. Rather, the level of trust that is sufficient to encourage B 's participation in this transaction depends on their specific benefits and costs from doing so. With sufficiently high transaction benefits (g_B) or low costs if the seller cheats (c), π_{min} is low and B is likely to engage in the transaction even with a low level of trust. Transactions for which π_{min} is low can be thought of as low trust transactions. For example, a barber's negligence that results in a bad haircut imposes only a small cost c for most clients, reflecting a low-trust transaction and explaining why barbershop walk-ins are an ordinary occurrence. If, in contrast, the costs from being cheated are high, π_{min} is high and the buyer is not likely to transact unless their trust in A is high. For most people, such high trust transactions include bungee jumping, air travel, and brain surgery – instances in which negligent or opportunistic behavior by A can be very costly for B .

If B is rational and risk-neutral, she will engage in the transaction such that $\Omega = 1$ if and only if $\pi \geq \pi_{min}$. Due to ambiguity aversion, gradual belief updating, and risk perception, however, individuals tend to weigh potential outcomes in a probabilistic manner (Tversky and Kahneman, 1979). Tversky and Kahneman (1992), for example, model decisions using an s-shaped probability weighting function and Barberis, Huang, and Santos (2001) argue that a smooth probability assessment best reflects observed behavior such as gradual changes in asset allocation. We therefore define B 's decision to engage in the transaction as a probability, $0 \leq y \leq 1$, defined by the logistic rule:

$$y = \Pr\{\Omega = 1\} = \frac{1}{1 + e^{-k(\pi - \pi_{min})}} \quad (3)$$

This characterization of the buyer's decision allows for the possibility of cognitive errors in which the buyer engages in some transactions even when they have negative expected value, i.e., when $\pi < \pi_{min}$, or risk aversion in which the buyer does not engage in some transactions that have positive expected value, i.e., when $\pi > \pi_{min}$. However, we assume the buyer avoids transactions that have extremely negative

expected values (the Appendix provides a precise definition of “extremely negative” in the context of our model). That is, our model accommodates the kind of behavioral biases normally contemplated in the literature (e.g., see Hirshleifer 2015). But we rule out self-destructive choices that would impose large costs on the buyer.⁶

The likelihood of a cognitive error is determined by the steepness parameter k . A larger k makes the probability flip more abruptly from $y \approx 0$ to $y \approx 1$ as π is close to π_{min} , and as $k \rightarrow \infty$ equation (3) reduces to a binary model in which $\Omega = 1$ if and only if $\pi > \pi_{min}$. That is, we can accommodate a rational risk neutral buyer who never makes a cognitive error by assuming $k = \infty$. More generally, $y \approx 1$ when B ’s trust in the seller is high relative to π_{min} , and $y \approx 0$ when B ’s trust is relatively low.

3.b. *Fraud, opportunism, negligence, and cheating*

In legal settings, the distinctions between fraud, opportunism, and negligence can be significant. For example, charges of fraud imply intent or *scienter* and can prompt larger penalties than findings of mere negligence. Throughout most of this paper we do not make such distinctions. Regardless of the seller’s intent or circumstances, the important issue is that, with probability π the buyer receives values less than expected. This can reflect the seller’s intent to fraud or merely negligent or indolent behavior that results in the buyer’s loss. An airline’s managers do not intend to impose costs on their customers, yet a customer who loses a bag, sits for hours in a plane waiting for takeoff, or suffers from a safety issue still suffers a loss compared to their contractual expectations. A seller might intentionally sell the buyer a poor quality apple, e.g., one that was bruised or stale from sitting on the shelf too long. Or the seller might just be negligent in handling the apple. Either way, what matters to the buyer is whether the apple meets expectations. To reflect this concern, we will refer to instances in which A does not perform as promised

⁶ As detailed in the Appendix, the range of choices we rule out involve transactions in which c is very large compared to g_B and π . A possible extension of this model is to examine such self-destructive choices. An opiate addict, for example, might purchase fentanyl from a supplier with poor quality control – a transaction that occurs despite low trust π and large cost c , which could include death.

or expected as “cheating” and for the most part will avoid distinctions between fraud, opportunism, and negligence.

B ’s expectations can be established via an explicit contract, as is typical in the construction industry or many transportation services. Many contracts, however, include implicit agreements. A builder’s promises to meet specific goals by certain dates may be explicit, but the contractor’s response to an unexpected weather event may not. The price of a coffee espresso is explicit, but how the barista pulls the shot is not. In many situations, the costs of identifying and specifying the full range of contingencies are prohibitively high. It also is prohibitively expensive to appeal to third parties to adjudicate many qualities of the good or service that is delivered. The quality of my espresso, or of a restaurant meal or haircut, is costly for an outsider to judge the seller’s contractual performance. As a result, many transactions require implicit agreements between the seller and buyer that are not enforced using third parties such as the law.

Of course, implicit agreements also are more prone to miscommunication, misjudgment, and ex post disagreement. For now, we assume both seller and buyer agree on the contractual arrangement, whether the agreement is explicit or implicit. In Section 6 we explore the effects of ex ante differences in the seller’s and buyer’s beliefs about the contract. Looking ahead, the prospect of such differences increases the probability that the buyer will – from their perspective – be cheated, thus increasing the minimum level of trust, π_{min} , required by the buyer to participate in the transaction, decreasing the number of completed transactions, and increasing the return to the seller A to invest in social capital. The prospect of costly differences in ex ante beliefs also increases the benefit of explicit contracts.

3.c. The seller’s problem

The potential cheating gain, b , is what tempts A to cheat. b could represent the value of the time saved by hurriedly giving a bad haircut, the money pocketed from misrepresenting the collusion history of a used car for sale, or the value of any other short-term benefit A derives from not living up to their side of the agreement. To reflect the fact that buyer B typically has less than perfect knowledge about A ’s benefits and costs from cheating, we assume that, at date 1, B regards A ’s gains from cheating as a random variable

$\tilde{b} \geq 0$ that is realized at date 2. Without loss of generality, assume $\tilde{b}$ is uniformly distributed over the interval $[0, W]$, where W represents the potential for $\tilde{b}$ to be large. For our main results it does not matter whether A learns of the realization of $\tilde{b}$ at date 1 or date 2. *Scienter* – that is, knowingly entering the transaction with the intent to cheat – implies A knows the realized value b at date 1 and cheats B at date 2. Alternatively, A might decide to cheat B only after discovering the realized value b at date 2. Such behavior is analogous to negligence or last-minute opportunism, as opposed to intentional or planned fraud.

In our setting, what deters A from cheating is the prospect of a loss in social capital, ΔS . That is, A brings a stock of social capital S to the transaction that decreases in value by the fraction Δ , $0 \leq \Delta \leq 1$, if A cheats B . Our notion of social capital relies on two social channels by which A experiences adverse consequences when they cheat B . The first channel is A 's cognitive dissonance from violating their personal or their community's moral code, which can include feelings of shame, guilt, loss of self-esteem, and emotional distress (e.g., see Charness and Dufwenberg, 2006). The second channel is A 's risk of social disapprobation. By cheating their customer, for example, A may face disapproval from their peers and exclusion from valued social groupings (e.g., see Butler et al., 2016). The consequences of cognitive dissonance and social ostracism are largely non-pecuniary, but they very well could matter to A and are reflected in ΔS . The stock of social capital S reflects the A 's reputation for honest dealing, and the scalar Δ reflects the degree this reputation is depreciated if A acts opportunistically.

Social capital is not the only channel by which A can experience adverse consequences for cheating B . In Section 5, we introduce the possibility of legal action (B sues A for fraud or negligence) and lost future sales (A gets a reputation for poor service). For now, however, we suppress other potential disciplinary channels and assume that the only adverse consequence that can accrue to A is via a loss in social capital.

The seller A 's decision at date 2 is therefore to perform as promised and receive the surplus g_A from the transaction, or to cheat B and receive the additional cheating benefit $\tilde{b}$ and the consequences ΔS .

Perform as promised if $\tilde{b} \leq \Delta S$

Cheat if $\tilde{b} > \Delta S$.

If B knows $\tilde{b}$ and ΔS , B 's problem is simple: engage in the transaction if $\tilde{b} \leq \Delta S$ and do not transact if $\tilde{b} > \Delta S$. B 's problem is complicated, however, by the fact that knows only the distribution $\tilde{b} \sim U[0, W]$. B 's trust in A at date 1 is therefore B 's subjective probability that A gains more from performing as promised than by cheating at date 2:

$$\pi = \Pr\{\Delta S - \tilde{b} \geq 0\} = \frac{\Delta S}{W}. \quad (4)$$

Equation (4) indicates that the likelihood A will perform as promised increases with A 's loss in social capital, ΔS , and decreases with their direct gain from cheating, $\tilde{b}$.

3.d. The role of social capital in promoting trust and economic value

Figure 1 illustrates the sequence of events. With probability $(1 - y)$, B 's level of trust in A is sufficiently small such that B refuses to engage in the transaction. With probability y , B trusts A enough to proceed with the transaction. If the transaction occurs, then with probability π the buyer gains g_B and the seller gains g_A for a net social gain of $(g_A + g_B)$. With probability $(1-\pi)$, $\tilde{b} > \Delta S$ and the seller cheats the buyer, earning a total gain $(g_A + \tilde{b} - \Delta S)$ and leaving the buyer with a loss c instead of a gain g_B .

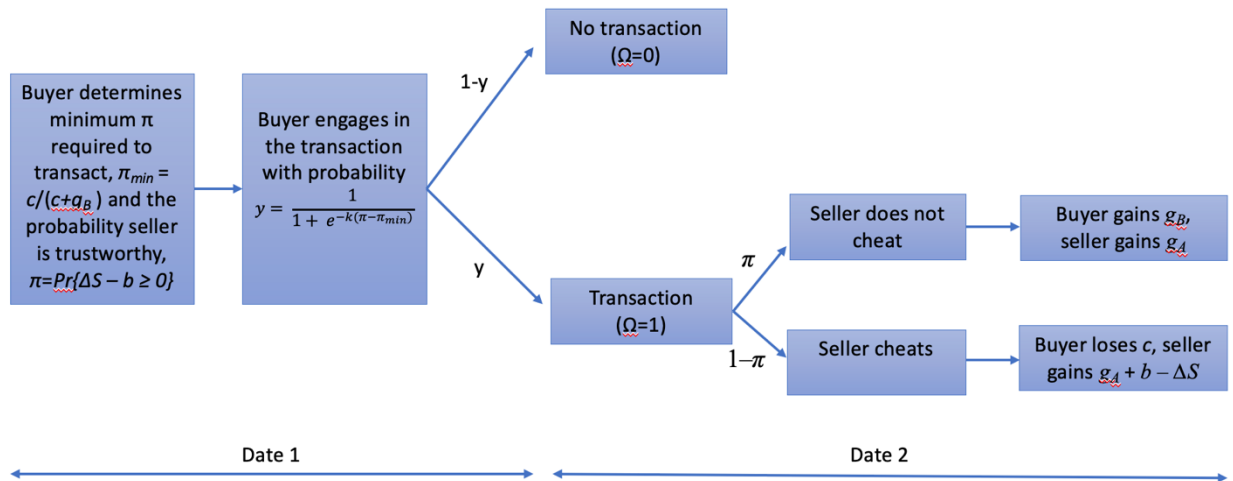


Figure 1: The relation between trust, transactions, and net gains

If a transaction occurs, the conditional gain from trade is

$$G = [\pi (g_A + g_B) + (1 - \pi) (g_A + \tilde{b} - (\Delta S + c))].$$

The seller cheats only when $(\tilde{b} > \Delta S)$, so the expected gain conditional on a transaction is:

$$E(G|\Omega = 1) = (g_A + \pi g_B) + (1 - \pi) (E(\tilde{b}|\tilde{b} > \Delta S) - (\Delta S + c)). \quad (5)$$

We use the shorthand $E(G)$ for the conditional gain from trade, and the unconditional expected gain from trade is $E(yG)$. A seller who cheats internalizes only the ΔS portion of the costs and imposes an external cost on society equal to the buyer's direct loss c plus the buyer's opportunity cost g_B .

The interesting case is when $(E(\tilde{b}|\tilde{b} > \Delta S) - (\Delta S + c)) < 0$ because, otherwise, even cheating outcomes would deliver positive gains from trade and we would have little reason to be concerned about the social costs of cheating. We therefore assume that A 's prospective cheating behavior poses a meaningful risk to B such that $c > (E(\tilde{b}|\tilde{b} > \Delta S) - \Delta S)$. This assumption has intuitive appeal because if the cost a cheating seller imposes on their counterparty typically exceed their cheating gain. For example, a restaurant owner who lowers their expenses by using expired milk gains little compared to the patron's costly gastric consequences if they get sick.

Proposition 1: Despite the risk of costly cheating behavior, the conditional and unconditional expected gain from trade is positive.

Proof: The proof is in the Appendix. The intuition for Proposition 1, however, can be seen from rearranging equation (5):

$$E(G|\Omega = 1) = E(G) = g_A + [(1 - \pi) (E(\tilde{b}|\tilde{b} > \Delta S) - \Delta S)] + [\pi g_B - (1 - \pi)c]$$

The first term, g_A , is positive. The second term also is positive, as the seller will not cheat unless $E(\tilde{b}|\tilde{b} > \Delta S) - \Delta S > 0$. The third term, $\pi g_B - (1 - \pi)c$, is positive whenever the buyer avoids cognitive errors and participates in the transaction only when their expected gain exceeds their

expected cost from being cheated. Even with reasonably small cognitive errors in which the third term is slightly negative, the expected gain conditional on a transaction occurring, $E(G)$, is positive.⁷ The likelihood of a transaction also is positive, $0 < y \leq 1$, so the unconditional expected gain, $E(yG)$, is positive.

Proposition 1 stipulates a condition that, while intuitively appealing, is not theoretically obvious. The logical conclusion of Akerlof's lemons problem is a world of autarky and penury because buyers refuse to engage with sellers. Proposition 1 shows one pathway by which sellers and buyers nonetheless establish trust. Despite risks of opportunism and fraud, the expected gains from trade are positive and some trades do occur because the seller is disciplined by the prospective loss of social capital.

We are now in position to characterize the effects of social capital and trust on the probability of trade and the gains from trade.

Proposition 2: The probability of trade: (a) increases with the buyer's trust in the seller π ; (b) increases with the buyer's prospective gain from trade, g_B ; and (c) decreases with the buyer's cost if cheated, c . The probability of trade also is higher for low-trust transactions (for which π_{min} is low) than for high-trust transactions (for which π_{min} is high).

Proof: From equation (3) and noting that $\pi_{min} = c/(c+g_B)$:

$$\begin{aligned}
 (a) \quad & \frac{dy}{d\pi} = ky(1-y) > 0 \\
 (b) \quad & \frac{dy}{dg_B} = ky(1-y) \frac{c}{(c+g_B)^2} > 0 \\
 (c) \quad & \frac{dy}{dc} = -ky(1-y) \frac{g_B}{(c+g_B)^2} < 0 \\
 (d) \quad & \frac{dy}{d\pi_{min}} = -ky(1-y) < 0
 \end{aligned}$$

⁷ As shown in the Appendix, the condition that the buyer avoids extremely large and costly cognitive errors precludes situations in which buyer engages in the transaction even though c is very large compared to g_A , g_B , and π .

Proposition 2(a), that the likelihood of trade increases with counterparty trust, is consistent with a growing number of empirical findings. Guiso et al. (2009), for example, find that trade between European countries is positively related to measures of trust between the countries' populations. Bottazzi et al. (2016) find that venture capitalists are more likely to invest in firms located in countries whose citizens the investor is more likely to trust. Guiso et al. (2008) find that lack of trust decreases individuals' willingness to invest in one particularly high-trust activity – investing in the stock market. Relatedly, Giannetti and Wang (2016) find that individual investors are less likely to participate in the stock market after a local financial scandal that decreases their trust in financial investing, and Gurun et al. (2018) find that investors exposed to the Bernie Madoff ponzi scheme fraud also decreased their investment in risky assets. Dupont (2025) shows that shocks to trust in a cultural institution (the Catholic church) also degrades households' trust and participation in the stock market.

Propositions 2(b)-(d) also predict that trade is more likely when the minimum trust required to make the transaction a fair bargain for the buyer is low, i.e., for low-trust transactions. Correspondingly, trade will more likely falter when the buyer's potential gains from trade, g_B , are low or the buyer's potential cost of being cheated, c , is high.

Proposition 3: Trust and the probability of trade both increase with the seller's social capital.

Proof: From equation (4),

$$\frac{d\pi}{dS} = \frac{\Delta}{W} > 0$$

From equation (3),

$$\frac{dy}{dS} = ky(1 - y) \frac{\Delta}{W} > 0$$

An increase in social capital increases A 's potential cost of cheating, ΔS , thus increasing the minimum value of $\tilde{b}$ that makes cheating optimal for A . This increases B 's trust that A will perform as promised and encourages B to engage in the transaction. In effect, ΔS serves as a bond that A forfeits if they cheat B .

Proposition 3 is consistent with empirical research showing that individuals' trust and propensity to engage in trade are both positively related to social capital. Guiso et al. (2004), for example, find that Italian households in high-social capital areas are more likely to use checks and invest in the stock market. Similarly, Hong et al. (2004) find that people are more likely to invest in the stock market when they have frequent interactions within socio-cultural networks, which serves as a proxy for social capital. Hasan et al. (2022) find that social capital plays an important role in peer-to-peer lending outcomes in China, as borrowers from high social capital regions receive higher bids from lenders and have higher funding success, while lenders from high social capital regions take higher lending risks.

Proposition 4: If $c > (E(\tilde{b}|\tilde{b} > \Delta S) - \Delta S)$, i.e., c is sufficiently large to pose a meaningful risk for B , the unconditional expected gain from trade increases with the buyer's trust, π .

Proof: The unconditional expected gain from trade is $E(yG)$.

$$\frac{d}{d\pi}(yE(G)) = \frac{dy}{d\pi}E(G) + y\frac{dE(G)}{d\pi}$$

As previously established, y , $dy/d\pi$, and $E(G)$ are positive. In addition,

$$\frac{dE(G)}{d\pi} = g_A - \left(E(\tilde{b}|\tilde{b} > \Delta S) - (\Delta S + c)\right).$$

If $c > (E(\tilde{b}|\tilde{b} > \Delta S) - \Delta S)$, the term in brackets on the right side is negative. Therefore,

$$\frac{dE(yG)}{d\pi} > 0.$$

Proposition 4 shows that trust not only increases the likelihood of trade, as established by Proposition 2. It also increases the gains from trade. The gains from trade increase with trust for two

reasons. First, an increase in trust increases the likelihood that $\Omega = 1$, i.e., that B will overcome the lemons problem and engage in the transaction with A . Second, an increase in trust means that the probability A will engage in cheating behavior is lower, thus decreasing the likelihood of the deadweight loss c and increasing the expected gain conditional upon the transaction occurring.

Proposition 4 is consistent with Fukuyama's (1995) argument that high trust among citizens in a country generates superior institutional and economic performance. It also supports intuition that motivates empirical research into the relation between trust and beneficial economic outcomes. La Porta et al. (1997), for example, find that trust among people is positively related to several measures of success for governmental and non-governmental organizations. Ahern et al. (2015) find that cross-border merger activity and synergy gains increase with cultural proximity, which serves as a proxy for mutual trust among the people involved in a merger. Hasan et al. (2017) find that firms located in U.S. counties with high levels of social capital enjoy lower bank loan spreads and looser nonprice loan terms compared to firms located in low social capital counties.

Proposition 5: If the seller's potential cheating gains are bounded such that $W < \Delta S + g_B + c + Z$, $Z > 0$, the unconditional expected gain from trade increases with the seller's social capital.

Proof: The proof is in the Appendix, which shows that $Z = k(1-y) \cdot E(G)$. The intuition is provided by noting that

$$\frac{dE(yG)}{dS} = y \frac{dE(G)}{dS} + E(G) \frac{dy}{dS}$$

Propositions 1 and 2 show that $E(G)$ and dy/dS are positive, and y is non-negative. Solving for $dE(G)/dS$:

$$\frac{dE(G)}{dS} = \frac{\Delta}{W} (\Delta S + g_B + c - W)$$

which is positive if $W < \Delta S + g_B + c$. Therefore, the conditional economic gain, $E(G)$, increases with social capital if W is bounded. The Appendix shows that the unconditional expected gain increases with social capital, i.e., $dyE(G)/dS > 0$, even if W faces a less constrained bound, $W < \Delta S + g_B + c + Z$, where $Z > 0$.

Proposition 5 states that an increase in social capital is not only positively related to trust and the probability of trade (as established by Proposition 3), but also the gains from trade – so long as the seller’s maximum potential gain from cheating, W , is not too extreme. This provides a theoretical rationale for a widespread view that social capital creates value and promotes economic development (e.g., Putnam 2000). Consistent with this proposition, Knack & Keefer (1997) find that social capital is positively associated with a country’s economic growth and investment. Guiso et al. (2004) find that high social capital areas in Italy have greater financial development than low social capital areas.

Propositions 1–5 provide a framework that characterizes the relation between social capital, trust, and economic outcomes. The next section models social capital and how it is created.

4. The creation of social capital

“Capital” implies a capital asset, an observation we use in Section 3 to provide meaning to the term “social capital.” The value of A ’s social capital is specific to A ’s interaction with B and reflects the value of A ’s non-pecuniary benefits from living up to their personal and societal expectations. The model’s key assumption is that the value of A ’s social capital decreases if B experiences the interaction as not successful (i.e., if A cheats B). In this section we discuss how social capital is created by a common component, C , that reflects the culture in which A operates, and an idiosyncratic personal component, P , that reflects A ’s unique values, attitudes, and ethics:

$$S = C + P.$$

4.a. Culture

Social capital depends in part on *A*'s and *B*'s cultural backgrounds and settings. Quoting Parsons (1951), Acemoglu and Robinson (2021) define culture as "... a stable and coherent 'normative pattern of value-orientations' that help individuals make decisions and adapt to different circumstances" and observe that "culture lives at the level of well-defined groups." Harrison and Huntington (2000) define culture as "the values, attitudes, beliefs, and orientations, and assumptions prevalent among people in society." Similarly, Guiso et al. (2006, p. 23) define culture as "...those customary beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation."

We adopt Parson's (1951) definition of culture as one component of social capital. Positive cultural characteristics – social norms that support honesty, fair dealing, and mutual consideration – contribute to *B*'s trust in *A* because *A* is likely to experience cognitive dissonance and social disapprobation if they violate social norms and expectations. Culture is a public good in that it builds trust and bonds contractual performance for many people who share the culture, simultaneously. *A*'s reliance on culture to build trust in their transaction does not preclude others in their communities from also using culture to build trust in their transactions. Culture therefore reflects a component of social capital that, while common to all members of the cultural grouping, operates at the level of individual decisions. Positive cultural characteristics contribute to the social capital that *A* and *B* bring to their interaction, thereby increasing *B*'s trust in *A*.⁸

Note that, as a public good, culture is effectively endowed upon *A* – as it relates to their specific transaction. However, *A*'s contractual performance can have an external effect by supporting or eroding the community's culture, which in turn affects the stock of social capital available for all subsequent transactions among members of *A*'s cultural community. We refer to the value of positive external effects

⁸ The reader may note that *B*'s culture also influences the likelihood and outcome of their transaction with *A*. For example, if *B*'s culture emphasizes trust across groups, *B* is more likely to trust *A* and engage in the transaction. Below, we model the influence of *B*'s culture as affecting y , the probability *B* will engage in the transaction.

as E^+ and the value of negative external effects as E^- . Incorporating external effects into the expected economic consequences of a transaction, we can rewrite equation (5) as:

$$E(G|\Omega = 1) = [\pi (g_A + g_B + E^+) + (1 - \pi) (g_A + \tilde{b} - (\Delta S + c + E^-))] \quad (6)$$

The direction of external effects depends on whether the seller cheats or performs as promised. With probability $(1-\pi)$ the seller cheats the buyer, leading to a decrease in the seller's social capital, ΔS , the buyer's cost c , and the broader community's cost E^- . Both c and E^- are external to the seller. The cost E^- arises because a A 's cheating decreases the value of the cultural capital that, as a component of S , helps to assure contractual performance and build trust. A 's cheating in this one transaction therefore decreases the social capital available to others in A 's cultural group, decreasing the likelihood of future transactions and increasing the likelihood of cheating among the transactions that do occur.

The possibility of positive external effects if the seller does not cheat, E^+ , illustrates how social capital is subject to a virtuous cycle. With probability π the seller performs as promised and contributes to a social norm of honest behavior that can build social capital for all others in A 's culture group. This, in turn, increases the likelihood of beneficial transactions and decreases the likelihood of cheating by other members in A 's community. Similarly, if A cheats, social expectations shift to accommodate cheating behavior in general, thus lowering the social capital available to support transactions in the community and decreasing economic value.

The possibility of external cultural effects affects the boundary conditions that qualify Propositions 1 through 5 in ways that reflect the relative sizes of E^+ and E^- . With large external benefits, for example, it becomes more likely that the unconditional expected gain from trade is positive, contributing to a cultural and social capital virtuous cycle.

4.b. *Personal social capital*

While culture affects social capital via community-wide social norms and orientations, it does not make all members of a cultural group equally trustworthy. This is because social capital includes an idiosyncratic component that reflects A 's unique values, attitudes, and ethics. We refer to this idiosyncratic component as A 's personal capital, P . It reflects A 's unique moral code and their value of adherence to it.

Because it is unique and affects the value of their prospective transactions, A has incentive to invest in their personal capital. We see this when individuals display religious symbols or perform rituals that reflect a commitment to values such as the Golden Rule, or cultivate personal relationships that help to bond their commitment to act honestly.⁹ Many people build personal social capital by eschewing cheating opportunities and performing as promised in their interactions with others.

The observation that people care about and work on their reputations implies that personal social capital can be augmented through costly investment. In our model, A 's social capital can be represented as

$$S = C + P = C + P(I),$$

where $P(I)$ reflects A 's ability to transform investment I into personal social capital P .

An inspection of equation (5) reveals that seller A has incentive to invest in social capital, but only under certain conditions. Let $E(G_A)$ represent A 's expected gain conditional on a transaction occurring. $yE(G_A)$ is A 's unconditional expected gain. Then A 's expected gain from an increase in social capital is given by:

$$\frac{\partial E(yG_A)}{\partial S} = \frac{\Delta}{W} \left[-y(W - \Delta S) + \left(g_A + \frac{(W - \Delta S)^2}{2W} \right) y(1 - y)k \right]$$

⁹ In Section 6 we discuss false signaling and its effects on trust and cheating.

The first term in brackets ($-y(W - \Delta S)$) is negative, while the second term is positive. As shown in the Appendix, the first term dominates at low levels of S while the second term dominates as S increases. This reflects the two offsetting effects of S on the seller's unconditional expected gain from trade. On one hand, an increase in S serves to increase A 's penalty if they cheat. This effect dominates when S is small – an increment to S increases A 's expected personal loss from cheating more than it increases A 's prospective gains from trade. On the other hand, an increment to S increases B 's willingness to engage with A and increases the likelihood that A will gain g_A from the transaction. This positive effect dominates when S is large.

The Appendix shows that, in numerical simulations, the range over which $\partial E(yGA)/\partial S < 0$ is limited to small values of S and that $\partial E(yGA)/\partial S > 0$ for most values of S . The possibility that $\partial E(yGA)/\partial S < 0$ for low S illustrates the possibility of a “corruption trap.” A corruption trap arises when a seller has low social capital and no incentive to invest in social capital. In such a trap, the stock of social capital stays small, relatively few value-increasing transactions occur, and when transactions do occur, cheating is relatively frequent. Such corruption traps characterize low social capital communities, including the regions in southern Italy that motivate Putnam's (2000) pioneering work into the role of social capital in economic development. The implication of our model is that corruption traps are self-reinforcing, suggesting that such communities are unlikely to grow social capital unless an external shock jumpstarts them out of the corruption trap and onto a different social capital growth path.

4.c. Investment in personal social capital

Consider the range of S over which A 's expected gain from trade increases with S , i.e., assume S is large enough to avoid the corruption trap. We assume the returns to investment in social capital are increasing and concave, $P'(I) > 0$ and $P''(I) \leq 0$, and that the cost of such investment, $\mu(I)$, increases and is convex, $\mu'(I) > 0$ and $\mu''(I) > 0$. A 's marginal benefit and marginal cost from investment are:

$$MB = \partial E(yGA)/\partial I = \partial E(yGA)/\partial S * \partial S/\partial I = \partial E(yGA)/\partial S * P'(I)$$

$$MC = u'(I).$$

To illustrate A 's investment incentives in a simple framework, assume $P(I) = h^*I$, where h is a productivity constant, and $\mu(I) = \frac{1}{2} I^2$. Setting $MB = MC$ yields A 's optimal investment in social capital, I^* :

$$I^* = \frac{\Delta h y (2W(\Delta S - W) - k(y - 1)(2Wg_A + (\Delta S - W)^2))}{2W^2}$$

This allows us to characterize the conditions that lead to investments in social capital.

Proposition 6: Given that S is sufficiently large to avoid the corruption trap (i.e., the seller's unconditional expected gain increases with social capital), the seller's optimal investment in social capital increases with their gain from trade (g_A), the efficiency with which investment generates social capital (h), the seller's current level of social capital (S), the rate at which cheating depreciates social capital (Δ), and the trust sensitivity parameter k . Optimal investment in social capital decreases with the buyer B 's gain from trade (g_B) but increases with the buyer's cost if they are cheated (c).

Proof: The partial derivatives of I^* with respect to each of the model's primitive parameters are reported in the Appendix.

Proposition 6 summarizes the comparative statics of A 's investment problem. A can invest to increase their social capital to increase buyer B 's willingness to trust and engage in trade. The amount of this investment increases with A 's ability to actually increase social capital via investment (h), and A 's gain from having more social capital (which are affected by g_A , S , Δ , and k). A 's optimal investment increases with the buyer's cost if cheated, c , because a buyer with high c requires a higher level of trust to be willing to engage in trade. Similarly, the seller's optimal investment in social capital decreases with the buyer's

gain from the transaction, g_B , because buyers with high g_B require less trust in the seller to be willing to engage in the transaction.

4.d. *The buyer's cultural and social capital*

For convenience we have focused on social capital held on one side of the transaction, which we call the seller A . Every counterparty, however, enters their transactions with their own specific cultural background and personal social capital, all of which affect the likelihood and outcomes of trade. Ahern et al. (2015), for example, show that merger outcomes are affected the cultural similarities of the acquiring and target firms. Social capital also impacts individuals' propensity to use financial services and participate in financial markets (Guiso et al., 2004; Hong et al., 2004).

In our model, we capture the influence of the counterparty's social capital by considering the decision of the buyer B . We represent the buyer's social capital as S_B . S_B could be high if, for example, B comes from a cultural environment with high generalized trust, if B 's personal values emphasize openness toward others, or if B has personality trait agreeableness.¹⁰ A high S_B implies that, all else equal, B is more likely to trade with A , imparting an upward bias to the probability of transacting, y . That is, $\partial y / \partial S_B > 0$.

The buyer's social capital can contribute to what we describe in Section 3 as a cognitive error, that is, the decision to engage in the transaction even if the expected value to the buyer is negative. It is also plausible, however, for a high S_B to offset the buyer's risk aversion that would lead B to forgo trades that have positive expected value. The effect of the buyer's social capital on the buyer depends on π and π_{min} . If $\pi > \pi_{min}$, that is, the buyer's expected gain is positive, an increase in the buyer's social capital increases their expected gain from trade.

Similarly, an increase in the buyer's social capital generally works toward an increase in the expected gain from trade:

¹⁰ Generalized trust refers to a proclivity to trust others, even strangers (e.g., see Guiso et al. (2003))). High generalized trust implies that, all else equal, B is more likely to trade with A . Trait agreeableness reflects sympathetic and cooperative tendencies, which also implies willingness to engage with others.

$$\frac{\partial yE(G)}{\partial S_B} = \frac{\partial y}{\partial S_B} E(G) + y \frac{\partial E(G)}{\partial S_B}$$

In equation (7), $\partial y/S_B > 0$ and $\partial E(G)/S_B = 0$, so the sign of $\partial yE(G)/S_B$ depends on $E(G)$. Proposition 1 shows that $E(G)$ is positive except when the expected gain to B is strongly negative. So, except for cases in which B perversely engages in transactions that promise large expected personal losses, an increase in B's social capital works to increase the overall gain from trade. This result is consistent with research showing that economic activity and growth are higher in communities with high generalized trust (Knack & Keefer, 1997; Putnam 2000).

5. Legal, market, and social capital

To this point we have assumed A experiences no legal or market consequences if they cheat B. In this section we relax this assumption and consider the interaction of social capital with legal enforcement (L) and market reputational capital (M). We define trust capital (TC) as the sum of the legal, market, and social capital that A brings to their transaction with B:

$$TC = L + M + S.$$

Legal capital refers to the laws, regulations, and legal institutions that discourage cheating by penalizing it. One reason A is encouraged not to cheat is that they do not want to pay a fine, lose a license, or face jail time. Legal enforcement is costly and can be ineffective in adjudicating some types of contractual performance (is that really a bad cup of coffee?), so it is unlikely to be the sole channel that encourages A's satisfactory performance in many types of transactions. Previous findings indicate, however, that legal capital plays helps to guarantee contractual performance and is positively associated with firm value and performance, financial market development, and economic growth.

Market capital, M , consists of the monetary losses imposed on A if A's cheating causes it to lose future sales or for its counterparties to adversely change the terms of contract. As an example, Beechnut Inc. lost sales when it was discovered to have sold as apple juice for infants what was actually beet-sugar sweetened water. Similarly, Sears Roebuck, Inc. lost sales in its automotive repair division when it was

discovered billing customers for fraudulent repairs. Klein and Leffler (1981) and Shapiro (1983) show that the prospect of such losses can be sufficient to encourage non-cheating behavior even in the absence of legal institutions and third-party enforcement of contracts. In particular, firms perform as promised when the value of the quasi-rents they earn from honest dealing exceeds the value of the short-term gain from cheating. Karpoff and Lott (1993) label the value of such quasi-rents that are at risk if a firm cheats its “reputational capital.” Here, we use the term “market capital” to emphasize that such losses are imposed when the cheating firm or individual faces less favorable terms of contract with their counterparties when they are discovered to have cheated.

Using this expanded notion of total capital, B ’s trust in A , π , depends on A ’s total ex-post consequences if A fails to deliver the promised goods or service. Substituting ΔTC for ΔS in equation (4),

$$\pi = Pr\{\Delta_L L + \Delta_M M + \Delta_S S \geq b\} \quad (9)$$

Here, Δ_L , Δ_M , and Δ_S are the fractions of L , M , and S that A loses if he cheats B . Δ_S is the same as Δ_S in the previous sections. $\Delta_L L$ represents the value of any legal sanctions imposed on A , and $\Delta_M M$ is the value of B ’s loss in market reputational capital. Δ_L , Δ_M , and Δ_S are all bounded between 0 and 1, so we can state equation (9) as

$$\pi = \pi\{TC, b\} = \pi\{L, M, S, b\} \quad (10)$$

where $\pi\{.\}$ is increasing in L , M , and S , and decreasing in b . That is, A ’s potential loss ΔTC is positively related to the amounts of legal, market, and social capital that A brings to their transaction with B .

The condition for the transaction to have non-negative value to B is:

$$Pr\{\Delta_L L + \Delta_M M + \Delta_S S - b \geq 0\} \geq c/(c+g_B).$$

5.a. *Partial vs. total effects of social capital on trust*

Including legal and market consequences complicates the relation between social capital, trust, and economic value added, i.e., Propositions 3 and 5. Proposition 3, for example, is that trust is positively related to social capital. From equation (8), however.

$$\frac{d\pi}{dS} = \frac{\partial\pi}{\partial S} + \left(\frac{\partial\pi}{\partial L} \frac{dL}{dS} + \frac{\partial\pi}{\partial M} \frac{dM}{dS} \right) \quad (11)$$

Proposition 3 states that $\partial\pi/\partial S > 0$. The sign of $d\pi/dS$ in equation (11), however, is affected by the interaction effects dL/dS and dM/dS . If an increase in social capital substitutes heavily for, say, market capital, $dM/dS < 0$ and $d\pi/dS$ could be negative. An example could be a socially tight-knit community in which sellers do not invest in reputational capital that helps to bond performance in a repeated game setting. In general, empirical work that seeks to establish a connection between social capital and trust-based outcomes should consider possible interactions with legal and market institutions and capital.

5.b. Are legal, market, and social capital substitutes or complements?

The extent to which legal, market, and social capital serve as substitutes or complements in developing trust is an important policy matter. Carlin et al. (2009) develop a model in which social capital and legal provisions can be complements or substitutes, but they argue the two genererally work as substitutes. In high social capital societies, less regulation is needed, since trust is primarily informed by social capital. Similarly, Karpoff and Lott (1993) argue that legal penalties work as substitutes for firms' reliance on reputational (or market) capital. In their framework, higher legal penalties for corporate misconduct will result in lower firm reputational investments and less reliance on market capital, i.e., the repeat purchase mechanism, to deter misconduct.

Equation (10) highlights how B 's trust in A is formed by the interrelated influences of legal, market, and social capital. Taking the total derivative,

$$d\pi = \left(\frac{\partial\pi}{\partial M} \frac{dM}{dL} + \frac{\partial\pi}{\partial S} \frac{dS}{dL} \right) dL + \left(\frac{\partial\pi}{\partial L} \frac{dL}{dM} + \frac{\partial\pi}{\partial S} \frac{dS}{dM} \right) dM + \left(\frac{\partial\pi}{\partial L} \frac{dL}{dS} + \frac{\partial\pi}{\partial M} \frac{dM}{dS} \right) dS.$$

Setting $d\pi = 0$ shows how a given level of trust can be formed using different combinations of legal, market, and social capital. Because of interaction effects, it is not necessarily true that an increase in one

corresponds to a decrease in another. Take, as an example, the effect of legal institutions on social capital. We might conjecture that, to create a given level of trust, a setting with poor legal institutions will rely more on social capital. But this depends on interactions with market capital. Setting $d\pi = 0$:

$$\frac{dS}{dL} = - \frac{\left(\frac{\partial \pi}{\partial M} \frac{dM}{dL} + \frac{\partial \pi}{\partial S} \frac{dS}{dL} \right)}{\left(\frac{\partial \pi}{\partial L} \frac{dL}{dS} + \frac{\partial \pi}{\partial M} \frac{dM}{dS} \right)}$$

The sign of dS/dL depends on the interactions of S and L with market capital M . A community with poor legal institutions, for example, may rely heavily on market capital – that is, the repeat purchase mechanism – and not substitute into greater investment in social capital. Similar observations apply to dS/dM and dM/dL .

Some empirical research suggests that legal, market, and social consequences sometime also work as complements to build trust and facilitate economic transactions. Knack and Keefer (1997), for example, find that social capital (proxied by norms of civic cooperation) is stronger where legal provisions toward contracting and property rights are stronger. La Porta (1997) find that lower social capital countries have less efficient judiciary and suffer from more corruption, indicating a low level of legal capital. And Stulz and Williamson (2003) find that Catholic countries have lower creditor rights than Protestant countries. This effect is distinct from legal origin and it persists within civil law countries. One explanation for this result is that Catholics' low social capital implies that they do not encourage cooperation between individuals through contracts and investment—consistent with Weber (1905)'s analysis of the impact of religion on capitalistic activity.

It remains an empirical matter to determine whether legal, market, and social capital serve as substitutes or complements in building trust, and in what settings. The extent to which they work as substitutes depends on the extent to which they affect each other. If legal, market, and social capital serve as complements, the development of stronger institutions in one domain can prompt a virtuous cycle in

which trust is increased via the other domains as well. A strengthening of legal institutions, for example, can have a direct effect on trust formation and also an indirect effect if it bolsters social norms toward honest dealing.

6. Extensions of the model

6.a. Aggregation over many transactions

Our base model involves a specific transaction involving one seller and one buyer. When measuring the effect of social capital on economic outcomes, however, most empirical research measures correlations between aggregate measures. Guiso et al, (2009), for example, consider the effect of bilateral trust between the peoples of two countries and the amount of foreign trade. We can extend our model to reflect the aggregate effect of many transaction decisions by noting that aggregate effects are the sum of many individual decisions. Generalizing from equation (6), the transaction t will occur if and only if:

$$\text{Transaction } t = 1 \text{ iff } \pi_{At}^B \geq \pi_{min,t}^B$$

or

$$Pr\{\Delta L_{At} + \Delta M_{At} + \Delta S_{At} - b_{At} \geq 0\} \geq c_{Bt}/(c_{Bt} + g_{Bt}) \quad (12)$$

Here, π_{At}^B refers to B 's trust in A regarding possible transaction t , and $\pi_{min,t}^B$ is the minimum level of trust B requires to engage in the transaction. $(\Delta L_{At} + \Delta M_{At} + \Delta S_{At} - b_{At})$ reflects B 's assessment of A 's net costs from cheating B . The greater the likelihood these net costs exceed zero, the higher B 's trust that A will not cheat. Note that B 's participation condition depends on their own direct benefits from the transaction (g_B), direct costs if A cheats (c), plus their assessment of A 's costs and benefits of cheating.

The t subscripts emphasize that both A 's and B 's costs and benefits depend on the particular transaction. A might, for example, experience a large loss in social capital for selling a clunker of an automobile to a neighbor, but only a small loss if selling to an out-of-town stranger. The loss might be smaller for giving a bad haircut to a fidgety child than an adult, or for pulling a poor espresso shot for

customer who is ignorant of coffee compared to a knowledgeable customer. More broadly, B 's trust in A , and therefore B 's likelihood of pursuing the transaction, depends on an (often implicit) assessment of all legal, market, and social consequences to A from cheating, as well as A 's direct benefit from cheating, b_{At} .

Extending equation (5) to a large number N of heterogeneous potential transactions, we can see that the number of completed transactions is strictly increasing in social capital. Each successful transaction with no cheating creates a surplus of $(g_{At} + g_{Bt})$. Generalizing from equation (12), the total social gain increases with social capital if sellers' short-term gains from cheating remain sufficiently low.

6.b. *Why fraud occurs*

With probability $1-\pi$, B 's trust is misplaced and A finds it optimal to cheat on their agreement. In our setting, it becomes optimal to cheat when A 's net short-term cheating gain exceeds the sum of his lost legal, market, and social capital $\tilde{b} > \Delta L + \Delta M + \Delta S$. Thus, one pathway by which cheating arises is that the seller's short-term cheating gain turns out to be higher than expected.

There are additional pathways as well. Throughout, we have assumed that the legal, market, and social capital at stake if A cheats are common knowledge. In practice, however, the seller and buyer can have different information and expectations of ΔL , ΔM , and/or ΔS . Let $E^A[\Delta L + \Delta M + \Delta S]$ equal A 's expected loss in total capital and $E^B[\Delta L + \Delta M + \Delta S]$ equal B 's expectations of A 's loss in total capital. If these expectations diverge such that $E^A[\Delta L + \Delta M + \Delta S] < E^B[\Delta L + \Delta M + \Delta S]$, B will consider A to be more trustworthy than A actually is, leading A to cheat in some circumstances even if, from B 's perspective, $\tilde{b} > E^B[\Delta L + \Delta M + \Delta S]$. For example, A may suffer less social disapprobation from cheating than B expects, or expect fewer regulatory repercussions than B expects. Notice that the mistake – i.e., the difference between expected losses and ex post losses – can come from either party. All that is required is that A expects their losses to be less than B expects.

We have assumed that, when contracting at date 1, A and B agree on the contractual terms. In practice, buyers and sellers frequently disagree about their terms of contract. Disputes arise even when the terms are explicitly specified, and disagreement is even more likely when the terms are explicit. In our

model, the absence of a meeting of minds over contractual terms can be represented by relaxing our assumption of common knowledge about the direct gains to trade, g_A and g_B . For example, the buyer might expect the implicit agreement to be that the apple they are purchasing was picked fresh the day of purchase, while the seller might think they made no such representation about the apple's freshness. Stated differently, the buyer's expectation of g_B is lower than the true (ex post transaction) value of g_B . Equation (2) shows that π_{min} is decreasing in g_B , implying that, by misjudging g_B , the buyer's participation condition is mistakenly low and the buyer engages in some transactions that they would not if they had full information about g_B .

Fraudulent or cheating behavior can thus arise from one or more of three channels: (i) the seller's short-term gain can turn out to be unexpectedly large; (ii) the seller's expectations of their losses in total capital, $E^A[\Delta L + \Delta M + \Delta S]$, can be less than the buyer's expectations of the seller's losses; or (iii) the seller and buyer can enter the contract with different expectations of their own or the other's direct gains from the transaction.

6.c. *Bilateral trust formation*

Our model casts the problem as if cheating goes only one way, i.e., only sellers can cheat buyers. This is for expositional convenience only, as fraud, opportunism, and negligence can arise from both sides to most transactions. For example, the buyer might enter into the transaction with a fraudulent form of payment that the seller discovers only after the transaction is completed or they perform their service. In this case, the problem is strictly analogous to our setting, as it is now the buyer who enters the transaction with legal, market, and social capital at risk. For a transaction to occur, both the buyer's and the seller's participation conditions must be met, i.e., both must have at least a minimum level of trust in the other to enter the transaction and risk being cheated.

7. Conclusions

This paper develops a model in which social capital is formed via shared culture plus idiosyncratic personal values and works to build trust. In the model, culture is an input that helps to build social capital, and trust is the primary output of social capital. Trust, in turn, facilitates mutually beneficial exchange activity such as stock market participation, trade flows, the control of fraud and opportunism, and other activities that promote economic efficiency and growth.

In the model, culture is the non-excludable and non-rivalrous set of norms and values that contributes to the social capital of every member of the cultural group. An individual's behavior, however, has external effects on the group's culture and the social capital of its members. Cheating behavior affects the group's culture in a way that decreases each group member's social capital, while honest behavior builds the social capital available to every member of the group.

We show that a person's stock of social capital has group and individual fixed effects, but that the amount of social capital at stake is unique to each potential transaction. For example, your barista's social capital can be large when you agree to buy a cup of coffee from them, contributing to your trust they will serve good coffee. But that same person's social capital may be low in a different potential transaction, say if they offer to sell you their car or ask for a loan. That is, social capital can reside in individuals and groups, but the amount available to bond behavior in a specific transaction is unique to that transaction.

Social capital is one component of the total capital a person brings to their interactions with others, along with legal capital and market capital. Legal, market, and social capital are additive in their effects on the total capital a person brings to a transaction, but they can act as substitutes or complements in the building of trust. Some empirical findings imply that these three sources of trust work as substitutes, for example, when an increase in legal penalties for misconduct results in less reliance on market or social capital. Other findings imply complementarity, for example, when strong legal institutions contribute to a community's social capital.

Our model provides a framework for interpreting the results of a large literature that explores the relation between empirical proxies for social capital and various economic outcomes. The proxies include

personal characteristics, community norms, and religious values – all channels by which community-wide culture influences the social capital each party brings to a transaction. The economic outcomes include stock market participation, trade flows, and fraud deterrence – all outcomes that depend on trust that is formed, in part, by social capital.

Finally, the model highlights three pathways by which fraud and cheating behavior arise despite the transaction-specific bonding provided by social capital. First, new information can arise that makes one party's short-term gain from cheating higher than anticipated by both parties. Second, the two parties to a transaction can have different information or expectations about the legal, market, and social consequences for cheating behavior. Third, the two parties can have different understanding of the contractual arrangement. In the model, the failure of a meeting of minds in contract formation manifests as differing expectations of the surpluses each party earns from the transaction. Such differing expectations can lead to the formation of trust when, with better information about their counterparty's expectations, the cheated party would have avoided making the contract in the first place.

The pathways by which social capital bonds honest performance and disciplines cheating behavior highlight the fundamental nature of mutual expectations and trust for economic activity. As economic agents, we constantly assess our counterparties' trustworthiness and our willingness to engage with them. Our assessments amount to predictions of our counterparties' behavior, which are based on our expectations of the legal, market, and social consequences they will incur if they treat us badly – just as they are making similar predictions about our own behavior. Even the simplest transactions – one's morning coffee and muffin, for example – involve complex projections of our own and others' future behavior. Such projections typically are implicit and made unconsciously, but they form the foundation upon which cooperative exchange and production activity is built.

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Appendix: Alternative definitions of social capital and trust

Our model of social capital and trust borrows liberally from several philosophical treatments of these concepts, including Putnam (1990), Fukuyama (1995), and Gambetta (1998). Still, our definitions do not align perfectly with all previous discussions of these concepts. This appendix provides a brief sketch of several prominent alternative definitions of trust and social capital, illustrating the overlapping but not perfectly congruent treatments of these concepts.¹¹

B.1.: Alternative Definitions of Trust

- I define [trust] as accepted vulnerability to another person's power over something one cares about, *in the confidence* that such power will not be used to harm what is entrusted.” (Baier, 1995)
- Trust is “an attitude, disposition, or inclination to act in certain ways in light of various beliefs one has both about oneself and others. Typically these beliefs concern one's own vulnerability and the restraint the trusted agent is prepared to exercise not to take advantage of that vulnerability.” (Brenkert, 1998)
- For Cohen and Dienhart (2013) “when A trusts B to do X, A invites B to acknowledge and accept an obligation to do X. When—or if—B accepts the invitation, B takes on that obligation. In that way trust creates an obligation and forms a trust relationship.”
- Trust is “the expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms, on the part of other members of that community” (Fukuyama, 1995)
- “When we say we trust someone or that someone is trustworthy, we implicitly mean that the probability that he will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him” (Gambetta, 1998).

¹¹ Most of the definitions of trust come from Cohen and Dienhart (2013)'s review of concepts of trust in philosophy and business ethics. We do not include definitions of trust as a response to a potential counterpart's trustworthiness, so called “motive-based theories” (McLeod, 2023).

- Mayer et al (1995) define trust as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the [trustor’s] ability to monitor or control that other party.”

B.2. Alternative definitions of social capital

The following definitions of social capital also overlap with our development:

- “The sum of actual or potential resources linked to the possession of a *lasting network of relationships* that more or less institutionalized, of inter-connections and inter-recognitions; or, in other words, of *belonging to a group*, as a set of agents who are not only endowed with common traits (which can be perceived by an observer, by others or by group members themselves) but are also united by permanent and useful *links*.” (Bourdieu, 1986. Our translation, original emphases)
- In a later definition, Bourdieu (1986) defines social capital as “the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition.”
- For Coleman (1990), “social capital is defined by its function. It is not a single entity but a variety of different entities, with two elements in common: they all consist of some aspect of social structures, and they facilitate certain actions of actors-whether persons or corporate actors-within the structure.”
- Social capital encompasses the norms of cooperation shared by members of a network. Durlauf & Fafchamps (2005)
- Fukuyama (1995) calls social capital “the capability that arises from the prevalence of trust in a society or in certain parts of it”
- Loury (1977) defines social capital as “the consequences of social position in facilitating the standard human capital characteristics”

- Putnam (1993) defines a community's social capital as "norms of reciprocity and networks of civic engagement" and "features of social organizations, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinating action." Later, Putnam (2001) acknowledges that "social trust is not part of the definition of social capital but it is certainly a close consequence.

References for Appendix B

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