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Contract Enforcement: A Political Economy Model of Legal Development

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Contract Enforcement: A Political Economy Model of Legal Development

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JEL: O1, K49, H40, C72.

Key Words: relational contract, legal contract enforcement, the elite rule, income inequality.

1 Introduction

Most economic transactions are prone to the risk of default by contracting partners, even though it is collectively beneficial for all relevant parties to act honestly. How to reduce such risk is thus essential to achieve efficient outcomes from voluntary exchanges. This problem is as old as human society and may become more severe over time as the growing

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specialization in the economy generates more frequent and complex economic exchanges among agents.

Various institutions have been created to solve the problem. A common enforcement method across different societies is to engage in bilateral relational contracts where a future stream of benefits is large enough to prevent short-sighted cheating today. In a multilateral environment such as a close-knit ethnic group or social communities, credible information of one's past behaviors can be circulated at low costs so that individual reputations can be developed and punishment carried out at the communal level (Landa 1981, Ellickson 1991, Bernstein 1992, Whyte 1996, Greif 1994, 2006, Dixit 2009). When it becomes more productive to trade with strangers outside one's community, the legal system is often relied upon to enforce contracts at the society level.

These different contract enforcement institutions have comparative advantages over each other and thus are usually coexisting in many societies (Ellickson 1991, Durlauf and Fafchamps 2005). Their relative usage, however, differs across societies in an important way. The prevalence of legal contracts is typically associated with well-developed economies (such as the West), which exhibit relatively low income inequality, high quality legal systems, and democratic political regimes, while a heavy reliance on informal relationships such as kinship and social communities is associated with developing countries that have the opposite characteristics (North 1991, McMillan and Woodruff 1999, North et al. 2000, Fafchamps 2002, Johnson et al. 2002, Greif 2006). Such stylized differences lead naturally to the conjecture that the collective-oriented culture, which (in contrast to the individualistic culture) seems inherently prone to the usage of relational contracts, is the culprit behind both low legal quality and slow economic development (Weber 1954, North 1991, North et al. 2000, Greif 1994, 2006). This may be true for some countries (in Latin America, for example); it is, however, difficult to be reconciled with the experiences of recently developed East Asian economies under the Confucian culture, namely Japan, Korea, Singapore, Hong Kong, and Taiwan (Landa 1981, Whyte 1996, Reed 2001).

This paper develops a political economy model of legal development to account for why the relative usage of relational and legal contracts differs across societies. It finds that the existence of strong social networks per se (which is more likely in a collective culture) does not necessarily reduce the overall welfare, though it may slow down the legal development process, since relational contracts have comparative advantage in such an environment.[1] However, if the intensive usage of relational contracts is accompanied by the elite rule (as probably in Latin America), then the legal quality is mostly likely to be inefficiently low and the income inequality inefficiently high, all of which hinder economic development. In

[1] East Asia seems to fit in this case compared with the benchmark case of the developed western countries.

other words, the presence of elite rule is a much stronger indicator than the social structure or cultural orientation in assessing whether less reliance on legal contract enforcement is a barrier to economic development. Conversely, the intensive reliance on legal contract enforcement needs not be welfare improving, especially when the legal quality is determined by the majority rule (the U.S., for example).

The underlying intuition is as follows. As a starting point, it is useful to note that, while the informal contract enforcement at individual and communal levels seems to have been functioning spontaneously from early on, legal enforcement appears much later in history, and in general it needs intentional public investment to establish (Greif 2002, 2005). For instance, the establishment of legal courts, the development of legal codes and procedures, the training of judges, lawyers, and the police force are all needed for the legal system to work. So the legal investment is treated in this paper as a costly public good, whose provision is to a large degree determined by the amount of benefits of using legal enforcement versus relational contracts as well as the political regime.[2]

This paper first analyzes the differences between legal contracts and relational contracts at both individual and communal levels. It shows that relational contracts secure cooperation by promising future gains in an established relationship. The need to stay with current partners, however, makes individuals reluctant to do business with new partners even though they are more productive than the old ones. In contrast, legal contracts use an impersonal third party, the legal court, to deter cheating, and thus free agents from the burden of maintaining less productive relationships.[3] As a result, the more productive the new matches are relative to the old ones, the higher the returns of using legal enforcement, and the larger the incentives to invest in the legal system.

A direct implication is that it can be socially optimal to use relational contracts exclusively and not to invest in legal quality at all, which is true when the gains from trading with strangers are not large enough. And across societies, those more suitable for the usage of relational contracts (for example, those with more homogenous population, better orga-

[2]It is important to note in the beginning that the legal quality in this paper refers not to the general quality of the legal system, but only to the specific legal institutions that concern contract enforcement. In England, for example, the common law courts were highly developed from early on, but the contract law was not developed until much later in the seventeenth and eighteenth centuries.

[3]This captures the insightful observation of Johnson et al. (2002): "Trust in existing suppliers may make entrepreneurs reluctant to purchase from new suppliers. ... The development of legal institutions brings indirect efficiency gains, by lowering entry barriers, in addition to direct efficiency gains through strengthening confidence in contracts." Though in reality the relational aspect of exchange is also relied upon by those who use legal contracts (Macaulay 1963), and some legal rules may enhance the usage of relational contracts, the distinction between these two types of contracts and their relative usage in society still seem to be important enough to warrant serious research.

nized communities or a collective culture) tend to start legal investment late and to have lower legal quality. In other words, the socially optimal pace of legal development may vary across societies because the comparative advantages of relational contract enforcement may differ due to exogenous reasons. This suggests that a higher quality legal system is not always better for development, and a collective culture is not necessarily bad.

When individuals have heterogenous returns and thus conflicting interests in improving the legal quality, a political economy model is needed to examine how legal investment is determined. Specifically, this paper shows that the traditional rich elite, who by definition are richer than others at times when the legal contract enforcement is not available or weak, must have enjoyed higher gains in using relational contracts.[4] But this means they would benefit relatively less from legal enforcement, while the less privileged poor masses stand to gain more from having a competent legal system.[5,6] And so it is not surprising to see that, if the rich elite are politically dominant and choose legal investment to maximize their own welfare, legal development tends to be slower than the socially optimal level, while the opposite is true if the masses are politically dominant. In other words, the legal investment tends to be too large under the majority rule and too small under the elite rule, and thus the legal quality is often higher in democratic societies than others.

Another finding is that the income inequality falls when the legal quality improves; the reason is that a better legal system, by providing all agents with more equal access to new trade opportunities, makes the quality of their initial matches and endowment less important and thus dampens the income gaps between the traditional elite and the rest. This suggests that, everything else equal, a democratic society, thanks to its higher legal quality, would have a lower income inequality than an elite ruling society. This is consistent with the evidence that countries with higher income inequality are more likely

[4] Mapping from theory to reality, it is useful to note that the traditional elite are often endowed with land and other natural resources, which are a relatively stable source of incomes, and thus their major business transactions are conducted mostly through relational contracts with similar elite families.

[5] This result is consistent with the comment of Pipes (1995, p. 289): "Those in power have no need of courts and laws to have their way; it is the poor and the weak who do. Anyone who doubts this proposition has only to compare the general condition and the sense of security of the lower orders in areas with weak legal traditions, as for example south-east Asia, with those like western Europe and the United States where they are deeply entrenched."

[6] The claim that the poor in general has much more to gain from a competent legal system compared with a dysfunctional one than the elite is not contradictory to the observation that a poor individual may benefit less than an elite even in a highly developed legal system. This can be seen using a numerical example. Suppose the poor gain 5 while the elite gain 7 in a competent legal system, while in a bad legal system the poor gain 2 while the elite gain 6. In this example, the poor gain absolutely less in both legal systems. But it is still true that the poor gain more in the competent legal system than in the bad one, and that the poor's gain (which is $5-2=3$) is also higher than that of the elite (which is $7-6=1$).

to use informal relational contracts (Chong and Gradstein 2007b).

Furthermore, the links between the elite rule, low legal quality, and high inequality can be mutually reinforcing when the political power of a group is affected by its collective economic strength. In this case, we have a self-perpetuating circle of economic, political, and legal conditions: A highly unequal endowment distribution gives rise to the elite rule, which slows down the legal development, and the low legal quality in turn helps preserve the high income inequality. Similar arguments suggest the existence of the opposite circle containing low income inequality, democracy, and high legal quality. Actually the circle can start from any of the three elements; for example, if two otherwise identical societies are given different legal qualities due to some exogenous reason, this may set them onto divergent paths, where the one with a higher legal quality will have lower income inequality and may thus choose a democratic political regime, while the other ends up with low legal quality, high income inequality, and the elite rule. And so the initial differences in any of these three conditions may lead to subsequent divergence in all of them across societies.[7]

This paper contributes to the literature of contract enforcement institutions by formally endogenizing the legal quality in a political economy model of legal development.[8] Many studies examine comparative advantages of different enforcement institutions and how they may be affected by exogenous changes, such as improvement in legal quality (Cooter and Landa 1984, Sobel 2006, Besley and Ghatak 2009), expanding trade (Greif 2006, Dixit 2003), exposure to markets (Kranton 1996a), and financial crisis (Li 2003).[9] Though the endogenous determination of enforcement institutions is also featured in a few studies, the focus and approach are different in the current paper. For example, Greif (2005) stresses the importance of coercive constraint institutions, while the current paper adopts a different angel of examining the effects of heterogenous returns among agents from using relational and legal contracts. Besley and Ghatak (2009) introduce a costless legal reform by the social planner to enhance the use of formal collateral, but fall short of a systematic analysis of legal development. In Dhillon and Rigolini (forthcoming), enforcement institutions are endogenous in the sense that consumers may participate in an informal network to get better information while firms may bribe the courts to reduce punishment for bad products; the current paper, in contrast, endogenizes the overall quality of legal enforcement as a public good investment and studies its variation across societies with different political regimes

[7] The importance of income inequality in political development is demonstrated by Engerman and Sokoloff (2002, 2005) among others.

[8] See MacLeod (2007) and Dixit (2009) for systematic surveys and synthesis of related work.

[9] To my best knowledge, I am not aware of similar attempts of using a political economy model to study legal development in the legal scholarship; for a possible explanation for why this is the case see for example Harris (2003).

and social communities.

From a broader perspective, this paper is also connected to studies demonstrating the harmful effects of high income inequality on institutions, where the privileged elite shape institutions to suit their narrow interests.[10] This paper differs from these studies in several respects. First, a key difference is in the exact source of inefficiency. A common result in the related literature is that the rich elite can take advantage of lawlessness by engaging in rent-seeking activities or corruption, which gives rise to economic stagnation and inefficient institutional change. In this paper, the inefficiency is not caused by rent-seeking activities, but by genuine differences in benefits from improving legal quality, where the traditional elite have comparative advantages in using relational contracts.[11] Second, and more importantly, this leads to a new insight that has not been noticed in the literature: Inefficient legal development not only occurs under the elite rule, but also happens under the majority rule; that is, while elite-ruled societies tend to *under-invest* in legal contract enforcement, democratic societies tend to *overinvest* in it.[12] Finally, none of these studies endogenizes the development of legal contract enforcement or examines its relationship with relational contracts and social communities.

This paper proceeds as follows. The formal political economy model is set up in the next section. Relational and legal contracts are analyzed in Section 3, while the legal quality is endogenized in Section 4. Some extensions and relevant examples are provided in Section 5. The final section concludes the paper. All technical proofs are in the Appendix.

2 The Model

There is a continuum of agents with a unit mass who live infinitely. A small proportion r of agents are the elite, each endowed with wealth w_e and education h_e, while the others belong to the poor masses, each endowed with a smaller wealth w_m and lower education h_m, where $w_e > w_m > 0$ and $h_e > h_m > 0$.

[10] See, for example, Sonin (2003), Glaeser, Scheinkman, and Shleifer (2003), Hoff and Stiglitz (2004), Chong and Gradstein (2007a), Acemoglu and Robinson (2006b, 2008).

[11] The point that the rich can do better in relational contracts is not new; Banerjee and Newman (1993), for example, provide a mechanism linking relational contracts and inequality; they do not, however, consider the political economy of contract enforcement as this paper does.

[12] A specific case of overusing legal contract enforcement is shown in Kranton and Swamy (1999), and in general it seems to be consistent with the recent evidence of declining social capital in the US (see, among others, Putnam 1995 and Durlauf and Fafchamps 2005). Though potential drawbacks of democracy in comparison to oligarchy are also discussed in Acemoglu (2008), the bad result there is higher taxes, which are a well-known consequence under majority rule, not the inefficiency of institutions as highlighted in this paper.

The model contains two phases. In the first phase, the legal quality q of contract enforcement is determined through a political process; it is taken as given in the second phase, when agents match with each other into pair-wise partnerships to carry out projects.

Legal Investment. The legal quality q of contract enforcement is chosen to maximize the total welfare of the politically dominant interest group, while the cost is equally shared among all agents. The cost function of legal investment is $C(q)$, where $C'(q) > 0$ and $C''(q) > 0$. Without any investment, the initial legal quality is zero. The cost of improving legal quality is presumably composed of writing the legal rules and training judges, lawyers, and the police force, etc. Though these details are not explicitly modeled in the paper, the overall effectiveness of them is indicated by q.

Repeated Matching Game. The second phase of the model can be described as a repeated matching game.[13] Agents match with each other to play a two-player repeated game, which can be interpreted as engaging in a business partnership. In each period, a match continues if both players agree to participate, and it breaks up if either one wishes to do so.

Stage Game. In a match, agents play the prisoner's dilemma (PD) described in Table 1. When both agents cooperate in the project, each gets a return of $a > 0$, which represents the gains from trade for both players. If one agent cooperates but the other defects, the cooperator gets a negative payoff $-d < 0$ while the cheater gets a higher return $a + b$, where $b > 0$ represents the temptation of cheating; cheating is bad for the total surplus, which is captured by the assumption $2a > a + b - d > 0$. If both agents defect, then each gets a return of zero, which is the normalized return of going autarky.

Table 1: The Stage Game: A Prisoner's Dilemma

		Agent 2	
		Cooperate	Defect
Agent 1	Cooperate	$(a,\ a)$	$(-d,\ a+b)$
	Defect	$(a+b,\ -d)$	$(0,\ 0)$

Return of Learning in Established Matches. After a partnership is formed for some time, the gains from trade may be improved through learning-by-doing, and the improvement scale increases in the education levels of the two partners. In particular, the return from the partnership becomes $a(1 + g(h_1, h_2))$ from the second period onwards after the partnership is formed, where $g_1,\ g_2 > 0$ and $g_{12} \geq 0$. So agents prefer to have a more educated partner, which will lead to perfect sorting such that elite agents match among

[13] Some parts of this repeated game are similar to Sobel (2006).

themselves and so do non-elite agents.[14] It is thus useful to denote $g_e \equiv g(h_e, h_e)$ and $g_m \equiv g(h_m, h_m)$; it is clear that $g_e > g_m$ holds based on the properties of $g(h_1, h_2)$ and $h_e > h_m$. Since the temptation of cheating remains b as before, the payoff for the cheater in the stage game becomes $a(1 + g_i) + b$ in an established match where $i \in \{e, m\}$.

Increase in Outside Opportunities. In each period, the gains from trade in a new match stay the same at a with probability ρ, where $\rho \in (0, 1)$. With probability $1 - \rho$, there is an exogenous shock that increases the gains from trade for newly-formed partnerships from a to $a(1 + \varepsilon)$ for the first N periods, where $\varepsilon > 0$, after which the gain from trade goes back to normal, that is, it becomes $a(1 + g_i)$. This is meant to capture the influence of new trading opportunities that are exogenously determined and beyond the control of agents, where ε indicates the increase of outside opportunities that cannot be reaped if one stays in the old partnership. Without much loss of generality, we assume $N = 1$ to simplify the analysis.[15] As the shocks do not change the temptation of cheating b, the payoff for cheating in the stage game becomes $a(1 + \varepsilon) + b$ when the gain from trade is $a(1 + \varepsilon)$.

Information. There is no information transmission across matches. Agents know the quality of their current match, the past actions of their own and their partners within the matches. They cannot access information about the past actions of any other agents. Since the population of agents is large, we neglect the possibility that any two agents have met before. Unmatched agents can find a new partner without cost.[16]

Strategy and Equilibrium. In each period of a match, an agent's strategy specifies an action in the above PD game, i.e. to cooperate or to defect, followed by a decision of whether to continue or to break up the partnership. Agents choose strategies to maximize the discounted sum of their stage-game payoffs, net of contracting costs if any, where the common discount factor is $\delta \in (0, 1)$. The paper focuses on subgame perfect equilibrium (SPE) outcomes, where an agent discontinues a partnership only if doing so gives him a better payoff than otherwise.

Relational Contract. In particular, we study two types of enforcement institutions (which are SPE) that enable agents to cooperate. One is a long-term relational contract that demands both agents to always cooperate and to continue the partnership regardless of exogenous shocks, and if any agent defects, it dissolves automatically at no cost to both agents. To deter cheating, each agent in the partnership has to incur a sunk cost R up-

[14] This is meant to capture the privileges enjoyed by the elite; alternative ways of modeling, for example, by assuming that the elite have better connections or own better projects, would yield similar results.

[15] Assuming $N > 1$ or $N = +\infty$ will not change the main qualitative results.

[16] When there is an endogenous matching cost, the qualitative results remain unchanged (see Sobel 2006). The information transmission assumption will be relaxed in Section 5.2 when social communities are discussed.

front, which cannot be recovered once the relationship stops.[17] The expenditure R can be interpreted as the cost of building the relationship, such as exchanging gifts or bonds, or spending time and resources participating social activities, which are quite common procedures of initiating business relationships in many societies. This means that, if an agent breaks the current partnership and forms a new one with a stranger, he must pay R again for the new partnership, otherwise he has to face the risk of being cheated.

Legal Contract. The other type of enforcement is to sign a short-term formal legal contract that mandates cooperation during the match, punishes cheating but allows agents to break up when a new match becomes more productive.[18] If a pair of players each takes a cost c to write a contract, the court identifies cheating when it occurs with probability $Q(c, q)$, where q denotes the legal quality as already mentioned. In real life, for example, the related cost of writing and using legal contracts includes the effort to specify and follow appropriate procedures in order to produce adequate evidence for the legal court to verify whether cheating has happened and to carry out possible punishment; a higher cost may imply a greater amount of documents or information to be presented or exchanged before payment is to be made or goods are to be delivered, which should increase the probability of cheating being verified and punished by the legal court. Similarly, such a probability is also higher when the legal system is more effective. So we assume $Q_c, Q_q > 0$, and $Q_{cq} \geq 0$. When cheating is verified by the court, the defector has to give the court his payoff $a(1+\tau)+b$, while the court gives his partner d to compensate her loss $-d$, where $\tau \in \{0, g, \varepsilon\}$ indicates the three possible levels of productivity in a partnership. The residual amount $a(1+\tau)+b-d \geq 0$ is consumed by the court, and so each agent gets zero payoff in the period when cheating happens and is punished by the court.[19]

Timing. The timing of this repeated game can be summarized as follows. Players form pairs with each other through random matching within their respective groups, and subject to mutual agreement, partners choose to adopt either a relational contract or a legal contract, and then behave accordingly. A match breaks up automatically once unexpected cheating occurs or at least one player decides to dissolve it. Players exiting from an old relationship form new matches, and then the same action sequence described above follows.

[17] The observation that imposing costs at the beginning of a relationship can lead to efficiency gains is also made by Carmichael and MacLeod (1997) and Kranton (1996b).

[18] In addition to these two types of contracts that are the focus of this paper, it is possible to have other contract formats such as short-term relational contracts and long-term legal contracts, which are, however, less commonly used. The working paper version of this paper includes them and the main results are similar.

[19] Other reasonable assumptions about the court's decision, as long as the cheating behavior is punished, will not alter the main results.

3 Relational and Legal Contracts

The model is analyzed using backward induction. This section focuses on the second phase of the model, namely the repeated matching game, while taking the legal quality q as given; it examines how agents adopt different contracts that are indeed subgame perfect equilibria under certain conditions.

3.1 Long-Term Relational Contracts

Suppose a pair of type i agents, where $i \in \{e, m\}$, choose a long-term relational contract that does not dissolve due to exogenous shocks. Since the relational contract demands cooperation in all periods, where the return is a in the first period and $a(1+g_i)$ afterwards, the value of such a new match is denoted by V_{ci} where

$$V_{ci} = a + \frac{\delta a(1+g_i)}{1-\delta}.$$

Similarly, when the initial gain from trade is $a(1+\varepsilon)$ followed by periods with a return of $a(1+g_i)$, the value of a new match is denoted by V_{ni}, where $V_{ni} = V_{ci} + a\varepsilon$ holds. To prevent cheating, both agents have to incur a relationship-building cost R_i, which turns out to be the same regardless of the level of the initial returns.

Let's check possible one-shot deviations when the initial gain from trade is a. Deviations may happen either in a new match or when the match becomes established. In a new match, a player gets $V_{ci} - R_{ci}$ if he cooperates; if he defects, his payoff is $a+b-R_{ci}+\delta EV_i$, where $a+b$ is the current payoff from defecting, and the continuation value $EV_i \equiv \rho V_{ci} + (1-\rho)V_{ni} - R_i$ is obtained by forming a new match in the next period: with probability ρ the gain from trade remains the same so the net value of a new match is again $V_{ci} - R_i$, while with probability $1-\rho$ the gain from trade increases to $a(1+\varepsilon)$ so the value of a new match is $V_{ni} - R_i$. Cheating is not profitable when cooperation yields a higher return than defecting, which is the case when

$$R_i \geq b/\delta - ag_i + (1-\rho)a\varepsilon \tag{1}$$

holds. It can be shown that this same condition also prevents cheating in an established partnership and when the initial gain from trade is $a(1+\varepsilon)$.[20]

To maximize the net value of the match, the relationship-building cost should be set at

$$R_i^* \equiv b/\delta - ag_i + (1-\rho)a\varepsilon, \tag{2}$$

which is obtained from (1) at equality, and no agents have incentives to defect. R_i^* is thus the minimum cost of using the long-term relational contract to achieve cooperation. It

[20] The formal proof is in the Appendix.

is larger when the temptation of cheating b is higher, when agents are less patient (i.e. when δ is lower), when the old partnership is less productive (g_i lower), and when outside opportunities are better ($a\varepsilon$ higher) and arrive more frequently ($(1-\rho)$ larger).

Another condition for the long-term relational contract to be a subgame perfect equilibrium is that it must be desirable to continue the old match even when a new match becomes more productive. The net value of starting a new match is $V_{ni} - R_i$ when the gain from trade is $a(1+\varepsilon)$, while the value of continuing with the old match is $a(1+g_i)/(1-\delta)$. So it is optimal for agents to keep the old match when $a(1+g_i)/(1-\delta) \geq V_{ni} - R_i$, which boils down to

$$a\varepsilon \leq R_i + ag_i. \tag{3}$$

This condition says that, when the productivity increase in new trade opportunities (indicated by $a\varepsilon$) is not large enough to compensate for the loss of productivity gain (ag_i) from learning-by-doing in the old match and the cost (R_i) of building a new relationship, it is optimal to stay in the current match. When R_i^* in (2) is plugged in, this condition becomes

$$\varepsilon \leq b/\delta\rho a,$$

where $b/\delta\rho a$ is the threshold level of productivity shock, below which elite agents have no incentives to dissolve the match. Thus we have proved the following results.

Lemma 1 *When outside opportunities are low ($\varepsilon \leq b/\delta\rho a$), the long-term relational contract is a subgame perfect equilibrium for both elite and non-elite agents, while the relationship-building cost is lower for the elite (that is, $R_e^* < R_m^*$).*

This lemma suggests that it is optimal for agents to engage in long-term relational contracts as long as the productivity gains in new trade opportunities are not too large compared with the forgone return to learning in an established match and the new relationship-building cost. Having higher returns in established partnerships ($g_e > g_m$), the elite are thus more willing to use long-term relational contracts than the others.

3.2 Short-Term Legal Contracts

Suppose a pair of agents of type $i \in \{e, m\}$ choose to adopt a short-term legal contract that punishes cheating but allows agents to break up at the beginning of a period when a new match is more productive. Let $\widehat{V}_{ci}$ and c_i^* denote respectively the value and the optimal cost of using a legal contract to deter cheating when the initial return is a. Using similar arguments as in the above analysis of relational contract to check for one-shot deviations, we get the following results.

Lemma 2 *The optimal legal cost c_i^* is higher when the legal quality q is lower and when the established match is less productive (g_i lower), while it is independent of outside opportunities ε.*

Note that, while the relationship-building cost R_i^* increases with new trade opportunities ε, the cost c_i^* of using legal contracts is independent of it, because the legal enforcement allows the old match to dissolve once new matches become more productive. In other words, agents adopting short-term legal contracts do not need to face the pressure of maintaining the relatively less productive old match.

For the short-term legal contract to be a subgame perfect equilibrium, it must be desirable to break up the old match when a new match becomes more productive, which is indeed true when

$$a\varepsilon \geq c_{ni}^* + ag_i \tag{4}$$

holds, where c_{ni}^* denotes the legal cost when the initial return is $a(1+\varepsilon)$. This condition is parallel to (3) in the case of relational contracts; it says that when the new trade opportunities (indicated by $a\varepsilon$) are large enough to compensate for the cost c_{ne}^* of writing a new legal contract and the loss of return to learning (ag_i) in the old match, it is optimal to break up the current match and form new ones. These are formally proved in the following lemma.

Lemma 3 *When outside opportunities are high ($\varepsilon \geq \varepsilon_i$), the short-term legal contract is a subgame perfect equilibrium for an agent of type i, where the threshold level $\varepsilon_i \equiv g_i + c_{ni}^*/a$ is derived from* (4)*. Legal contracts enable agents to take advantage of new opportunities more often than relational contracts, but they are less likely to be used by the elite* (*because* $\varepsilon_m < \varepsilon_e < b/\delta\rho a$)*.*

This lemma suggests that it is optimal for agents to engage in short-term legal contracts once the outside opportunities are large enough compared with the legal cost and the forgone benefit of learning in an established match. Given that the threshold level of new opportunity of the elites is higher ($\varepsilon_e > \varepsilon_m$), the elite agents are less willing to adopt short-term legal contracts than others, where the underlying reason is again due to their higher returns in established partnerships ($g_e > g_m$). Comparing the two types of contracts, the condition $\varepsilon_m < \varepsilon_e < b/\delta\rho a$ suggests that legal contracts enable agents to break up old matches more often than relational contracts (with threshold $b/\delta\rho a$ derived above) in order to take advantage of new opportunities.

3.3 Comparison between Relational and Legal Contracts

Recall that, for an agent of type $i \in \{e, m\}$, the net value of using a long-term relational contract is $V_{ci} - R_i$ and that of using a short-term legal contract is $\widehat{V}_{ci} - c_i^*$. So the benefit of switching from relational to legal contracts is the difference between these two net values: $\pi(q; \varepsilon, g_i) \equiv (\widehat{V}_{ci} - c_i^*) - (V_{ci} - R_i)$, which after some algebra boils down to

$$\pi(q; \varepsilon, g_i) = (1-\rho)(a\varepsilon - b/\delta\rho) + \frac{\delta(1-\rho)}{1-\delta}(a\varepsilon - ag_i - c_{ni}^*) + \frac{a+b}{\delta\rho}Q(c_e^*, q).$$

Its properties and implications are summarized below.

Lemma 4 *The relative benefit of using legal contracts is larger and thus relational contracts are used less when outside opportunities ε are larger, when the legal quality q is higher, and when the return to learning g_i is lower. For any given ε and q, since the elite enjoy higher gains from established matches than others ($g_e > g_m$), they benefit less from switching to legal contracts.*

The intuition is as follows. Better outside opportunities make it more worthwhile to break up the old match since a new partnership promises higher gains from trade. The benefit is also larger when the legal quality q is higher because the legal cost of forming new matches decreases in q. Since the elite have comparative advantages in using long-term relational contracts due to $g_e > g_m$, they are less willing to adopt legal contracts than the non-elite. This is the main insight that is underlying the different incentives for legal investment.

4 Investment in Legal Quality

This section analyzes the first phase of the model where the legal quality q is endogenized in a political economy context. Specifically, the politically dominant interest group chooses the legal quality to maximize its joint welfare while taking into consideration the effect of legal quality on its expected returns in the subsequent repeated matching game. Without any investment, the initial legal quality is zero and thus all agents use relational contracts. So the legal investment, if ever made, has to be large enough to make agents willing to shift from relational to legal contracts.

4.1 Socially Optimal Legal Investment

The socially optimal level of legal investment is determined to maximize the aggregate welfare of all agents. The total benefit of increasing the legal quality from 0 to q is

$r\pi(q;\varepsilon,g_e)+(1-r)\pi(q;\varepsilon,g_m)$ if all agents shift from long-term relational contracts to short-term legal contracts, which is the focus of the following analysis.[21] The total investment cost $C(q)$ is equally shared among all agents. So the optimal legal quality q^s is defined by

$$q^s \equiv \arg\max_q\{(1-r)\pi(q;\varepsilon,g_m)+r\pi(q;\varepsilon,g_e)-C(q),0\}.$$

Since the benefits of using legal contracts are strictly increasing in the outside opportunities ε, there must exist a unique level ε^s such that

$$(1-r)\pi(q^s;\varepsilon^s,g_m)+r\pi(q^s;\varepsilon^s,g_e)-C(q^s)=0. \tag{5}$$

So ε^s is the socially optimal threshold level of ε, above which legal investment starts.

Proposition 1 *When outside opportunities are low ($\varepsilon \le \varepsilon^s$), it is socially optimal to have no legal investment. Conversely, when outside productivity is high, then the optimal legal quality q^s is positive. ε^s is increasing while q^s is decreasing with return to learning g_i.*

This proposition suggests that the threshold level of outside opportunities, ε^s, for a society to start legal investment is higher and the optimal legal quality q^s is lower when the productivity of established matches represented by g_i is higher. If ε is drawn from some exogenous distribution $F(\cdot)$, the probability of investing in legal quality is $1-F(\varepsilon^s)$, which is lower if g_i is higher. So in the socially optimal case, a society is less likely to invest in legal quality and invests less if ever investing when the long-term relational contracts are more effective in achieving cooperation.

4.2 Legal Investment with Exogenous Political Systems

As the benefits from legal investment differ across agents, which has become clear in the preceding analysis, political conflicts may play an important role in the determination of legal quality. Suppose the political system is determined exogenously, where a society is either under the elite rule or under the majority rule, and the legal quality is chosen to maximize the welfare of the politically dominant group.

Legal Investment under Elite Rule. Under the elite rule, the elite group is dominant and hence will choose a legal investment to maximize its own welfare. The total benefit for the elite group from increasing the legal quality from 0 to q is $r\pi(q;\varepsilon,g_e)$ while the cost it

[21] It is also possible that the legal quality is only high enough for the non-elite agents to switch to legal contracts while the elite still use relational contracts, in which case the total benefit of legal investment is $(1-r)\pi(q;\varepsilon,g_m)$. As the main results are similar, this case is omitted to simplify the exposition.

has to pay is $rC(q)$, since the total cost $C(q)$ is shared among all agents where the elite group is of r proportion.[22] So the optimal legal quality q_e^* under the elite rule is

$$q_e^* \equiv \arg\max_q \{r\pi(q;\varepsilon,g_e) - rC(q), 0\}.$$

Since $\pi(q;\varepsilon,g_e)$ is strictly increasing in ε, there must exist a unique level ε^e such that

$$\pi(q_e^*;\varepsilon^e,g_e) - C(q_e^*) = 0. \tag{6}$$

So the elite ruling society starts legal investment only when $\varepsilon > \varepsilon^e$, in which case the legal quality q_e^* is uniquely determined by

$$\pi_1(q_e^*;\varepsilon,g_e) - C'(q_e^*) = 0. \tag{7}$$

Proposition 2 *Under the elite rule, the threshold outside opportunity ε^e to start legal investment is higher and the legal quality q_e^* is lower than in the socially optimal case, and the more so when return to learning g_e is higher.*

This proposition suggests that the elite are less likely to invest in legal quality and invest less if ever investing when they are relatively more productive in established partnerships. And compared with the socially optimal case, the legal quality is lower and the threshold productivity shock needed to start legal investment is higher under the elite rule. So the legal development is slower under the elite rule than in the socially optimal case, and thus agents are more likely to use relational contracts and less likely to use legal contracts.

Legal Investment under Majority Rule. Under the majority rule, the mass are politically dominant and thus choose a legal quality to maximize their overall welfare $(1-r)\pi(q;\varepsilon,g_m) - (1-r)C(q)$. The same results will go through if the median voter of the population decides the optimal legal investment to maximize his own welfare, since all non-elite agents are identical and they constitute the majority. So the legal quality under democracy with majority voting will be the same. The analysis is similar to that under the elite rule. The optimal legal quality q_m^* under the majority rule is uniquely determined by

$$\pi_1(q_m^*;\varepsilon,g_m) - C'(q_m^*) = 0 \tag{8}$$

[22] The legal investment cost $C(q)$ can be paid by tax revenues generated from the population. Here it is assumed that each agent pays the same amount of tax. Alternative cost-sharing methods should not change the main results. For example, in the extreme case where the elite agents are required to pay nothing for legal investment, they will not start it unless $\pi(q;\varepsilon,g_e) \geq 0$, but the social optimal legal development may start even when $\pi(q;\varepsilon,g_e) < 0$ is true. And more importantly, there is always an opportunity cost of improving legal quality, since the tax revenues can be used in other ways to increase the elite's utility. In this sense, legal investment is always costly from the elite's perspective.

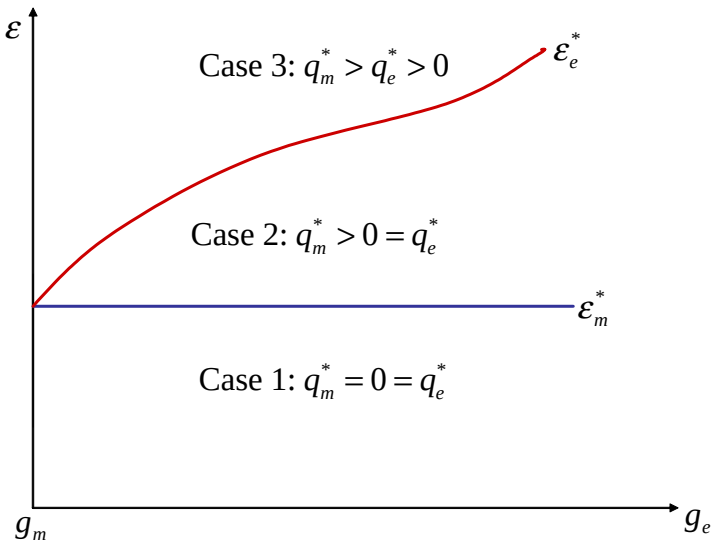

Figure 1: Legal Investment under Different Political Regimes

when $\varepsilon > \varepsilon^m$, and is zero otherwise, where the threshold outside opportunity ε^m satisfies

$$\pi(q_m^*; \varepsilon^m, g_e) - C(q_m^*) = 0. \tag{9}$$

Proposition 3 *Under the majority rule, the threshold outside opportunity ε^m to start legal investment is lower and the legal quality q_m^* is higher than in the socially optimal case, and the more so when return to learning g_m is lower.*

This proposition suggests that, compared with the socially optimal case, the legal quality under majority rule is larger and the threshold productivity shock needed to start legal investment is lower. In other words, a society under the majority rule may *overinvest* in legal quality than the socially optimal level. This is not surprising, since the poor, who are more disadvantaged under the long-term relational contracts than the elite, can enjoy more benefits from utilizing new trade opportunities with legal contracts and hence have more incentives to improve the legal system.

Comparison between Political Regimes. Depending on the level of ε, the legal development may differ across political regimes. There are three possible scenarios, which are illustrated in Figure 1 and analyzed below.

Case 1: Small Outside Opportunities ($\varepsilon \leq \varepsilon^m$). There is no legal investment in any political system so that $q_m^* = 0 = q_e^*$ and only long-term relational contracts are used. The income inequality, as represented by the income gap G_1 between the two types of agents, is

the largest, where

$$G_1 \equiv V_{ce} - R_e - (V_{cm} - R_m) = a(g_e - g_m)/(1-\delta)$$

is derived from results in the last section.

Case 2: Medium Outside Opportunities ($\varepsilon^m \leq \varepsilon \leq \varepsilon^e$). There is still no legal investment under the elite rule, but the society under majority rule will start to invest in the legal system so that $q_m^* > 0 = q_e^*$. As a result, agents under majority rule adopt legal contracts and thus can take advantage of the new trade opportunities that are more productive, which decreases the income inequality to[23]

$$\begin{aligned} G_2(q_m^*;\varepsilon) &\equiv \widehat{V}_{ce} - c_e^* - (\widehat{V}_{cm} - c_m^*) \\ &= G_1 - [\pi(q_m^*;\varepsilon, g_m) - \pi(q_m^*;\varepsilon, g_e)], \end{aligned}$$

which is smaller than that in Case 1 and in society under the elite rule.

Case 3: Large Outside Opportunities ($\varepsilon > \varepsilon^e$). There is positive legal investment in both political systems, though the legal quality is higher under the majority rule than under the elite rule: $q_m^* > q_e^* > 0$. As legal contracts allow agents to exploit new trade opportunities, the traditional advantage of the elite in terms of $g_e > g_m$ matters less in both societies than before, and the income gap is always lower under majority rule because $G_3(q_m^*;\varepsilon) < G_3(q_e^*;\varepsilon)$ holds due to $q_m^* > q_e^*$.

An important implication from these scenarios is that as the productivity of new trade opportunities ε become higher relative to that of established partnerships, it is more likely for legal development to start and for the legal quality to be higher. Another implication is that legal development often leads to lower income inequality, but legal development is less likely to occur under the elite rule than under democracy. So the elite rule, lower legal quality, and higher income inequality form an organic cluster of political and legal institutions with corresponding economic outcomes, while their opposites, namely democracy, higher legal quality, and lower income inequality form another cluster.

It is also possible that, under the same political regime, different levels of legal development are caused purely by an arbitrarily small difference in outside opportunities ε. Imagine two identical societies under the elite rule. One society experiences a slightly larger shock $\varepsilon = \varepsilon^e + u$ and thus invests in legal quality; the other society experiences a slightly smaller shock $\varepsilon = \varepsilon^e - u$ and thus does not invest. Even if everything else is identical across the two societies, their economic outlooks are very different: the lucky society has a higher legal quality, its agents adopt legal contracts, its income distribution is more equal than the unlucky one. These results are summarized in the following proposition.

[23] If the elite agents still use relational contracts, the income gap under majority rule is $G_1 - \pi(q_m^*;\varepsilon, g_m)$.

Proposition 4 *When outside opportunities ε are larger, the legal development is more likely to start, and it leads to lower income inequality; the process is slower and income inequality is higher under the elite rule than under democracy.*

4.3 Legal Investment with Endogenous Political Systems

When political dominance has to be backed up by economic strength, it can be shown that the elite are even less willing to invest in legal quality because their relative economic power is likely to be weakened as a result of legal development.

Suppose the political system is determined by the balance of economic power among different groups (Acemoglu and Robinson 2006a). In particular, when the total wealth of the elite agents is higher than that of the poor mass, the elite group is political dominant and the society is under the elite rule; if the opposite is true, it is majority rule. The political system is determined both before and after the legal investment decision, since the income distribution may change with legal quality.

When the legal quality is zero, all agents use long-term relational contracts and get corresponding returns $V_{ce} - R_e$ or $V_{cm} - R_m$ in addition to their endowed wealth w_e or w_m; so the elite rule happens if

$$r(w_e + V_{ce} - R_e) \geq (1 - r)(w_m + V_{cm} - R_m). \tag{10}$$

The elite rule continues automatically if there is no legal reform, since the income distribution remains the same. If the legal quality is increased to $q > 0$ and all agents switch from relational to legal contracts, the elite rule continues if

$$r(w_e + \widehat{V}_{ce} - c_e^*) \geq (1 - r)(w_m + \widehat{V}_{cm} - c_m^*). \tag{11}$$

It is easy to show that whenever (11) holds, (10) will also hold, but the reverse is not true. This means that legal investment weakens the economic power of the elite. To see this more clearly, let $Y(q)$ denote the relative economic power of the elite compared with the mass, where

$$Y(q) \equiv r(w_e + \widehat{V}_{ce} - c_e^*) - (1 - r)(w_m + \widehat{V}_{cm} - c_m^*).$$

Then (11) is equivalent to $Y(q) \geq 0$, that is, the elite rule occurs when $Y(q) \geq 0$ while democracy arises otherwise. And thus $Y(q)$ indicates how secure the elite rule is.

Proposition 5 *Legal development weakens the elite rule but solidifies democracy, since $Y'(q) < 0$. Specifically, the legal quality can never reach above $\overline{q}$ under the elite rule, where $Y(\overline{q}) = 0$.*

This proposition suggests that the elite rule survives only when $q \leq \overline{q}$, and it is more secure when q is lower; on contrary, democracy arises when $q > \overline{q}$ and it is solidified when q is higher. This means that, when the political system is endogenously determined, $\overline{q}$ is the highest possible legal quality that can sustain the elite rule. So even if the elite choose to start the legal development process, it is slower than the socially optimal case and may not increase above a certain threshold $\overline{q}$.

The endogenization of political regimes further strengthens the relationship between the elite rule, lower legal quality, and higher income inequality by making them mutually reinforcing; it is not only the case that the elite rule leads to slower legal development and hence higher income inequality, but also true is the opposite direction where higher income inequality leads to the elite rule, which completes the self-perpetuating circle. The other cluster of lower income inequality, democracy, and higher legal quality also forms a self-perpetuating circle with mutually reinforcing elements. One can imagine that, if ε increases over time, it is possible for the institutional circle of elite rule to persist for a long period and then eventually transits to the democracy circle of institutions, though the detail is best left for future research.

5 Extensions and Discussions

A key insight of the paper is on the importance of trading with strangers: only when the outside opportunities ε become large enough compared with returns in established partnerships, would a society feel desirable to invest in legal contract enforcement in order to facilitate the frequent breaking-up of old matches and formation of new ones. Another insight is on the conflict of interests in legal development; specifically, the traditional rich elite, who enjoy comparative advantages in relational contracts due to better endowment or privileges, often benefit less from a competent legal system than the poor mass and hence have less incentives in improving legal quality. These two insights are much more robust than the highly simplified model seems to suggest. To illustrate this, this section introduces some extensions of the basic model and discusses possible interpretations of the results.

5.1 Contract Enforcement with Social Communities

In the basic model, agents do not have stable connections among each other except for the bilateral contracts between them, which is not true in real life where individuals belong to different communities. This assumption can be relaxed and our main results still go through and are even strengthened. Since social communities tend to be stronger or function better in a collective-oriented culture than in individualistic ones (Greif 1994), the following

arguments and results about the effects of social communities also apply to the collective culture.

To illustrate the main idea, suppose there are N_e social communities within the elite group and N_m communities among the masses, where $N_i > 1$ is a finite integer for $i \in \{e, m\}$. A social community could be a family, a kinship network, a clan, an ethnic group, a village or town, or a social club. Members in the same community have formed intricate social connections or developed valuable public goods before the game in the basic model starts. As a result, if a member cheats in the prisoner's dilemma as described in Table 1, his partner or the community can impose upon the defector some punishment $x_i > 0$ with negligible cost, where $i \in \{e, m\}$. The punishment can take many forms. For example, in a well-organized social club where members enjoy certain privileges, anybody ever found cheating can be formally expelled from the club or informally shunned by other members (Bernstein 1992); neighbors in a small village or members of a close-knit group typically interact with each other in many different ways or even across generations, which provide ample opportunities to punish someone who has cheated (Ellickson 1991).

This means that dealing with a partner from the same community is less risky or less costly than dealing with somebody from outside. It is essentially equivalent to reducing the temptation of cheating in the PD game from b to $b - x_i$ for agents in the same communities. Another interpretation is that community members have formed multilateral relationships with each other that is worth x_i and can be carried on across partnerships. This makes it less costly for agents to break up bilateral relational contracts in order to capture higher gains from trade arising in new partnerships. So in some sense, a part of the benefit of long-run relationship switches from the bilateral partnership to the community level, where agents can change partners when new matches become more productive but still remain in the multilateral environment of the same community. In other words, the long-term relationship building is now within the border of community instead of the much narrower bilateral relations between two individuals. As a consequence, trade efficiency will be enhanced.

There is, however, a potential drawback for contract enforcement in communities because it makes agents reluctant to trade with outsiders, which becomes more relevant when new partnerships are more productive between agents from different communities than those within the same communities. A competent legal system is thus needed to facilitate trading among agents across communities.

Suppose in every period the gain from trade is a with probability ρ in all new partnerships, while with probability $1 - \rho$ the gain from trade is $a(1 + \varepsilon)$ as before for new partnerships within the same community but increases to $a(1 + \varepsilon + \theta)$ for those across dif-

ferent communities, where $\theta > 0$ indicates the extra gain in productivity from matching with strangers. Similar arguments as in the basic model can be used to show that only when θ is large enough will legal investment starts. Furthermore, if $x_e \geq x_m$ so that the elite agents are better at enforcing multilateral relationships in communities, they will be even less willing to invest in legal quality than in the basic model. The relevant results are summarized in the following proposition.

Proposition 6 *The existence of social communities improves trading efficiency over bilateral relational contracts by reducing relationship-building costs and by encouraging new partnership formation within communities. It, however, reduces the incentives of society to invest in legal quality, the more so when communities are more effective in enforcing relational contracts (x_i larger), regardless of political regimes.*

This proposition suggests that, when social communities are more effective in contract enforcement (when x_e or x_m is higher), a larger productivity gap between matches within the community and those with outsiders is needed for society to start legal investment, and the gap is also larger than that in the basic model. So legal development is likely to be slower when social communities are functioning better in facilitating relational contracts regardless of political regimes, which also applies to the socially optimal result. That is, the existence of stronger communities or collective cultures itself does not necessarily lead to inefficiency, though it does cause slower legal development.

These results seem to be useful in understanding differences between East Asia and the West, where social communities are arguably more prevalent in East Asian countries than the West; and probably as a result of this difference, legal contract enforcement is used less intensive in East Asia than the West. This, however, does not necessarily mean that legal development in East Asia is less efficient, which seems to be supported by recent strong economic growth of these East Asian countries. In other words, as long as the income inequality is not high and the political power is not centralized in the elite, a heavier reliance on relational contracts due to competent social communities or cultural preferences does not have to block economic development.

5.2 Open versus Closed Society

In the model, the importance of outside opportunities ε is taken as exogenously given. This, however, can be readily endogenized to generate new insights. For example, one can imagine that in a closed society that has little contact with the outside world, the outside opportunities ε tend to be rare and of small scale. According to the arguments in the model, legal investment is less likely to start (due to $\varepsilon < \varepsilon^i$), and so the elite rule is easier

to maintain. The opposite is true in an open society, where the legal development is likely to start early and eventually weaken the elite rule.

Foreseeing such consequences, a society under the elite rule would be less willing to adopt an open policy than those under democracy if the degree of openness can be affected by policies, and as a result, it is less likely to experience large outside opportunities and to feel the necessity to improve its legal system. If the political rent is large, which tends to happen when land and other natural resources are abundant, the elite are more likely to adopt a closed-society policy in order to preserve the elite rule, and as a consequence, the legal development is further retarded.

5.3 Relevant Examples

The main purpose of this paper is to propose a theory to help organize our thoughts on the development of legal contract enforcement and why it differs across societies. Though it would be desirable to systematically examine the comparative history of contract law development to see whether the insights developed here are useful, such a task is clearly beyond the scope of this paper. What this section does is thus very modest; it attempts to convince the reader that the main results in this paper are relevant in accounting for some stylized historical facts.

From early medieval times, trade and commerce started to gather momentum in Europe. For several hundred years since then, merchants had to rely on social relations and networks (relational contracts) to handle contract issues with each other (Benson 1989). The legal development in contract enforcement was not put on the political agenda until much later in history. For much of the history of the common law in England, for example, contract law remained poorly developed until the law merchant (a medieval series of customs and principles used to regulate trading) was incorporated into the common law under the leadership of Mansfield in the eighteenth century.[24]

The development of commercial law in England seems to be lagging behind the commercial need; a possible reason proposed in this paper is the lack of interests by the ruling monarch and the landed elite class. This becomes evident when one notices that land

[24]It is useful to note that the law merchant, though having its own courts with judges or arbitrators, eventually relies on a merchant's concern of his own reputation and the social network to enforce cooperation. So in essence it is a function of social community (similar as a village's committee of senior people in settling disputes among villagers), and thus still belongs to the realm of relational contracts. If one agrees that legal contract enforcement is characterized by the ultimate reliance on a state's coercive power for enforcement, then it is natural to see that the law merchant should not be regarded as a form of legal enforcement. Furthermore, the fact that the role of law merchant greatly diminished in England after it was absorbed in the common law seems to indicate the advantage of legal enforcement relative to the law merchant.

law was well developed early on and dominated English law, especially in the common law courts. Such a stark contrast is not surprising because, compared with relationships concerning land, other kinds of legal relationship including contract and tort were of little consequence for the landed elite (Zywicki 2003). Only after the commercial and industrial activities became important enough in the economy, their interests were reflected by the political regime change (the Glorious Revolution in 1688 established the political dominance of parliament), which preceded the legal reform in the eighteenth century that developed the commercial law.[25]

The influence of Atlantic trade on the institutional change across Europe (Acemoglu et al. 2005) is also consistent with the main results in this paper. The opening of the sea routes to the New World, Africa, and Asia and the colonial expansion can be regarded as an exogenous increase in outside trading opportunities ε in the model. It enriched merchants and traders outside the royal circle and landed elite in England and Netherlands, and hence altered the balance of political power and prompted corresponding institutional changes that favor commercial interests. In countries with absolutist political regimes such as Spain, Portugal and to some extent France, however, similar reform did not happen partially because Atlantic trade was restricted to the royal circle and thus the commercial class did not gain much power during the process. These observations suggest that the presence of large outside opportunities, by altering the political balance of power, is often the ultimate driving force behind legal and other institutional changes; this, however, is less likely to happen in societies where the elite are more dominant.

This paper's results may also be useful in understanding differences in legal development between Latin America, East Asia, and the advanced western countries. The paper shows that relational contracts are more widespread when the legal system is of low quality, which is in turn linked with high income inequality, the elite rule, and strong social networks and cultural preference for personalistic relations. All of these elements are present in Latin America, while the opposites are often observed in the developed West, especially North America, and somewhat in between are East Asian countries under the influence of

[25] As another example, France became the first modern continental nation since the end of the fifteenth century, but there was not a unified national body of law (the French civil code of 1804) until after the French Revolution.

Confucian culture.[26]

The sharp contrast between Latin and North America may be deeply rooted in their colonial institutions, which in turn can be linked to different levels of inequality in endowment (Engerman and Sokoloff 2002). Indeed, the large plantation agriculture and slavery in mining in Latin America induce huge disparities in wealth and thus make it more prone to elite rule and slow legal development. In contrast, commodities were grown on family farms in North America where it exhibits relative equality in land endowment. In both Latin American and East Asian countries, relational contracts are more extensively used, and social communities and personalistic culture are stronger relative to North America; a crucial difference between them, however, is that the income inequality is much higher in Latin America and the elite rule is stronger, which may lead to its lower economic growth and legal quality relative to East Asia. Finally, differences in contract enforcement between East Asia and the West are probably due to cultural differences, and both styles may be justifiable in term of social welfare optimization. In summary, strong social communities or the personalistic culture (in East Asia) may slow down the legal development (compared with the West) but not necessarily reduce the overall welfare; the elite rule, however, may cause both (in Latin America), and hence seems to be more detrimental to development.

6 Conclusions

Contract enforcement institutions are important for economic performance because most economic exchanges are subject to risk of default and the potential gains from trade may not be realized. This paper analyzes the differences between legal contracts and relational contracts at both individual and communal levels, and finds that a fundamental conflict of interests in legal investment lies in the different returns of using relational and legal contracts across agents, where the traditional rich elite gain less from legal enforcement than the masses. In other words, it is the less well-connected poor people that stand to gain most from having a competent legal system. And so it is not surprising that, if the rich elite are politically dominant and choose legal investment to maximize their own welfare, legal development tends to be slower than in the socially optimal case; and conversely, over-investment in legal quality and under-usage of relational contracts may happen under

[26] The data from Botero et al. (2004) show that the "size of the unofficial economy" as a percentage of GDP is about 41.4% in Latin America, more than two times as large as in the West and East Asia. Similar estimates are shown, for example, in De Soto (1989) and Portes (1994). The average Gini index is 51.4 in Latin America, almost the highest income inequality among all countries, while it is around 32-36 for the other two groups of countries (United Nations 2005). The degree of institutionalized democracy during 1950-1995 and per capita GDP are the lowest in Latin America.

majority rule.

Furthermore, it turns out that the elite rule, slow legal development, and high income inequality form a self-perpetuating circle. As legal enforcement provides a relatively more equal access to safeguarding partnerships against defecting than relational contracts, it helps reducing income inequality and thus may weaken the elite rule. Put in another way, lower legal quality helps preserve high income inequality, which in turn tends to give rise to the elite rule. This, combined with the result that the elite rule leads to slow legal development, suggests that these economic, political, and legal conditions belong to an organic cluster of institutions that generate and support each other in a mutually reinforcing way. It is straightforward to see that the opposite cluster of low income inequality, democracy, and high legal quality is also self-perpetuating. The transition between these two clusters is an intriguing topic that is worth pursuing in future research.

This paper also finds that better functioning social communities help improve trade efficiency in relational contracts and thus may also slow down legal development. This by itself, however, is not necessarily welfare reducing, since legal enforcement is only one alternative among many and its low usage can be the socially optimal result of having better alternatives. Following the same logic as above, only when agents who belong to better communities dictate legal investment decisions would the resulted lower legal quality be sub-optimal. The enforcement quality of social communities is taken as exogenous in the paper, presumably as a side-effect of other purposes served by communities. It might be useful in future research to endogenize the formation of communities to enhance its contract enforcement capabilities in a broad sense.

Appendix

Proof of R_i.

Proof. The no-deviation case in an established match is similar. Suppose in the nth period the partnership is still not broken, where $n \geq 2$. If an agent cooperates in the PD game, he gets a payoff $a(1+g_i)/(1-\delta)$; if he defects, his payoff is $a(1+g_i)+b+\delta EV_i$. So he will not defect if $a(1+g_i)/(1-\delta) \geq a(1+g_i)+b+\delta EV_i$, which leads to the same condition (1) as in a new match. The reason is that the benefit of cheating remains the same in both cases.

The possible one-shot deviations when the initial gain from trade is $a(1+\varepsilon)$ can also be analyzed similarly, where deviation is not profitable when (1) is satisfied. ■

Proof of Lemma 2.

Proof. The value of a new match with return a is denoted by $\widehat{V}_{ce}$ on the equilibrium path. When players cooperate in a new match, they get a immediately, followed by a continuation value

$$E\overline{V}_e = \rho\widehat{V}_{ge} + (1-\rho)(\widehat{V}_{ne} - c_{ne}),$$

where with probability ρ agents stay in the same match and get a value $\widehat{V}_{ge}$, while with probability $1-\rho$ the old match dissolves as a result of the positive productivity shock ε and thus agents form a new match with others to get $\widehat{V}_{ne} - c_{ne}$. That is

$$\widehat{V}_{ce} = a + \delta E\overline{V}_e. \tag{12}$$

The continuation value $\widehat{V}_{ge}$ is determined in a similar way, the only difference is that the current return is $a(1+g_e)$ due to learning-by-doing in the same match: $\widehat{V}_{ge} = a(1+g_e) + \delta E\overline{V}_e$. So it is obvious that

$$\widehat{V}_{ge} = \widehat{V}_{ce} + ag_e. \tag{13}$$

$\widehat{V}_{ne}$ is the value of starting a new match when the gain from trade is $a(1+\varepsilon)$, which happens with probability $1-\rho$. This means $\widehat{V}_{ne} = a(1+\varepsilon) + \delta E\overline{V}_e$. It is easy to see that

$$\widehat{V}_{ne} = \widehat{V}_{ce} + a\varepsilon. \tag{14}$$

From equations (12), (13), and (14), we get

$$\widehat{V}_{ce} = \frac{a + \delta\rho a g_e + \delta(1-\rho)(a\varepsilon - c_{ne})}{1-\delta}. \tag{15}$$

Let's check the possible one-shot deviation when the initial gain from trade is a. In a new match, if an agent cooperates, the match will continue where he gets $\widehat{V}_{ce} - c_e$. If he cheats, he gets payoff $(a+b)(1-Q(c_e,q)) + \delta E\widehat{V}_e - c_e$, where the first term is his expected current payoff, and $E\widehat{V}_e$ is the continuation value in the next period when he becomes an unmatched player since his partner will break up the partnership according to the contract. The expected value of entering a new match is

$$E\widehat{V}_e = \rho(\widehat{V}_{ce} - c_e) + (1-\rho)(\widehat{V}_{ne} - c_{ne}),$$

since the net value of starting a new match when the gain from trade is a is $\widehat{V}_{ce} - c_e$, which occurs with probability ρ, while with probability $1-\rho$ the new match is more productive and yields a net value $\widehat{V}_{ne} - c_{ne}$. Cheating is thus not optimal when $(a+b)(1-Q(c_e,q)) \leq \widehat{V}_{ce} - \delta E\widehat{V}_e$ holds, which is simplified to

$$(a+b)Q(c_e,q) + \delta\rho c_e \geq b - \delta\rho a g_e. \tag{16}$$

In the nth period when the partnership is still not broken, where $n \geq 2$, the one-shot deviation is less profitable than in the first period. If an agent cooperates in the PD game, he gets a payoff $\widehat{V}_{ge}$; if he defects, his payoff is $[a(1+g_e)+b](1-Q(c_e,q)]+\delta E\widehat{V}_e$. So he will not defect if

$$(a(1+g_e)+b)Q(c_e,q)+\delta\rho c_e \geq b-\delta\rho a g_e,$$

which is satisfied when (16) holds.

Define c_e^* to make the equality in (16) hold and we get

$$c_e^* = b/\delta\rho - ag_e - (a+b)Q(c_e^*,q)/\delta\rho, \tag{17}$$

the minimum cost to use the legal contract when the legal quality is q and the initial gain from trade is a. Based on (17), we get

$$\begin{aligned}\frac{\partial c_e^*}{\partial q} &= -\frac{(a+b)Q_2}{(a+b)Q_1+\delta\rho}<0,\\ \frac{\partial c_e^*}{\partial g_e} &= -\frac{\delta\rho a}{(a+b)Q_1+\delta\rho}<0,\end{aligned}$$

and $\partial c_e^*/\partial\varepsilon = 0$. ■

Proof of Lemma 3.

Proof. The main task of the proof is to calculate the optimal legal cost c_{ni}^*, which is uniquely determined by

$$(a(1+g_i)+b)Q(c_{ni}^*,q)+\delta\rho c_i^* = b-\delta\rho a g_i.$$

We focus on solving c_{ne} for elite agents, since the mechanism is identical for non-elite agents.

Let's check the possible one-shot deviation when the initial gain from trade is $a(1+\varepsilon)$. In a new match, if an agent cooperates, the match will continue and so he gets $\widehat{V}_{ne}-c_{ne}$. If he cheats, he gets payoff $(a(1+\varepsilon)+b)(1-Q(c_{ne},q))+\delta E\widehat{V}_e-c_{ne}$. Similar exercises as in the text show that cheating is not optimal when $c_{ne}\geq c_{Le}$, where $\overline{c}_{Le}$ is uniquely determined by $(a(1+\varepsilon)+b)Q(c_{Le},q)+\delta\rho c_e^* = b-\delta\rho a g_e$,or equivalently

$$Q(c_{Le},q) = \frac{a+b}{a(1+\varepsilon)+b}Q(c_e^*,q). \tag{18}$$

So c_{Le} is the minimum cost of using the legal contract to deter cheating in a new match when the initial gain from trade is $a(1+\varepsilon)$. Similar arguments suggest that cheating is not profitable in any nth period of a match where the initial gain of trade is $a(1+\varepsilon)$ if

$$(a(1+g_e)+b)Q(c_{ne},q)+\delta\rho c_e^* \geq b-\delta\rho a g_e \tag{19}$$

holds. So the minimum legal cost that deters cheating in an established match is c^*_{ne} that is determined by

$$(a(1+g_e)+b)Q(c^*_{ne},q)+\delta\rho c^*_e = b-\delta\rho a g_e \tag{20}$$

or equivalently

$$Q(c^*_{ne},q) = \frac{a+b}{a(1+g_e)+b}Q(c^*_e,q).$$

It is easy to check that $c^*_{ne} < c^*_e$, and $c^*_{ne} > c_{Le}$ if $\varepsilon > g_e$. So when the initial gain of trade is $a(1+\varepsilon)$, the legal cost should be at least as large as c^*_{ne} to deter cheating when $\varepsilon > g_e$. Now we show c^*_{ne} also decreases in q. Let a new value $\widehat{c}$ satisfy $(a(1+g_e)+b)Q(\widehat{c},q)+\delta\rho\overline{c} = b-\delta\rho a g_e$ where $\overline{c}$ is a constant such that $\overline{c} > c^*_e$. comparing it with (20) that determines c^*_{ne}, we get $c^*_{ne} > \widehat{c}$. So c^*_{ne} is in between c^*_e and $\widehat{c}$, and c^*_{ne} becomes identical to c^*_e when $g_e = 0$ and arbitrarily close to $\widehat{c}$ when $\overline{c}$ is approaching c^*_e. Since both c^*_e and $\overline{c}$ are decreasing in q, so is c^*_{ne}.

The net value of starting a new match is $\widehat{V}_{ne} - c_{ne}$ when the initial return is $a(1+\varepsilon)$, while the value of continuing with the old match for another period is $\widehat{V}_{ge}$. So it is optimal for agents to dissolve the old match when $\widehat{V}_{ne} - c_{ne} \geq \widehat{V}_{ge}$ holds, which boils down to $c^*_{ne} \leq a(\varepsilon - g_e)$, and thus $\varepsilon_e = g_e + c^*_{ne}/a$.

Next we prove $\varepsilon_e < b/\delta\rho a$. This is indeed so because (17) and (20) imply that $\delta\rho c^*_{ne} < \delta\rho c^*_e$ and $\delta\rho c^*_e \leq b - \delta\rho a g_e$, which together implies that $\delta\rho c^*_{ne} < b - \delta\rho a g_e$ and hence $\varepsilon_e \equiv g_e + c^*_{ne}/a < b/\delta\rho a$.

And finally we show that $\varepsilon_e > \varepsilon_m$ holds because $g_e > g_m$ and

$$\frac{\partial \varepsilon_e}{\partial g_e} = 1 + \frac{1}{a}\frac{\partial c^*_{ne}}{\partial g_e} > 0. \tag{21}$$

Note that

$$\begin{aligned}
\frac{\partial c^*_{ne}}{\partial g_e} &= \frac{a+b}{a(1+g_e)+b}Q_1(c^*_e,q)\frac{\partial c^*_e}{\partial g_e} - \frac{a(a+b)}{(a(1+g_e)+b)^2}Q(c^*_e,q) \\
&= -\frac{1}{a(1+g_e)+b}\frac{\delta\rho a(a+b)Q_1}{(a+b)Q_1+\delta\rho} - \frac{a(a+b)Q}{(a(1+g_e)+b)^2} < 0;
\end{aligned}$$

Let's check whether $\frac{1}{a}\frac{\partial c^*_{ne}}{\partial g_e} > -1$ or equivalently $|\frac{\partial c^*_{ne}}{\partial g_e}/a| < 1$ holds; this is indeed true because

$$\begin{aligned}
|\frac{\partial c^*_{ne}}{\partial g_e}/a| &< \frac{1}{a(1+g_e)+b} + \frac{a+b}{(a(1+g_e)+b)^2} \\
&= \frac{a(1+g_e)+b+a+b}{(a(1+g_e)+b)^2} < 1,
\end{aligned}$$

where the first inequality holds due to $\frac{(a+b)Q_1}{(a+b)Q_1+\delta\rho}\delta\rho < 1$ and $Q \leq 1$. ■

Proof of Lemma 4.

Proof. Comparing the legal cost c_{Le} and the relationship building cost R_e, we get

$$R_e - c_e^* = (1-\rho)(a\varepsilon - b/\delta\rho) + (a+b)Q(c_e^*, q)/\delta\rho.$$

Comparing the values of these two types of contracts, we get

$$\widehat{V}_{ce} - V_{ce} = \frac{\delta(1-\rho)(a\varepsilon - ag_e - c_{ne}^*)}{1-\delta}.$$

Plugging these two terms in $\pi(q;\varepsilon,g_e)$, we have

$$\begin{aligned}\pi(q;\varepsilon,g_e) &\equiv \widehat{V}_{ce} - c_e^* - (V_{ce} - R_e) = \widehat{V}_{ce} - V_{ce} + R_e - c_e^* \\ &= (1-\delta)^{-1}[(1-\rho)a\varepsilon - (1-\delta\rho)ag_e - \delta(1-\rho)c_{ne}^*] - c_e^* + (1-\rho)b\delta^{-1}.\end{aligned}$$

It is straightforward to see that $\partial\pi(q;\varepsilon,g_e)/\partial\varepsilon = (1-\delta)^{-1}(1-\rho)a > 0$ holds as both c_e^* and c_{ne}^* are independent of ε. And

$$\begin{aligned}\frac{\partial\pi(q;\varepsilon,g_e)}{\partial q} &= \frac{\partial}{\partial q}[\frac{\delta(1-\rho)(a\varepsilon - ag_e - c_{ne}^*)}{1-\delta} + R_e - c_e^*] \\ &= -\frac{\delta(1-\rho)}{1-\delta}\frac{\partial c_{ne}^*}{\partial q} - \frac{\partial c_e^*}{\partial q} > 0\end{aligned}$$

holds since both c_e^* and c_{ne}^* are decreasing in q while R_e is independent of q. Finally,

$$\frac{\partial\pi(q;\varepsilon,g_e)}{\partial g_e} = \frac{\partial(\widehat{V}_{ce} - V_{ce})}{\partial g_e} + \frac{\partial(R_e - c_e^*)}{\partial g_e} < 0$$

is true because $\partial(R_e - c_e^*)/\partial g_e = (a+b)Q_1(c_e^*, q)\partial c_e^*/\partial g_e < 0$ and

$$\frac{\partial(\widehat{V}_{ce} - V_{ce})}{\partial g_e} = -\frac{\delta(1-\rho)a}{1-\delta}(1 + \frac{1}{a}\frac{\partial c_{ne}^*}{\partial g_e}) < 0$$

due to (21). ■

Proof of Proposition 1.

Proof. The first order condition (FOC) for interior solutions is

$$(1-r)\pi_1(q^s;\varepsilon,g_m) + r\pi_1(q^s;\varepsilon,g_e) - C'(q^s) = 0 \tag{22}$$

where

$$\pi_1(q;\varepsilon,g_e) = -\frac{\delta(1-\rho)}{1-\delta}\frac{\partial c_{ne}^*}{\partial q} - \frac{\partial c_e^*}{\partial q} > 0 \tag{23}$$

and $\pi_1(q;\varepsilon,g_m)$ is similar. The second order condition

$$SOC \equiv r\frac{\partial^2\pi(q;\varepsilon,g_e)}{\partial q^2} + (1-r)\frac{\partial^2\pi(q;\varepsilon,g_m)}{\partial q^2} - C''(q) < 0$$

is satisfied because

$$\frac{\partial^2\pi(q;\varepsilon,g_i)}{\partial q^2} = -\frac{\delta(1-\rho)}{1-\delta}\frac{\partial^2\widetilde{c}_{Li}}{\partial q^2} - \frac{\partial^2\widehat{c}_{Li}}{\partial q^2} < 0.$$

So q^s is uniquely determined by (22). Based on it we get $\partial q^s/\partial\varepsilon = 0$ and

$$\frac{\partial q^s}{\partial g_e} = [r\frac{\partial^2\pi(q;\varepsilon,g_e)}{\partial q\partial g_e} + (1-r)\frac{\partial^2\pi(q;\varepsilon,g_m)}{\partial q\partial g_m}](-SOC)^{-1} < 0,$$

where it can be shown that

$$\frac{\partial^2\pi(q;\varepsilon,g_e)}{\partial q\partial g_e} = -\frac{\delta(1-\rho)}{1-\delta}\frac{\partial^2 c^*_{ne}}{\partial q\partial g_e} - \frac{\partial^2 c^*_e}{\partial q\partial g_e} < 0. \tag{24}$$

Then from (5) we get

$$\frac{\partial\varepsilon^s}{\partial g_e} = -\frac{r\pi_3(q^s;\varepsilon^s,g_e)}{r\pi_2(q^s;\varepsilon^s,g_e) + (1-r)\pi_2(q^s;\varepsilon^s,g_m)} > 0,$$

where $\pi_3 < 0$ and $\pi_2 > 0$ are proved in Lemma 4. And Similarly $\partial\varepsilon^s/\partial g_m > 0$ holds. ■

Proof of Proposition 2.

Proof. The FOC for interior solutions is

$$\pi_1(q^*_e;\varepsilon,g_e) - C'(q^*_e) = -\frac{\delta(1-\rho)}{1-\delta}\frac{\partial c^*_{ne}}{\partial q} - \frac{\partial c_{Le}}{\partial q} - C'(q^*_e) = 0.$$

The second order condition $\partial^2\pi(q;\varepsilon,g_e)\partial q^2 - C''(q) < 0$ is also satisfied so that q^*_e is uniquely determined by (7). Based on it we get $\partial q^*_e/\partial\varepsilon = 0$ and

$$\frac{\partial q^*_e}{\partial g_e} = \frac{\partial^2\pi(q;\varepsilon,g_e)}{\partial q\partial g_e}/(-\frac{\partial^2\pi(q;\varepsilon,g_e)}{\partial q^2} - C''(q) < 0.$$

Then from (6) we get

$$\frac{\partial\varepsilon^e}{\partial g_e} = -\frac{\pi_3(q^*_e;\varepsilon^e,g_e)}{\pi_2(q^*_e;\varepsilon^e,g_e)} > 0,$$

where $\pi_3 < 0$ and $\pi_2 > 0$ are proved in Lemma 4.

Since $\pi_3 < 0$ and $g_e > g_m$, we know $\pi_1(q^*_e;\varepsilon,g_m) > \pi_1(q^*_e;\varepsilon,g_e)$, which implies that

$$r\pi_1(q^*_e;\varepsilon,g_e) + (1-r)\pi_1(q^*_e;\varepsilon,g_m) - C'(q) > \pi_1(q^*_e;\varepsilon,g_e) - C'(q^*_e) = 0,$$

where the equality follows (7). Compared with (22), this means $q^*_e < q^s$; that is, the legal quality under the elite rule is lower than the socially optimal level.

Suppose $\varepsilon^e \le \varepsilon^s$ holds; then

$$\begin{aligned}
0 &= r\pi(q^s;\varepsilon^s,g_e) + (1-r)\pi(q^s;\varepsilon^s,g_m) - C(q^s) \ \text{ by (5)} \\
&> r\pi(q^*_e;\varepsilon^s,g_e) + (1-r)\pi(q^*_e;\varepsilon^s,g_m) - C(q^*_e) \ \text{ since } q^s \text{ is the maximizer} \\
&\ge r\pi(q^*_e;\varepsilon^e,g_e) + (1-r)\pi(q^*_e;\varepsilon^e,g_m) - C(q^*_e) \ \text{ if } \varepsilon^s \ge \varepsilon^e \text{ and by } \pi_2 > 0 \\
&> \pi(q^*_e;\varepsilon^e,g_e) - C(q^*_e) \ \text{ since } g_e > g_m \text{ and by } \pi_3 < 0 \\
&= 0, \ \text{ by (6)}
\end{aligned}$$

which is not possible. Thus $\varepsilon^e > \varepsilon^s$ must be true. ■

Proof of Proposition 3.

Proof. The optimization part and comparative statics are similar to the above proof and can be easily derived based on the proof of Proposition 1. So they are omitted.

Since $\pi_3 < 0$ and $g_e > g_m$, we know $\pi_1(q_m^*; \varepsilon, g_e) < \pi_1(q_m^*; \varepsilon, g_m)$, which implies that

$$r\pi_1(q_m^*; \varepsilon, g_e) + (1-r)\pi_1(q_m^*; \varepsilon, g_m) - C'(q) < \pi_1(q_m^*; \varepsilon, g_m) - C'(q_m^*) = 0,$$

where the equality follows (8). Compared with (22), this means $q_m^* > q^s$; that is, the legal quality under the majority rule is larger than the socially optimal level.

Suppose the opposite $\varepsilon^m \geq \varepsilon^s$ holds; then

$$\begin{aligned}
0 &= r\pi(q_m^*; \varepsilon^m, g_m) + (1-r)\pi(q_m^*; \varepsilon^m, g_m) - C(q_m^*) \text{ by (8)} \\
&> r\pi(q^s; \varepsilon^m, g_m) + (1-r)\pi(q^s; \varepsilon^m, g_m) - C(q^s) \text{ since } q_m^* \text{ is the maximizer} \\
&> r\pi(q^s; \varepsilon^m, g_e) + (1-r)\pi(q^s; \varepsilon^m, g_m) - C(q^s) \text{ since } g_e > g_m \text{ and by } \pi_3 < 0 \\
&> r\pi(q^s; \varepsilon^s, g_e) + (1-r)\pi(q^s; \varepsilon^s, g_m) - C(q^s) \text{ if } \varepsilon^m \geq \varepsilon^s \text{ and by } \pi_2 > 0 \\
&= 0 \quad \text{by (5)},
\end{aligned}$$

which is not possible. Thus $\varepsilon^m < \varepsilon^s$ must be true. ■

Proof of Proposition 5.

Proof. Note that

$$Y(q) \equiv r(w_e + \widehat{V}_{ce} - c_e^*) - (1-r)(w_m + \widehat{V}_{cm} - c_m^*),$$

where

$$\widehat{V}_{ci} - c_i^* = \frac{a + \delta\rho a g_i + \delta(1-\rho)(a\varepsilon - c_{ni}^*)}{1-\delta} - c_i^*$$

for $i \in \{e, m\}$. Then

$$\begin{aligned}
\frac{\partial Y(q)}{\partial q} &= r\frac{\partial(\widehat{V}_{ce} - c_e^*)}{\partial q} - (1-r)\frac{\partial(\widehat{V}_{cm} - c_m^*)}{\partial q} \\
&= r[-\frac{\delta(1-\rho)}{1-\delta}\frac{\partial c_{ne}^*}{\partial q} - \frac{\partial c_e^*}{\partial q}] + (1-r)[\frac{\delta(1-\rho)}{1-\delta}\frac{\partial c_{nm}^*}{\partial q} + \frac{\partial c_m^*}{\partial q}] \\
&= r\pi_1(q; \varepsilon, g_e) - (1-r)\pi_1(q; \varepsilon, g_m) \text{ by (23)} \\
&< r[\pi_1(q; \varepsilon, g_e) - \pi_1(q; \varepsilon, g_m)] \text{ since } -(1-r) < -r \text{ and } \pi_1(q; \varepsilon, g_m) > 0 \\
&< 0 \quad \text{since } g_e > g_m \text{ and } \pi_{13}(q; \varepsilon, g_e) < 0 \text{ by (23)}.
\end{aligned}$$

So $\partial Y(q)/\partial q < 0$; that is, $Y(q)$ is less likely to be positive when q is higher. ■

Proof of Proposition 6.

Proof. The following conditions can be derived using similar arguments as in Section 3.1 and 3.2. If partners belong to the same communities, the minimum relational building cost to maintain a long-term relational contract is

$$\widehat{R}_e \equiv (b - x_e)/\delta - ag_e + a(1-\rho)\varepsilon, \tag{25}$$

and the cost of a short-term relational contract that automatically breaks up when a new match becomes more productive is

$$\widetilde{R}_{se} \equiv (b - x_e)/\delta\rho - ag_e, \tag{26}$$

The short-term relational contract is more profitable than the long-term ones when

$$\varepsilon > (b - x_e)/\delta\rho a. \tag{27}$$

This part of the proof illustrates how to calculate $\widetilde{R}_{se}$, since the other conditions can be obtained following exactly the same steps as in the text. When $\varepsilon > (b - x_e)/\delta\rho a$, it is optimal to change partners when new matches become more productive. If so, the cost of relationship building is different. Following arguments in Section 3.2, the value of a newly formed match is

$$\widetilde{V}_{ce} = a + \delta(\rho\widetilde{V}_{ge} + (1-\rho)(\widetilde{V}_{ne} - \widetilde{R}_{ne})) \equiv a + \delta EV_{se},$$

where EV_{se} is the expected continuation value, and

$$\begin{aligned} \widetilde{V}_{ge} &= a(1+g_e) + \delta EV_{se} = ag_e + \widetilde{V}_{ce}, \\ \widetilde{V}_{ne} &= a(1+\varepsilon) + \delta EV_{se} = a\varepsilon + \widetilde{V}_{ce}. \end{aligned}$$

So we get

$$\widetilde{V}_{ce} = \frac{a + \delta\rho a g_e + \delta(1-\rho)(a\varepsilon - \widetilde{R}_{ne})}{1-\delta}.$$

Let's check the possible one-shot deviation when the initial gain from trade is a. In a new match, if an agent cooperates, the match will continue where he gets $\widetilde{V}_{ce} - \widetilde{R}_e$. If he cheats, he gets payoff $(a + b - x_e) + \delta E\widetilde{V}_{ce} - \widetilde{R}_e$. Note that the expected value of entering a new match $E\widetilde{V}_{ce}$ is

$$\begin{aligned} E\widetilde{V}_{ce} &= \rho(\widetilde{V}_{ce} - \widetilde{R}_{ce}) + (1-\rho)(\widetilde{V}_{ne} - \widetilde{R}_{ne}) \\ &= \widetilde{V}_{ce} + (1-\rho)a\varepsilon - (\rho\widetilde{R}_{ce} + (1-\rho)\widetilde{R}_{ne}), \end{aligned}$$

since the net value of starting a new match when the gain from trade is a is $\widetilde{V}_{ce} - \widetilde{R}_{ce}$, which occurs with probability ρ, while with probability $1-\rho$ the new match is more productive and yields a net value $\widetilde{V}_{ne} - \widetilde{R}_{ne}$. Cheating will not happen when

$$\begin{aligned}(a+b-x_e) &\leq \widetilde{V}_{ce} - \delta E\widetilde{V}_{ce} = a + \delta\rho a_e g_e + \delta\rho\widetilde{R}_{ce}, \\ &\Rightarrow \quad a+b-x_e \leq a + \delta\rho a_e g_e + \delta\rho\widetilde{R}_{ce} \\ &\Rightarrow \quad \widetilde{R}_{ce} \geq (b-x_e)/\delta\rho - ag_e.\end{aligned}$$

The same condition can also deter cheating when the initial gain from trade is $a+\varepsilon$. So the minimum cost of using the short-term relational cost is

$$\widetilde{R}_{se} = (b-x_e)/\delta\rho - ag_e$$

when partners belong to the same community. In the basic model, there is no community so that $x_e = 0$, and thus the short-term relational cost is $R_{se} = b/\delta\rho - ag_e$, which is larger than $\widetilde{R}_{se}$.

The existence of social communities improves trade efficiencies in several scenarios, which are summarized in the following table.

Table 2: Trade Efficiencies Improved by Communities

Cases	with Community	Basic Model	Benefit of Community
$\varepsilon \leq \frac{b-x_e}{\delta\rho a}$	$V_{ce}-\widehat{R}_e$ (long-term)	$V_{ce}-R_e$ (long-term)	$\frac{x_e}{\delta}$
$\varepsilon \in (\frac{b-x_e}{\delta\rho a}, \frac{b}{\delta\rho a})$	$\widetilde{V}_{ce}-\widetilde{R}_{se}$ (short-term)	$V_{ce}-R_e$ (long-term)	$\frac{x_e}{\delta} + (\varepsilon - \frac{b-x_e}{\delta\rho a})\frac{a(1-\rho)}{1-\delta}$
$\varepsilon > \frac{b}{\delta\rho a}$	$\widetilde{V}_{ce}-\widetilde{R}_{se}$ (short-term)	$\widetilde{V}_{ce}-R_{se}$ (short-term)	$\frac{x_e}{\delta\rho}$

The benefit of the second case in Table 2 is calculated as follows.

$$\begin{aligned}\widetilde{V}_{ce} - \widetilde{R}_{se} &= \frac{a + \delta\rho a g_e + \delta(1-\rho)(a\varepsilon - \widetilde{R}_{se})}{1-\delta} - \widetilde{R}_{se} \\ &= \frac{a(1+g_e) + \delta(1-\rho)a\varepsilon - (1-\delta\rho)(b-x_e)/\delta\rho}{1-\delta},\end{aligned}$$

$$V_{ce} - R_e = \frac{a(1+g_e)}{1-\delta} - b/\delta - a\varepsilon(1-\rho),$$

$$\widetilde{V}_{ce} - \widetilde{R}_{se} - (V_{ce} - R_e) = \frac{(1-\rho)(a\varepsilon - (b-x_e)/\delta\rho)}{1-\delta} + x_e/\delta.$$

Using short-term legal contracts enables agents to form partnerships with individuals from different communities in order to capture the higher gains from trade. The net benefit of doing so is

$$\begin{aligned}\widetilde{\pi}(q; g_e, x_e, \theta) &\equiv \widehat{V}_{sce} - c_e^* - (\widetilde{V}_{ce} - \widetilde{R}_{se}) \\ &= \frac{\delta(1-\rho)[a\theta - c_{ne}^*] + (1-\delta\rho)[(b-x_e)/\delta\rho - ag_e]}{1-\delta} - c_e^*\end{aligned}$$

for an elite agent, where $\widehat{V}_{sce}$ is the same as $\widehat{V}_{ce}$ in (15) except by replacing ε by $\varepsilon+\theta$. It is easy to see that $\partial\widetilde{\pi}(q;g_e,x_e,\theta)/\partial x_e<0$ holds, which means that the benefit of using legal contracts is lower when x_e is higher or when the communities are more effective in enforcing relational contracts.

Let $\widetilde{q}^s$ denote the socially optimal legal quality and θ^s the threshold level of θ beyond which legal investment starts. The FOC for interior solutions is

$$r\widetilde{\pi}_1(\widetilde{q}^s;g_e,x_e,\theta)+(1-r)\widetilde{\pi}_1(\widetilde{q}^s;g_m,x_m,\theta)-C'(\widetilde{q}^s)=0, \tag{28}$$

where

$$\widetilde{\pi}_1(\widetilde{q}^s;g_e,x_e,\theta)=-\frac{\delta(1-\rho)}{1-\delta}\frac{\partial c_{ne}^*}{\partial q}-\frac{\partial c_e^*}{\partial q}=\pi_1(\widetilde{q}^s;\varepsilon,g_e)$$

as in the basic model. The second order condition is also the same as before. So $\widetilde{q}^s$ is uniquely determined by (28). Based on it we get the following comparative statistics:

$$\frac{\partial\widetilde{q}^s}{\partial\theta}=0,\frac{\partial\widetilde{q}^s}{\partial x_e}=0.$$

θ^s is determined by

$$r\widetilde{\pi}(\widetilde{q}^s;g_e,x_e,\theta^s)+(1-r)\widetilde{\pi}(\widetilde{q}^s;g_m,x_m,\theta^s)-C(\widetilde{q}^s)=0,$$

based on which we get

$$\frac{\partial\theta^s}{\partial x_e}=-\frac{r\widetilde{\pi}_3(\widetilde{q}^s;g_e,x_e,\theta^s)}{r\widetilde{\pi}_4(\widetilde{q}^s;g_e,x_e,\theta^s)+(1-r)\widetilde{\pi}_4(\widetilde{q}^s;g_m,x_m,\theta^s)}>0,$$

where $\widetilde{\pi}_3<0$ and $\widetilde{\pi}_4>0$ are indeed true as both c_e^* and c_{ne}^* are independent of θ and x_e. Similarly $\partial\theta^s/\partial x_m>0$ holds. And $\theta^s>\varepsilon^s$ holds because $\widetilde{\pi}(q;g_e,x_e,\theta)<\pi(q;\theta,g_e)$, which is implied by $\widetilde{V}_{ce}-\widetilde{R}_{se}>V_{ce}-R_e$.

It is straightforward to see that the same comparative statics hold for both the majority rule and the elite rule under similar arguments. ■

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