The Transition from Relational to Legal Contract Enforcement

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Abstract

This paper studies the transition of contract enforcement institutions from relational contracts to the increasing usage of legal enforcement. Its key insight is that rich agents rely more on persistent relational contracts and thus benefit less from a competent legal system than the poor. So when the rich elite are politically dominant, which is more likely to happen when endowment inequality is higher, legal development is delayed. In contrast, when the poor are dominant, there is over-investment in legal quality. The existence of a loyalty culture slows down legal development but does not necessarily reduce social welfare; if it can be affected by policies, however, it may exacerbate legal development gaps across societies with different income inequalities.

JEL: O1, K49, C72.

Key Words: relational contract, legal contract enforcement, institutions, endowment inequality.

1 Introduction

Whether an economy can sustain long-run economic growth depends to a large extent on whether its agents can achieve collectively efficient outcomes through voluntary exchanges. To this end, both informal relational contracts and formal legal ones may provide effective enforcement to facilitate cooperation. Though these two enforcement formats coexist in many societies for most times (Ellickson 1991, Durlauf and Fafchamps 2004), the prevalence of formal impersonal enforcement is often associated with developed Western economies, while a heavy reliance on personalistic relationships is associated with developing countries.

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(Fafchamps 2002, McMillan and Woodruff 1999, Johnson et al. 2002). The transition from relational to impersonal contract enforcement is thus deemed important for economic development. The question not well understood is why some countries have succeeded in making the transition while others have not.

Some studies suggest that a strong cultural preference for loyal personal relationships may be a cause of underdevelopment. For example, North (1991, North et al. 2000) argues that one reason for the economic stagnation of Latin America is the prevalence of personalistic relationships, which induce despotism, corruption, and inefficiency. A similar view is advanced by Greif (1994, 2000, 2002, 2005) who compares different contract enforcement methods in various societies. The causal view, however, is difficult to reconcile with the experiences of recently developed Asian economies under Confucian culture, namely Japan, Korea, Singapore, Hong Kong, and Taiwan (Landa 1981, Whyte 1996, Reed 2001). If the presence of a personalistic culture per se may not necessarily inhibit economic development, then what does? And how does one explain the correlation?

To answer these questions, this paper builds a simple model of how a society’s contract enforcement institutions evolve. Its results suggest that high inequality in endowment may be the fundamental cause for poor legal development and prevalence of relational contracts, as well as a strong cultural preference for personalistic relationships. Latin America seems to fit into this category. When the endowment is relatively equal, the existence of a personalistic culture does not necessarily reduce overall welfare, though it may slow down the legal development process, since relational contracts have comparative advantage in such a cultural environment. The East Asian countries mentioned above seem to be appropriate examples. Western economies, having relatively low inequality and an individualistic culture, are the implicit benchmark case, whose transition from relational to legal contract enforcement is the fastest.

The main results of the paper and their intuition are as follows. 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

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1The high cost of using the legal system forces governance of exchange by informal means (De Soto 1989, Botero et al. 2004). For example, informal employment in urban populations in various Latin American countries averaged about 30% in 1989 (Portes 1994, p. 438). The cultural and political roots of such a situation may go back to the colonial era under the Spanish empire (North et al. 2000, Engerman and Sokoloff 1997, 2005).

2The average Gini index is around 32-36 for both East Asian countries and the West, while it is 51.4 in Latin America, which has almost the highest income inequality among all regions (United Nations 2005). Even in today’s Brazil, for example, “the richest 1 percent of the population controls 13 percent of the nation’s wealth, while the poorest 50 percent controls only 13 percent” (Santiso 2006, p. 134).
partners even though they are more productive than the old ones. In other words, agents using relational contracts have to face a fundamental trade-off between the lower risk of being cheated and the smaller gain from trading with a long-term partner. By contrast, legal contracts use an impersonal third party, the legal court, to deter cheating.\(^3\) Legal enforcement, by reducing the value of persistent relationships in achieving cooperation, makes agents more likely to break up old, less productive partnerships and form new ones.

The relative usage of relational versus legal contracts in society is thus determined by the quality of the legal system and how productive established partnerships are relative to the new ones.

If there is heterogeneity in terms of gains from trade across established relationships, agents in less productive relations have lower incomes than others when relational contracts are used exclusively. Since these agents suffer higher efficiency losses in order to secure cooperation with their long-term partners, they benefit more from the legal system that makes it less costly to form new and more productive partnerships. In contrast, rich agents who have higher gains in established relationships may not benefit from a higher legal quality at all. Since the poor benefit more from legal enforcement than the rich, income inequality will be lower under a higher legal quality.

Another important implication is that the poor have more incentives to invest in legal quality than the privileged rich elite, who enjoy higher returns from using relational contracts.\(^4\) This means that legal development, if determined in a political economy process, will be slower when the rich elite are politically dominant, which is more likely to happen when the endowment distribution is highly unequal. And the higher the inequality, the less likely the rich elite will benefit from the legal system, and hence the lower the investment in legal quality. Elite rule, however, may be gradually undermined as long as legal quality keeps increasing, since income inequality is reduced in the process. On the contrary, when the poor are politically dominant, there is a tendency to overinvest in the legal system so that the law is overused compared with the social optimal level. A related result is that the average tenure of relationships in such a society is shorter than optimal, since its higher

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\(^3\)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.”

\(^4\)This result is consistent with the comment of an influential observer, “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.” (Pipes, 1995, p. 289).
legal quality induces more people to break up with their long-term partners in order to form new matches.\textsuperscript{5}

It is straightforward to see that, when there exists a loyalty or personalistic culture that discourages one from breaking up with a long-term partner in pursuit of higher gains in a new relationship, agents are more likely to engage in persistent relations and thus benefit less from legal enforcement. When the distribution of projects in a society is such that initially more agents adopt persistent partnerships, the loyalty culture tends to be more widely cultivated, and hence people have less gain from improving legal quality. In such a case, a slow legal development may still be social optimal. The prevalence and strength of the personalistic culture, however, are often higher under elite rule, not only because the rich elite benefit most from it, but also because legal quality is often lower in such a society. So the endogeneity of culture tends to exacerbate the difference in legal development between societies with different levels of income inequality, where the elite-ruled societies overinvest in loyalty culture and underinvest in law, while the opposite is true in societies where the poor majority is politically dominant. These results show that “different societies are likely to have different contract enforcement institutions whose legal, social, and cultural aspects constitute a coherent interrelated system” (Greif 1997).

This paper contributes to the literature by developing a political economy model of how contract enforcement institutions evolve from relational contracts to the increasing usage of legal contracts, and why their relative usage differs across societies. It suggests that higher inequality in the initial endowment is more likely to give rise to elite rule, which leads to slower legal development, more prevalence of relational contracts, and a stronger personalistic or loyalty culture. As long as legal quality keeps increasing, however, income inequality is gradually reduced to undermine elite rule and speed up legal development.

In a related study, Greif (2005) proposes a general framework where markets and political institutions co-evolve through a dynamic interplay between contract enforcement institutions and coercive constraint institutions. Though not having a formal model, that paper covers a vast range of relevant issues and contains many insights that may be fruitfully formalized in future research. In an economy where product quality varies due to productivity shocks and legal quality is affected by producers who may bribe judges, but not by consumers, Dhillon and Rigolini (2006) find that corruption is higher and consumers invest more in getting information about firms’ reputations when there are more shocks. Besley and Ghatak (2008) examine whether a one-shot costless legal reform that enhances the use of formal collateral will be adopted by producers and suppliers. Similar to the

\textsuperscript{5}The results about the over-usage of law and the declining tenure in partnerships may provide a theoretical explanation for relevant evidence in the social capital literature (see, e.g., Putnam 1993, 1995).
current paper, they also find that a determining force in the legal reform is whether the traditional elite who benefit most from relational networks are politically dominant.

A number of papers analyze the comparative advantages of different enforcement institutions. In a closely related study, Sobel (2006) contrasts relational contracts and legal institutions in supporting bilateral relationships; its basic model is extended in the current paper to analyze how agents choose between different types of relational and legal contracts. Li (2003) proposes that the relative strength and weakness of relational contracts compared with impersonal legal enforcement may account for both East Asian miracles and crises. Dixit (2003) explores how the relative advantage of informal multilateral enforcement versus external enforcement changes as trade expands. Cooter and Landa (1984) show that improvements in contract law reduce the equilibrium size of trading groups. Kranton (1996a) finds that inefficient outcomes may emerge in a situation where agents can move between markets and relational networks. See MacLeod (2007) for a survey of related work. None of these studies endogenizes legal quality.

This paper proceeds as follows. In Section 2, a repeated matching game is analyzed, which provides the micro foundation for studying the transition from relational to legal contracts in Section 3. Some extensions and discussions of modeling choices are provided in Section 4. The final section concludes the paper. All proofs are relegated to the appendix.

2 Relational versus Legal Contracts

2.1 A Repeated Matching Game

There is a continuum of agents with a unit mass. They are randomly matched to play a two-player repeated game. In each period, a match continues if both players agree to participate, and it breaks up if either one wishes to do so. A match can be either fresh or stale. In a fresh match, agents play the prisoner’s dilemma described in Table 1, where the standard conditions $b > a > 0$, $d > 0$, and $2a > b - d > 0$ are assumed. A match is always fresh in the initial period; in each period afterwards while the match is not broken up, it remains fresh with probability $\rho$, and it becomes stale with probability $1 - \rho$. Stale matches remain so as long as the match continues, providing a constant payoff $l$ to both players in each period, where $l \in (0, a)$.

<table>
<thead>
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<th>Table 1: The prisoner’s dilemma in a fresh match</th>
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<td>Cooperate</td>
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<td>Defect</td>
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It is useful to note that a fresh match is more productive than a stale match when both partners cooperate (since \(a > l\)), but it is also more risky in that one may be cheated by his partner, while a stale match always brings a payoff \(l\). The distinction between a fresh match and a stale match thus captures the essential trade-off involved in a persistent relationship: trading with a long-time partner is less risky, but it is also likely to be less productive than trading with a new partner.

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.\(^6\)

In each period of a fresh 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. In a stale match, agents only need to consider the latter decision. 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 outcomes, where an agent discontinues a partnership only if doing so gives him a better payoff than otherwise.

In particular, we study two types of enforcement institutions that enable agents to cooperate. One is a relational contract where players spend the first several periods of a relationship getting the reservation utility 0 and then start cooperating. By refraining from getting higher payoffs in the initial periods, players are essentially building up their relationship to stand against future cheating.\(^7\) When players do not break up even when the match becomes stale, they are in a Persistent Relational contract (PR); when they do break up, they are in a Fair-weather Relational contract (FR) since they stay together only when the match is fresh.

The other type of enforcement is to sign a formal legal contract mandating cooperation starting from the first period of a match. 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 general quality of the legal system. Assume \(Q_c, Q_q > 0, Q_{cc}, Q_{qq} \leq 0,\) and \(Q_{cq} \geq 0\). When cheating is verified by the court, each agent gets zero payoff.\(^8\) Depending on

\(^6\)When there is an endogenous matching cost, the qualitative results remain unchanged (see Sobel 2006).

\(^7\)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).

\(^8\)Under this assumption, the defector has to give the court his payoff \(b\), while the court gives his partner \(d\) to compensate his loss \(-d\). The residual amount \(b - d \geq 0\) is consumed by the court. Other reasonable assumptions, as long as the cheating behavior is punished, will not alter the main results.
whether they continue or break up in a stale match, agents can choose between a Persistent Legal contract (PL) and a Fair-weather Legal contract (FL) respectively. The four varieties of contracts are summarized in Table 2.

<table>
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<th>Table 2: Contract Enforcement Formats</th>
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<tr>
<td>Relational contract</td>
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<td>Persistent Relational contract (PR)</td>
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<td>Fair-weather Relational contract (FR)</td>
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<tr>
<td>Legal contract</td>
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<tr>
<td>Persistent Legal contract (PL)</td>
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<td>Fair-weather Legal contract (FL)</td>
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The timing of this game can be summarized as follows. Players randomly pair with each other. Subject to mutual agreement, partners choose a relationship among the four options, PR, FR, PL, and FL, and then behave accordingly. A match breaks up automatically once unexpected cheating occurs. Players exiting from an old relationship randomly form new matches, and then the same action sequence described above follows. The subsections below show that these contracts are indeed subgame perfect equilibria, and analyze how agents adopt different contracts.

2.2 Relational Contracts PR and FR

When there is no cheating problem so that players can start cooperating from the first period of a match, each player gets a value of $V_P = a + \delta[\rho V_P + (1 - \rho)\tilde{l}]$ from a persistent relationship PR, where $\tilde{l} = \frac{l}{1 - \delta}$ is the discounted payoff of a stale match, and the subscript $P$ denotes a persistent relationship. Solving $V_P$ we get

$$V_P = \frac{a + \delta(1 - \rho)\tilde{l}}{1 - \delta \rho},$$

which is achieved in PR after certain periods of costly relationship building. Note that $V_P$ increases in $l$, the gain from trade in a stale match. The value of cooperation in a fair-weather relational contract FR, $V_{FR}$, however, is not dependent on $l$, since players break up when the match is stale. Accordingly, the relationship building cost in FR is also different from that of PR. The choice between these two relational contracts PR and FR is determined by their net payoffs $V_{0P}$ and $V_{0F}$, respectively, as proved in the following lemma.

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9The setup of the game builds on and extends the basic model of Sobel (2006), which does not consider FR and PL, since its main focus is contrasting PR and FL for fixed $l$ and $q$. 

7
Lemma 1 (i) There exists a unique \( l^* \) such that players choose PR if \( l > l^* \), FR if \( l < l^* \), and are indifferent between PR and FR when \( l = l^* \), where

\[
l^* = \frac{a - b(1 - \delta \rho)}{\delta \rho}.
\]

(ii) The value and relation-building cost of FR are, respectively,

\[
V_{0F} = V_{FR} - c_{FR} = \overline{l}^*,
\]

\[
c_{FR} = \frac{b - a}{\delta \rho},
\]

where \( \overline{l}^* \equiv \frac{l^*}{1 - \delta} \), and both \( V_{0F} \) and \( c_{FR} \) are independent of \( l \). The value and relation-building cost of PR are, respectively,

\[
V_{0P} \equiv V_{P} - c_{PR} = \frac{\rho l^* + (1 - \rho)l}{1 - \delta \rho},
\]

\[
c_{PR} = \frac{a - \rho l^* - (1 - \rho)l}{1 - \delta \rho},
\]

where \( V_{0P} > V_{0F} \) and \( c_{PR} < c_{FR} \) hold for any \( l > l^* \).

The intuition behind Lemma 1 is as follows. Since a persistent relationship will continue even when the match goes stale, the continuation value of PR increases in \( l \), and hence it needs a lower relationship-building cost \( c_{PR} \) to achieve cooperation when \( l \) is higher. This is why \( c_{PR} \) decreases in \( l \). When \( l < l^* \), however, a stale match is so unproductive that it is better to break it up and meet a new partner, which is exactly the arrangement of FR. Since players never stay together in a stale match, the relationship building cost \( c_{FR} \) in FR does not depend on \( l \); that is, all players in FR contracts incur the same cost \( c_{FR} \) regardless of their levels of \( l \). Given that \( c_{FR} \) is independent of \( l \) while \( c_{PR} \) decreases in \( l \), there must exist a unique level \( l^* \) such that \( c_{FR} = c_{PR}(l^*) \) and players are indifferent between using FR and PR. This implies that PR is cheaper to use when \( l > l^* \), while FR is cheaper for \( l < l^* \), where \( c_{FR} = \frac{b - a}{\delta \rho} \) is the highest cost and \( V_{0F} = \overline{l}^* \) is the lowest return of using any relational contracts. This is illustrated in Figure 1, where the dashed line denotes the lower cost between \( c_{FR} \) and \( c_{PR} \). The values of FR and PR are shown in the upper part of the figure, where all agents using FR have the same return \( \overline{l}^* \), while those using PR get \( V_{0P} \) that increases in \( l \).

2.3 Legal Contracts PL and FL

Suppose there exists a legal system to enforce formal contracts. We investigate players’ choices between legal contracts PL and FL to achieve cooperation. The minimum legal
Figure 1: The value and cost of relational contracts FR and PR

Figure 2: The value and cost of legal contracts FL and PL
cost is denoted as $c_F$ in an FL, and $c_P$ in a PL. The results are proved in Lemma 2 and illustrated in Figure 2, where the dashed line denotes the lower cost between $c_F$ and $c_P$.

**Lemma 2** (i) The legal costs $c_F$ and $c_P$ are determined by, respectively,

$$bQ(c_F, q) + \delta p c_F = b - a,$$

$$bQ(c_P, q) + \delta p c_P = \delta c_{PR},$$

where $\frac{\partial c_F}{\partial l} < 0$, $\frac{\partial c_F}{\partial q} = 0$; $\frac{\partial c_P}{\partial l} < 0$, $\frac{\partial^2 c_F}{\partial q^2} > 0$, and $\frac{\partial^2 c_P}{\partial q^2} > 0$.

(ii) For any legal quality $q$, there exists a unique $l_F(q)$ such that players choose PL if $l > l_F(q)$, FL if $l < l_F(q)$, and are indifferent between PL and FL when $l = l_F(q)$, where

$$l_F(q) = a - (1 - \delta) p c_F$$

and it is increasing and concave in $q$. The net value of FL,

$$V_F - c_F = \frac{l_F(q)}{1 - \delta} \equiv \tilde{l}(q),$$

is independent of $l$, while the net value of PL, $V_P - c_P$, strictly increases in $l$.

The intuition is as follows. $c_F$ and $c_P$ are the minimum costs of using legal contracts FL and PL, respectively, to enforce cooperation starting from the first period of a match. Using legal contracts becomes cheaper when legal quality improves, which is why both $c_F$ and $c_P$ decrease in $q$. Whether to break up or continue a stale match again depends upon how large $l$, the gain from trade in the stale match, is. When $l$ is higher, players need less outside incentive to continue their relationship. So $c_P$ decreases in $l$ while $c_F$ is independent of it, where the two are equal when $l = l_F(q)$ given any legal quality $q$. As illustrated in the upper part of Figure 2, agents using FL have a constant return of $\tilde{l}(q)$ for any $l \leq l_F(q)$, while an agent using PL gets a return $V_P - c_P$ that strictly increases in $l$. Note that, when the legal quality $q$ is higher, $l_F(q)$ is higher so that FL becomes more widely used than PL, and its return $\tilde{l}$ is also higher than before.

### 2.4 Choices between Relational and Legal Enforcement

The above analysis shows that players with higher $l$ are more likely to establish persistent relationships in both relational and legal contracts, and legal contracts are adopted more often when the quality of legal system is higher. The optimal choice among the four contract options turns out to depend on both $l$ and $q$.

Since the threshold productivity $l_F(q)$ strictly increases in legal quality $q$ while $l_*$ is independent of it, there exists a unique $q_*$ such that these two coincide:

$$l_F(q_*) = l_*.$$
This condition implies, together with results in Lemma 2, that $c_F(q_*) = c_P(l_*, q_*) = \frac{b-a}{\delta p} = c_{FR}$ holds. That is, when $q = q_*$, the required minimum legal cost $c_F$ is exactly equal to the highest relational cost $c_{FR}$. In this case it does not matter whether cheating is detected, since the contract cost $c_{FR}$ itself is already high enough to forbid any cheating. Since $l = l_F(q)$ means indifference between PL and FL, $l = l_*$ means indifference between PR and FR, and $l_F(q_*) = l_*$ means indifference between FL and FR, players with $l_*$ are indifferent among all four types of contracts under legal quality $q_*$. So $(l_*, q_*)$ is the common point where the four contracts meet. See Figure 4 for illustration.

Since a persistent relationship yields the same maximum value $V_P$, the choice between PR and PL depends on which is cheaper to enforce. For any $q > q_*$, define $l_R(q)$ such that players are indifferent between PR and PL:

$$c_P(l_R, q) = c_{PR}(l_R) \iff l_R(q) = \frac{a - \rho l_* - (1 - \delta p) c_P}{1 - \rho}.$$  \hfill (12)

So projects with $l > l_R$ would continue to use PR until legal quality is above $\bar{q}$, which is determined by

$$l_R(\bar{q}) = a.$$  \hfill (13)

The location of $l_R(q)$ with respect to $l_*$ and $l_F(q)$ for some $q > q_*$ is proved in Lemma 3 and illustrated in Figure 3, where the dashed line denotes the highest value among the four contracts.

**Lemma 3** $l_R(q)$ is increasing and concave in $q$, where $l_R(q) = l_* = l_F(q)$ at $q = q_*$, and $l_R(q) > l_F(q) > l_*$ for any $q > q_*$. 

The detailed choices among the four types of contracts are proved in the following proposition and illustrated in Figure 4.

**Proposition 1** (Optimal Contracts) There exists a unique legal quality $q_*$, below which only relational contracts are used: FR if $l \leq l_*$ and PR otherwise. When $q > q_*$, players use FL if $l \leq l_F(q)$, PL if $l \in (l_F(q), l_R(q)]$, and PR if $l > l_R(q)$ and $q \leq \bar{q}$. Players in the boundary cases are indifferent between alternative choices. $q_*$, $l_R(q)$, and $\bar{q}$ are determined by (11), (12), and (13) respectively.

This proposition suggests that relational contracts are used exclusively when legal quality is too low (i.e. when $q < q_*$). When the quality of legal system is high enough ($q > q_*$), writing legal contracts is cheaper than building relationships so that all fair-weather relational contracts FR are replaced by fair-weather legal contracts FL, and persistent relational
Figure 3: Values of relational and legal contracts when $q > q^*_a$

Figure 4: Optimal contracts dependent on project productivity $l$ and legal quality $q$
contracts PR are replaced by either FL or FP, except for those whose gains from trade in a stale match are very high (i.e. \( l > l_R(q) \)).

Note that the payoff in a stale match, \( l \), can be interpreted as the strength of a project to withstand negative shocks that transform a fresh match to a stale one, where some projects by nature suffer less and hence have a higher payoff \( l \) after the shocks. A project may represent a line of work; for example, traders with business exclusively in one local area are in general less vulnerable to consumption shocks of other regions than those trading across regions, and firms transacting in necessity goods usually have a more stable business than those dealing with other goods when there are negative income shocks. Suppose the economy has a distribution of \( l \) on the support of \([0, a] \), where \( l \sim G(\cdot) \), and a continuum of players trading within each line of work characterized by \( l \). Then the following proposition is a straightforward implication of Proposition 1.

**Proposition 2** When the legal quality \( q \) is higher, more relational contracts are replaced by legal contracts, where FL is adopted more often than PL. As a result, average income goes up and income inequality goes down.

This result offers an explanation for why legal development is often associated with economic development and lower income inequality. A higher legal quality increases individual incomes because, by reducing the cost of attaining cooperation in new matches, it enables more agents to break up from less productive stale matches and to obtain higher gains in new matches. It also reduces income inequality by providing an impersonal and leveled platform to attain cooperation in fresh matches; players with lower payoffs in stale matches, who are disadvantaged in using relational contracts, benefit more than others from the improved legal system.

As illustrated in Figure 3, when the legal quality increases from \( q_* \) to \( q \), players with \( l \leq l_* \) change from FR to FL and get an income increase of \( l_F(q) - l_* \); those with \( l \in (l_* , l_F(q)] \) change from PR to FL and get an income increase of \( l_F(q) - V_{0P} \), which is lower than \( l_F(q) - l_* \) because \( V_{0P} > l_* \); those with \( l \in (l_F(q), l_R(q)] \) change from PR to PL and get an income increase of \( c_{PR} - c_P(q) \), which can be shown by simple algebra to be smaller than \( l_F(q) - V_{0P}(l_F) \); and finally, players with the highest gains in a stale match \( l > l_R(q) \) will not change their contract, i.e., they will continue to use PR, and hence do not benefit from the improvement in legal quality. So the gain from a better legal system differs across projects: In general, players with a higher \( l \) rely more on persistent and relational contracts, and hence gain less than those with lower \( l \) projects; though they still have higher incomes than others, the income gaps shrink as legal quality increases.
2.5 The Effects of Personalistic Preferences

When a match turns stale, some players may feel uncomfortable or morally incorrect to break up with their current partners in order to form new matches and obtain higher gains from trade. Such a feeling can be quite prevalent in cultures that emphasize personal loyalty, where individuals who desert friends for higher profits or material gains are often disdained by others. Compared with a typical economic agent who cares only about material payoffs, a player who prefers not to break up a stale match when he should do so for larger gains is said to have personalistic preferences. This is modeled as follows.

Suppose there exists a personalistic culture characterized by \( \alpha \), where \( \alpha \geq 0 \), such that each player gets a psychological payoff \( \alpha \), in addition to the material payoff \( l \), in each period he stays in a stale match. This implies that when a match turns stale players in a stronger personalistic culture are more reluctant to break up with their current partners and thus are more likely to engage in relational and persistent contracts than in legal and fair-weather contracts. The detailed adjustment of the basic model to \( \alpha \) is summarized by the following proposition. The optimal contracts under such a culture are illustrated in Figure 5.

**Proposition 3** When there is a cultural preference \( \alpha \) for persistent relationships, the relevant payoffs and costs for fair-weather matches do not change, while those for persistent
relationships are changed in the way that \( l \) is replaced by \( l + \alpha \), where the thresholds \( l_*(\alpha) \), \( l_F(q, \alpha) \) and \( l_R(q, \alpha) \) are each reduced by \( \alpha \) from their original levels so that more projects use relational and persistent contracts, and \( \frac{\partial^2 c_F}{\partial q \partial \alpha} < 0 \) holds in that the benefit of PL from legal quality improvement is smaller when \( \alpha \) is higher.

3 Investment in Legal Quality

We are now in a position to endogenize the quality of the legal system and study how contract enforcement institutions may evolve from relational contracts to the increasing usage of legal contracts.

Suppose there are infinite generations of agents. Each generation lives one period and each agent brings up one child. The distribution of \( l \) in the population follows \( G(\cdot) \) on the support \([0, a]\) and remains the same for all generations, where there is a continuum of players trading within each line of work that is characterized by a certain level of \( l \). Each dynasty has a random draw of \( l \) from the distribution \( G(\cdot) \) in the initial period, and stays in the same line of work for all generations. In each generation \( t \), players take as given \( q_t \) and play a reduced form of the matching game in the basic model, where one gets a lifetime payoff \( V_0P \), \( V_0F \), \( V_P - c_{Pt} \), or \( V_F - c_{Ft} \) if the optimal contract is PR, FR, PL, and FL, respectively, according to Proposition 1.

At the end of period \( t \), the legal quality for the next generation \( t + 1 \), \( q_{t+1} \), is chosen to maximize the joint welfare of the immediate children of the politically dominant interest group.\(^{11}\) The cost function of legal investment is \( C(q_{t+1}, q_t)k_t^{-1} \), where \( C_1 > 0 \), \( C_2 < 0 \), \( C_{11} > 0 \), and \( C_{12} < 0 \). Technological conditions affecting the cost of improving legal quality are captured by \( k_t \), which is exogenously determined and increasing over time. That is, the exogenous technical progress makes it cheaper over time to invest in legal quality. In period \( t + 1 \), the new generation replaces the previous one, takes \( q_{t+1} \) as given, and chooses their optimal contracts. Then the same sequence of events is repeated.

The initial legal quality is zero so that all agents use relational contracts in the beginning. Since a low quality legal system is too costly to be useful, a society will not start its legal development process until it is optimal to establish one with high enough quality \( q_{t+1} > q^* \). Then based on Proposition 1, three types of contracts are used by agents, namely, FL, PL,

\(^{10}\)This assumption can be justified as follows. Suppose each period is divided into infinite sub-periods, and in each sub-period all players in the same cohort die with probability \( 1 - \delta \). This will give us the same results derived in Proposition 1 if the original discount factor is set to one. Before they die, decisions on legal investment are made for the next generation.

\(^{11}\)Allowing the model to be more forward-looking does not seem to affect the main qualitative results, since the driving force remains the same. This will become clear in the analysis below.
and PR. Between these groups there are conflicts of interests over legal development: the FL group (with \( l \leq l_{F,t+1} \)) benefits most from the investment in legal quality, the PL group (with \( l \in (l_{F,t+1}, l_{R,t+1}] \)) benefits less, while the PR group (with \( l > l_{R,t+1} \)) gets no benefit. Before studying the political economy model of legal development, we first present social optimal legal development as the benchmark case.

### 3.1 Legal Development: Social Optimal Result

Let \( \pi_{FL}(q_{t+1}) \), \( \pi_{PL}(q_{t+1}) \), and \( \pi_{PR}(q_{t+1}) \) denote respectively the total welfare of the three groups FL, PL, and PR at period \( t+1 \):

\[
\pi_{FL}(q_{t+1}) = G(l_{F,t+1})l_{F,t+1}, \\
\pi_{PL}(q_{t+1}) = \int_{l_{F,t+1}}^{l_{R,t+1}} (V_P - c_{P,t+1}) dG(l), \\
\pi_{PR}(q_{t+1}) = \int_{l_{R,t+1}}^{a} (V_P - c_{PR}) dG(l).
\]

Then \( E(V_{t+1}) = \pi_{FL}(q_{t+1}) + \pi_{PL}(q_{t+1}) + \pi_{PR}(q_{t+1}) \) is the aggregate welfare of all agents in economy. The social optimal level of legal quality \( q^*_{t+1} \) in each generation \( t+1 \) is obtained by maximizing \( E(V_{t+1}) \) minus the investment cost.

\[
q^*_{t+1} = \arg \max_{q_{t+1}} E(V_{t+1}) - C(q_{t+1}, q_t) k_t^{-1}.
\]

This can actually be implemented in a perfectly mobile society, where the allocation of projects is random in all generations. In such a society, children of the same cohort have the same expected welfare equal to \( E(V_{t+1}) \), and thus there is no conflict of interests regarding public investment in legal quality. The optimal solution \( q^*_{t+1} \) is described in the following proposition.

**Proposition 4** The social optimal legal quality \( q^*_{t+1} \) is uniquely determined by

\[
G(l_{F,t+1})l_{F,t+1} + \int_{l_{F,t+1}}^{l_{R,t+1}} (-c_{P,t+1}) dG(l) - C_1(q_{t+1}, q_t) k_t^{-1} \begin{cases} < 0 & \text{for } q^*_{t+1} = 0, \\ = 0 & \text{for } q^*_{t+1} > q^*, \end{cases}
\]

where \( t = 1, 2, ..., \infty \). The legal development starts later and the legal quality \( q^*_{t+1} \) is lower when the personalistic preference \( \alpha \) is stronger.

So the legal development process starts only when the net gain from establishing legal contract enforcement becomes larger than exclusively using relational contracts. Since the marginal gain from improving the legal system decreases in the cultural preference \( \alpha \) (due to \( -\frac{\partial^2 c_P}{\partial q \partial \alpha} < 0 \)), the overall legal development is slowed down by \( \alpha \); the aggregate welfare,
however, is not necessarily lower because the values of persistent relationships $\pi_{PL}$ and $\pi_{PR}$ strictly increase in $\alpha$ while $\pi_{FL}$ does not change. So a society with a stronger personalistic preference, having a comparative advantage in utilizing relational contracts to attain cooperation among agents, may maximize its aggregate welfare by starting legal development later than others.

### 3.2 Legal Development with Interest Groups

As mentioned earlier, agents using different contracts have conflicts of interests in legal development. Specifically, agents using PR prefer zero investment in legal quality because of $\frac{\partial \pi_{PR}}{\partial q} = 0$; though both PL and FL agents prefer positive investment in legal development, PL agents desire less investment than FL agents because of $0 < \frac{\partial(-c_P)}{\partial q} < \frac{\partial(l_F)}{\partial q}$ by Lemma 2, and among PL agents, those with higher $l$ benefit less from the same legal quality.

Suppose the legal quality $q_{t+1}$ is chosen in every generation $t$ to maximize the joint welfare of the politically dominant interest group’s immediate children, while the total cost is equally shared among all agents. An interest group’s political dominance is derived from its economic dominance. Specifically, we assume that a group is politically dominant if its aggregate income is larger than those of the other groups combined; if two groups have equal economic power, the smaller group is politically dominant.\(^{12}\)

**FR Dominance.** Suppose initially the group of players using FR is politically dominant. Let $V$ denote the total income in the economy when there is no legal system:

$$V = \overline{I}G(l_*) + \int_{I_*}^a V_0 pdG(l)$$

where $\overline{I}G(l_*)$ is the aggregate income of agents using FR, and $\int_{I_*}^a V_0 pdG(l)$ is that of PR agents. Then the FR group is politically dominant if

$$\overline{I}G(l_*) > \frac{1}{2}V,$$

which is equivalent to

$$l_{PR} < [1 + \frac{1 - \delta \rho}{1 - \rho} \frac{2G(l_*) - 1}{1 - G(l_*)}]l_*, \quad (14)$$

where $l_{PR} \equiv \int_{I_*}^a ldG(l)/(1 - G(l_*))$ is the average level of $l$ among agents using PR. Note that $G(l_*) > \frac{1}{2}$ must hold, since $l_{PR} > l_*$. When the majority of agents use FR and the income inequality is small enough so that condition (14) holds, the FR group has sufficiently large economic power to support its political dominance over the PR group. This often happens in a democracy given that the FR agents are the poorest in society and must have a large

\(^{12}\)This assumption is made only for convenience; the opposite one is perfectly fine.
size to become economic dominant (Acemoglu and Robinson 2006). If this is true, then
the members of the FR group will remain in the dominant group forever, and there will be
overinvestment in legal quality in that legal development comes earlier and legal quality is
higher compared with the social optimal result. So there is mutual reinforcement between
democracy and legal development.

The reason is as follows. Once legal development starts with \( q_{t+1} > q^* \), the children
of the FR group will all adopt FL, whose average incomes will increase more than others;
this alone will guarantee the continuity of their political dominance. Furthermore, the
bottom PR agents (with \( l \in (l^*, l_F(q_{t+1})) \), whose children will switch to FL contracts
once \( q_{t+1} \) is realized, will also join the FL interest group. As legal quality increases, the
economic power of the new interest group FL will continuously grow, since agents using
FL benefit most from a higher legal quality, and so will its size, since the children of
existing members continue to use FL, and more and more agents whose parents used PL
or PR start to use FL. As the economic power of the FL group (containing previously
the FR group) gets strengthened in the process of legal development, so does its political
dominance; since the FL group includes the majority of the population whose incomes
are ever-increasing both absolutely and relatively to the richest agents, democracy is more
likely to be solidified. The overinvestment in legal quality when the FL group is politically
dominant is a straightforward result of the fact that agents using FL benefit the most from
a higher legal quality than the other agents using PL or PR. These results are summarized
in the following proposition.

**Proposition 5** *(Overinvestment if FR-dominant)* Under condition *(14)*, the optimal legal
quality \( q_{t+1}^{FR} \) is determined by

\[
G(l_{F,t+1})[l_{F,t+1}^t-C_1(q_{t+1}^{FR}, q_t)k_t^{-1}] + G'(l_{F,t+1})l_{F,t+1}^t[l_{F,t+1}^{t+1} - C(q_{t+1}^{FR}, q_t)k_t^{-1}] < 0 \quad \text{for } q_{t+1}^{FR} = 0,
\]

\[
= 0 \quad \text{for } q_{t+1}^{FR} > q^*,
\]

where \( t = 1, 2, ..., \infty \). Legal development starts earlier and legal quality \( q_{t+1}^{FR} \) is higher than
the social optimal case.

**PR Dominance.** When condition *(14)* does not hold, the PR group is initially domi-
nant, which is often the case of elite rule since the PR agents are the rich members in society.
Then legal development tends to be delayed, the more so when income inequality is higher.
The ineffective legal system in turn helps preserve the inequality. Once legal investment
starts, however, the economic dominance of the PR group will inevitably be undermined
for two reasons: First, the relative economic power of the PR group will decrease since
the incomes of FL and PL agents gain more from a better legal system than PR agents;
Second, the size of the original PR group will shrink as its poorest members’ children (with \( l \in (l_*, l_F(q_{t+1})) \)) will join the FL group and the middle-income members’ children (with \( l \in (l_F(q_{t+1}), l_R(q_{t+1})) \)) will join the PL group.

Let \( l_{E,t+1} \) denote the lowest possible \( l \) in the smallest PR elite group that is politically dominant. Then \( l_{E,t+1} \) is uniquely determined by

\[
\int_{l_{E}}^{a} V_0p \, dG(l) = \frac{1}{2}V. \tag{15}
\]

When the distribution \( G(\cdot) \) is fixed, the higher \( l_E \) is, the higher the income inequality. Since the children of PR agents with a high \( l \) are less likely to benefit from legal development by using FL or PL, a higher \( l_{E,t+1} \) implies that the elite PR group is more likely to remain dominant for a longer time, and hence the legal development will be more severely delayed.

Let \( q_E \) denote the lowest legal quality below which the elite PR group do not benefit from the legal system. That is, the legal development under the elite rule will not start until the legal quality is above \( q_E \). Then \( q_E \) is uniquely determined by

\[
l_R(q_E) = l_E. \tag{16}
\]

Given that \( l_R'(q) > 0 \), it is easy to see that \( q_E \) is higher when \( l_E \) is larger, and \( q_E > q_* \) since \( l_E > l_* \). When technical progress has made it possible to have a legal quality above \( q_E \) in some period \( T_E \), the bottom agents in the elite PR group (with \( l \in (l_*, l_R(q_{t+1})) \)) will find it desirable to invest in legal quality and hence switch camp to the interest group whose children will adopt either FL or PL. And the definition of \( l_E \) implies that this interest group, comprised originally of all non-elite agents and now joined by a part of the current elite group, is economically and hence political dominant in period \( T_E - 1 \). So \( T_E - 1 \) is the first period when the investment in legal quality starts, and when the political dominance of the PR group terminates for good. From then on the political regime changes from elite rule to democracy, and legal development shifts to a fast development track. Note that, for any given \( q_t \) and \( k_t \), there is also overinvestment in legal quality \( q_{t+1} \), since the dominant group is comprised of FL and PL who will ignore the interests of the PR group. However, initially such overinvestment is desirable even in terms of aggregate welfare because the society is catching up in legal development that has been delayed by elite rule. These results are summarized in the following proposition.

**Proposition 6** (Underinvestment if PR-dominant) When condition \( (14) \) does not hold, the optimal legal quality \( q_{t+1}^{E} \) is

\[
q_{t+1}^{E} = \begin{cases} 
0 & \text{if } q_{t+1}^{PR} \leq q_E, \\
q_{t+1}^{PR} & \text{if } q_{t+1}^{PR} > q_E,
\end{cases}
\]

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where $q_{t+1}^{PR}$ is uniquely determined by

$$G(l_{F,t+1})I_{F,t+1}^f + \int_{l_{F,t+1}}^{l_{R,t+1}} (-c'_{P,t+1})dG(l) - (1 - G(l_{R,t+1}))C_1(q_{t+1}^{PR}, q_t)k_t^{-1}$$

$$+ G'(l_{R,t+1})l_{R,t+1}^f[V_0 + C(q_{t+1}^{PR}, q_t)k_t^{-1}] = 0. \quad (15)$$

For fixed $q_t$ and $k_t$, $q_{t+1}^{PR} < q_{t+1}^{FR}$ and $q_{t+1}^{PR} \geq q_{t+1}^{E}$. $T_E$ is the first period that $q_{t+1}^{PR} > q_E$ occurs, and $T_E$ is larger when $l_E$ is higher. That is, legal development starts later when income inequality is higher.

As in the social optimal case, the existence of a personalistic culture $\alpha > 0$ tends to slow down the legal development in this interest group model of legal investment. Furthermore, since the aggregate marginal gain from legal development is lower, the investment in legal quality will be reduced by $\alpha$ no matter which interest group is dominant. Note that, however, condition (14) is less likely to hold with $\alpha > 0$ than before because there are fewer agents using FR; this implies that the PR group is more likely to be politically dominant when $\alpha > 0$ and thus legal development is more likely to be delayed.

4 Discussions

4.1 Endogenous Social Mobility Policy

In the above analysis we assume that there is no across-generation mobility. When this assumption is relaxed to allow for a certain level of mobility, legal investment should be closer to the social optimal result. For instance, suppose that, in each generation $t$, with probability $p$ an agent gets a random draw of $l$ from the distribution, and with probability $1 - p$ he gets the same $l$ as his parent. So probability $p$ measures across-generation mobility. The realization of $l$ in generation $t + 1$ occurs at the beginning of period $t + 1$, after the legal investment decision is made at the end of period $t$. This means that the joint welfare of the dominant interest group contains the aggregate social welfare $E(V_{t+1})$ weighted by $p$. So the higher the social mobility $p$, the closer the legal investment to the social optimal choice. When $p = 1$, there is perfect mobility, and the social optimal level of legal quality will always be chosen, regardless of the political regime. Allowing a certain level of social mobility $1 > p > 0$ makes the legal development process under PR-dominance smoother, since the elite will invest in legal quality earlier, that is, well before $q_E$ is feasible, and may continue to stay in power after legal investment starts; however, our main result, that there is underinvestment in the legal system under elite rule, still holds.

If the degree of social mobility can be affected by policies, the identity of the politically dominant interest group may have important consequences. For an extreme example,
suppose there are two feasible levels of social mobility: either 0 or \( p \), where \( p > 0 \). In the FR-dominant society, the high mobility policy \( p \) will be chosen in each period, since agents using FR have the lowest income \( \bar{l} \) in the economy and thus benefit from more mobility. The same mobility policy may also be chosen in the PR-dominant society if the income inequality is mild such that the group of agents with above-average incomes does not have dominant economic power, that is, if \( V_0P(l_E) < V \) holds. In contrast, the zero mobility policy will be chosen when the income inequality is high enough, i.e., if \( V_0P(l_E) \geq V \) holds before the legal investment starts, and in each period if

\[
\int_{l_{M,t+1}}^{a} [V_P(l) - c_P(q_{t+1},l)]dG(l) \geq E(V_{t+1})
\]

holds after the legal investment starts, where \( l_{M,t+1} \) is the payoff in a stale match of the median-income project, i.e., \( V_P(l_{M,t+1}) - c_P(q_{t+1},l_{M,t+1}) = E(V_{t+1}) \).

To summarize, legal development in society with higher social mobility is closer to the social optimal result, while low mobility is more likely to occur when the income inequality is higher. So our main result about the slow legal development in societies with high endowment inequality is still true when the social mobility policy is endogenized.

### 4.2 Endogenous Personalistic Culture

Although cultures are slow-moving institutions, they may still, at least to some extent, respond to incentives. Since players in persistent relationships PR and PL get higher payoffs when \( \alpha \) is higher, they may find it beneficial to cultivate the cultural preference \( \alpha \), especially when improving legal quality is too costly. So it is possible that the social optimal level \( \alpha_t^* \) is positive, and its level is higher when more agents are initially using PR. Once the legal development starts, however, \( \alpha_t^* \) will become smaller because the benefit from the personalistic cultural preferences is reduced when the legal quality is higher due to \( \partial (-\frac{\partial c_P}{\partial \alpha})/\partial q < 0 \).

When the FR group is politically dominant and has the ability to influence the level of \( \alpha \), its optimal choice \( \alpha_t^{FR} \) will definitely be lower than \( \alpha_t^* \), if not zero, since its economic power decreases in \( \alpha \). On the contrary, when the PR group is dominant, its optimal choice \( \alpha_t^{PR} \) will be higher than the social optimal level because its members’ payoffs increase in \( \alpha \). This endogenous cultural difference between an FR-dominant society and a PR-dominant society may exacerbate their difference in legal development as shown in Propositions 5 and 6, which in turn generates further reinforcing feedbacks into their cultural difference: Since

\[\text{Even when the personalistic culture can only be voluntarily cultivated by individual agents, the cultural gap between these two types of societies may still arise because the slower legal development in a PR-dominant society will induce more investment in culture.}\]
the benefit from $\alpha$ is lower when legal quality is higher, and since the legal development in
the FR-dominant society is much faster, the gap between $\alpha_i^{FR}$ and $\alpha_i^{PR}$ may become even
larger once legal development starts in FR-dominant society.

In summary, if the personalistic culture can be endogenously chosen, it is possible to
have a positive level of personalistic culture in the social optimal result, though its optimal
level goes down as legal quality improves, and the difference in legal development between
societies with different initial income inequalities may become much larger.

The endogenous culture, however, may pose a new and potentially retarding effect on
the legal development in the elite-ruled society. Note that in such a society there exists a
self-perpetuating cycle comprised of mutually reinforcing elements shown in Figure 6: higher
initial income inequality, elite rule, a stronger personalistic culture, lower legal quality, and
higher income inequality in the next generation. In other words, a higher income inequality
is more likely to lead to a politically dominant PR group, which tends to adopt a lower
social mobility policy and a stronger personalistic culture to enhance contract enforcement;
the stronger culture will reduce the marginal benefit of investing in legal quality so that
legal development is slowed down; and a less developed legal system will preserve the initial
income inequality, giving rise to another round of the same cycle. With an exogenous cul-
ture, this cycle will eventually be broken up by the ever-improving technological conditions
that reduce the cost of investing in legal quality; that is, sooner or later, some of the elite
members will find it cheap enough to improve legal quality. Such a happy ending may never
arrive if the elite find it relatively cheaper to cultivate $\alpha$ than investing in legal quality,
which may happen, for example, when the cost of cultivating or maintaining $\alpha$ decreases
even faster than the cost of improving the legal system. So it is possible for a society to
get trapped in this under-developed cycle with a suite of political, legal, and cultural insti-
tutions that are deeply entangled with each other and mutually reinforcing. This implies
that small differences in the initial conditions may perpetuate into vastly different clusters
of institutions, which set societies onto diverging development paths.

4.3 Discussions on Modeling Choices
The main insight of the paper is that the poor benefit more from a competent legal system
than the rich, which is derived from the result that richer agents rely more on persistent
relational contracts. Many of our modeling choices can be relaxed or altered as long as this
insight goes through.

Though we do not explicitly model the possibilities for the rich elite to take advantage of
lawlessness or low legal quality, such as by engaging in rent-seeking activities or corruption,
a similar force is implicitly built in the model, since the high level of $l$ owned by the rich
elite can be interpreted as their privileges. This is further demonstrated by the fact that the aggregate income of the elite is more likely to be higher than that of the poor when legal quality is lower. That said, our model actually sends a more powerful message about the negative effects of high income inequality on legal development than models that focus on corruptive or rent-seeking activities of the elite, since even the honest-dealing elite lack incentives to improve the law.

One assumption in the model that may look restrictive is that each agent works only in one line of business characterized by $l$, the gain from trade in a stale match. It can be relaxed to allow an agent to conduct multiple businesses. For example, suppose each agent involves in $n$ businesses with different $l_i$ for $i = 1, ..., n$. Then if the agent joins the FR group when at least half of his income comes from businesses using the FR contract and joins the PR group if otherwise, our main results about legal development still go through. Alternatively, it can be accommodated in our model by assuming $n$ duplicate agents each working in only one business $l_i$; since among these $n$ agents the FR group is dominant when the aggregate income of agents using FR is dominant, this delivers a similar result to using the original agent with multiple businesses.

Similarly, the assortative matching assumption that players match with those working in the same business, though arguably quite reasonable and realistic, can also be relaxed to allow for matching across business lines, where the partner with a higher $l$ still gets a higher return $l$ once the match turns stale. Here an agent’s level of $l$ can be interpreted as his bargaining power. To accommodate such a change of assumption, agents need to reach
an agreement on a contract format before proceeding into the relationship. This is not a problem in our model with no searching cost and a continuum of agents.

In the model, agent heterogeneity is captured by \( l \) such that agents get different returns once their matches become stale, while the gains from trade in fresh matches, denoted by \( a \), are the same across agents. In a more realistic setting, \( a \) may also differ across agents as well as \( l \). If agents still match with those in the same line of business now characterized by the vector \((a, l)\), our main results will remain unchanged for the following reason. Fix \( a \); richer agents have higher \( l \) and use PR instead of FR, and hence they benefit less from legal development. Since this basic insight is true for all \( a \), then aggregating across \( a \) will deliver the same result as before, that is, the higher the income inequality, the more likely elite rule is to arise, and thus legal quality is lower.

A more restrictive assumption is that there is no information transmission among agents. It keeps the model silent on the role of informal networks such as trade unions or consumer associations in facilitating cooperation and on their interactions with legal enforcement. Presumably, allowing such networks should be more beneficial to the usage of relational contracts than legal enforcement, which seems unlikely to affect our main results.

### 5 Conclusions

Contract enforcement institutions that limit agents' ability to inflict costs on each other by defaulting play a crucial role in achieving cooperation in voluntary exchange. It is well observed that the relative usage of various enforcement institutions differs greatly over time and across societies. Specifically, informal relational contracts are more prevalent at earlier times and in developing countries, while the increasing adoption of impersonal legal enforcement is often associated with economic development and advanced economies.

This paper develops a political economy model to analyze the transition process from relying exclusively on relational contracts to the ever-increasing usage of legal contracts. It finds that the personalistic relationship and a cultural taste for it can be compatible with economic development, though their prevalence is reduced when legal quality improves. The legal development may be delayed when the rich elite who benefit most from relational contracts are politically dominant; this is more likely to occur when there is high inequality in endowment. As long as the cost of improving legal quality is reduced over time by technical progress, it is possible, even under the elite rule, for legal quality to keep improving; a higher legal quality will increase average income and reduce inequality, and hence weaken the political dominance of the elite. So reducing the investment costs of legal quality seems to be a feasible way to escape from the self-perpetuating cycle of high income inequality, elite
rule, poor legal development, heavy reliance on relational contracts, and strong personalistic preferences.

The paper can be extended in various ways. For example, it is interesting to model investment decisions that improve the quality of relationships, increasing either their productivity or the likelihood that established relationships remain productive; it seems plausible that a higher legal quality shifts resources from maintaining old matches to improving the productivity of new ones, which may speed up technological changes. The roles of multilateral networks and information transmission and punishment mechanisms may be explored to shed light on different features of relational contracts than those discussed in the paper. The coercive constraint institutions as suggested by Greif (2005) may present another barrier to legal development and the transition of contract enforcement institutions.
References


Appendix

1. Proof of Lemma 1.

Recall that in any informal relational contract the matched partners do not start to cooperate until after the \( N \)th period. When the match is still fresh in any period \( n \geq N + 1 \), the value of such an established persistent relationship \( PR \) at period \( n \) is \( V_P \). In any period \( n < N \), the value of continuing the relationship when the match is still fresh is

\[
V_n = \delta[\rho V_{n+1} + (1 - \rho)l].
\]

Then the value at the initial period of a relationship is

\[
V_{0,N} = \frac{(\delta \rho)^N a + \delta(1 - \rho)l}{1 - \delta \rho}.
\]  \hspace{1cm} (16)

In any period \( n \geq N + 1 \) when the match is still fresh, agents will not cheat if the payoff of cheating \( b + \delta V_{0,N} \) is smaller than \( V_P \), the payoff of cooperation. The condition \( b + \delta V_{0,N} \leq V_P \) determines the minimum number of periods, \( N \), that players have to stick to each other before cooperation starts:

\[
(\delta \rho)^N = \frac{a + \delta(1 - \rho)l - b(1 - \delta \rho)}{a \delta}.
\]  \hspace{1cm} (17)

Suppose without loss of generality all persistent relationships go through exactly \( N \) periods before cooperating. Plugging (17) into (16) we get

\[
V_{0,P} = \frac{a - b(1 - \delta \rho) + \delta(1 - \rho)l}{\delta(1 - \delta \rho)},
\]

which is the value of a new match adopting \( PR \).\(^{14}\)

A persistent relationship will continue even when the match goes stale. Doing so is rational when it yields a higher payoff than starting a new relationship. That is, \( l \geq V_{0,P} \) must hold, which is equivalent to \( l \geq \frac{a - b(1 - \delta \rho)}{\delta \rho} \equiv l_* \). Then \( V_{0,P} \) can be rewritten as \( V_{0,P} = \frac{\rho l_* + (1 - \rho)l}{1 - \delta \rho} \), where \( \min \{V_{0,P} : l \geq l_* \} = \bar{l}_* \). The gap between \( V_P \) and \( V_{0,P} \) is

\[
c_{PR} = V_P - V_{0,P} = \frac{a - \rho l_* - (1 - \rho)l}{1 - \delta \rho},
\]

which represents the relationship-building cost. Its highest level is \( c_{PR}(l = l_*) = \frac{b - a}{\delta \rho} \).

Following similar arguments as above we get the following conditions for \( FR \).

\[
V_{FR} = a + \delta(\rho V_{FR} + (1 - \rho)V_{0,F}) \Rightarrow V_{FR} = \frac{a + \delta(1 - \rho)V_{0,F}}{1 - \delta \rho}.
\]

\[
V_{n,F} = \delta[\rho V_{n+1,F} + (1 - \rho)V_{0,F}] \Rightarrow V_{0,F} = \frac{(\delta \rho)^N a + \delta(1 - \rho)V_{0,F}}{1 - \delta \rho} \Rightarrow V_{0,F} = \frac{(\delta \rho)^N a}{1 - \delta}.
\]

\(^{14}\)The integer problem on the minimum number of noncooperative periods is assumed away; otherwise some minor quantitative adjustment is needed, which will not change the qualitative results.
\[ b \leq V_{FR} - \delta V_{0F} = \frac{(1 - \delta(\delta\rho)^N)a + \delta(1 - \rho)(\delta\rho)^N a}{1 - \delta \rho} = \frac{a - b(1 - \delta\rho)}{\delta \rho} = l_\ast \]

\[ \Rightarrow V_{0F} = \frac{a - b(1 - \delta\rho)}{(1 - \delta)\delta \rho} = \gamma_\ast \]

\[ \Rightarrow V_{FR} = \frac{a + \delta(1 - \rho)\gamma_\ast}{1 - \delta \rho}. \]

\[ c_{FR} = V_{FR} - V_{0F} = \frac{a - l_\ast}{1 - \delta \rho} = \frac{b - a}{\delta \rho}. \]

Since conditions (5) and (3) imply \( V_{0P} \geq V_{0F} \) when \( l \geq l_\ast \), we get the result.

2. Proof of Lemma 2.

(1) FL. We first study the legal contract FL leading to a fair-weather relationship. Suppose an unmatched player obtains a value \( W_F \) while a matched player obtains \( V_F \). On the equilibrium path of a fair-weather relationship where players cooperate immediately when they meet, \( V_F - c = W_F \). That is, once they spend cost \( c \) to write an effective contract to forbid cheating, each player can obtain a value of \( V_F \). When players cooperate, they get \( a \) immediately, followed by a continuation value \( V_F \) with probability \( \rho \) and \( W_F \) with probability \( 1 - \rho \). That is \( V_F = a + \delta(\rho V_F + (1 - \rho)W_F) \), which with \( W_F = V_F - c \) gives

\[ V_F = \frac{a - \delta(1 - \rho)c}{1 - \delta}, \]

\[ W_F = \frac{a - (1 - \delta\rho)c}{1 - \delta}. \]

Let’s check the possible one-shot deviation. In a new match, if a player cheats he gets payoff \( b(1 - Q(c, q)) + \delta W_F - c \), where the first term is his expected current payoff, and in the next period he will start as an unmatched player with payoff \( \delta W_F \), since his partner will break up the partnership. If he cooperates, the match will continue where he gets \( V_F - c \). Cheating will not happen when

\[ b(1 - Q(c, q)) \leq V_F - \delta W_F, \]

which becomes \( bQ(c, q) + \delta pc \geq b - a \) after plugging in \( V_F \) and \( W_F \). Define \( c_F \) to make the equality hold and we get condition (7): \( bQ(c_F, q) + \delta pc_F = b - a \). Since players will not cheat when \( c \geq c_F \), \( c_F \) is the minimum cost to use FL.

Another condition is that it must be desirable to break up a match when it becomes stale. That is \( l \leq W_F \) should hold, which is \( l \leq a - (1 - \delta\rho)c \). When the equality holds, we get \( c_S = \frac{a - l}{1 - \delta \rho} \) as the threshold legal cost, above which players will not break up a stale match. So fair-weather relationships are feasible when \( c \in [c_F, c_S] \). Note that \( c_F \) is independent of
l while $c_S$ decreases in $l$. This implies that when players adopt a fair-weather relationship, $c_F \leq c_S$ must be true, or equivalently

$$l \leq a - (1 - \delta \rho)c_F \equiv l_F$$

holds, where $c_F = c_S$ when $l = l_F$. So in a given legal system, only projects with low $l \leq l_F$ will adopt fair-weather relationships.

(2) PL. The value of an established match in PL is $V_P$, while an unmatched player gets $W_P = V_P - c$. A player will not cheat if $b(1 - Q(c, q)) \leq V_P - \delta W_P$. It is simplified to

$$bQ(c, q) + \delta c \geq b - \frac{(1 - \delta)a + \delta(1 - \rho)l}{1 - \delta \rho},$$

where the equality holds when $c = c_P$, which is the minimum cost to use PL. Note that the right-hand side is exactly $\delta c_{PR}$, which can also be connected to $\delta c_S$:

$$bQ(c_P, q) + \delta c_P = \delta c_{PR} = b - a + (1 - \rho)\delta c_S.$$ The condition $W_P \leq \bar{l}$ is equivalent to $c \geq c_S$. So players prefer PL when $c \geq \max\{c_P, c_S\}$.

(3) The cost conditions can be related in the following way:

$$bQ(c_P, q) + \delta (c_P - c_S) + \delta pc_S = b - a = bQ(c_F, q) + \delta pc_F.$$

When $c_P = c_S$, condition (8) is exactly the same as (7), which means $c_P = c_F$. But then $c_P = c_F = c_S$ must hold, which happens only when $l = l_F$, since $c_F = c_S$ holds at $l = l_F$. The above condition can be rewritten as

$$b(Q(c_F, q) - Q(c_P, q)) + \delta \rho(c_F - c_P) = \delta(1 - \rho)(c_F - c_S).$$

When $c_P > c_S$, we must simultaneously have $c_F > c_P > c_S$, where $c_F > c_S$ happens only when $l > l_F$. Similarly, if $c_P < c_S$, we must simultaneously have $c_F < c_P < c_S$ and $l < l_F$.

$$\frac{\partial c_F}{\partial q} < 0 \text{ and } \frac{\partial c_P}{\partial q} < 0 \text{ since}$$

$$\frac{\partial c_F}{\partial q} = -\frac{bQ_q(c_F, q)}{bQ_c(c_F, q) + \delta \rho} < 0,$$

$$\frac{\partial c_P}{\partial q} = -\frac{bQ_q(c_P, q)}{bQ_c(c_P, q) + \delta} < 0.$$

When $l \geq l_F$ we know $c_F > c_P$ from the analysis above. But this, together with $Q_{qc} \geq 0$, $Q_{cc} \leq 0$, and $\rho < 1$, implies $\frac{\partial c_F}{\partial q} > \frac{\partial c_P}{\partial q}$.

$$\frac{\partial^2 c_F}{\partial q^2} = -\frac{bQ_{qq}(bQ_c + \delta \rho) - b^2Q_q(Q_{cq} + Q_{cc}\partial c_F/\partial q)}{(bQ_c + \delta)^2} > 0,$$

$$\frac{\partial^2 c_P}{\partial q^2} = -\frac{bQ_{qq}(c_P, q)(bQ_c + \delta) - b^2Q_q(c_P, q)(Q_{cq} + Q_{cc}\partial c_P/\partial q)}{(bQ_c + \delta)^2} > 0.$$
\(l_F\) is increasing and concave in \(q\) since

\[
\begin{align*}
\frac{\partial l_F}{\partial q} &= (1-\delta \rho) - \frac{\partial c_F}{\partial q} > 0, \\
\frac{\partial^2 l_F}{\partial q^2} &= -(1-\delta \rho) \frac{\partial^2 c_F}{\partial q^2} < 0.
\end{align*}
\tag{19}
\]

Then this implies \(q\) is increasing and convex in \(l_F\).

When \(l > l_F\), only PL is an equilibrium since \(c_F > c_S\). When \(l < l_F\), both PL and FL are feasible since \(c_F < c_P < c_S\). Players either incur a cost \(c_F\) to engage in FL, getting a net value \(V\) in (10), or incur a cost \(c_S\) to have PL and get \(V_P - c_S = \lambda\). It is easy to see that when \(l < l_F\), FL has a higher value than PL, and when \(l = l_F\) players are indifferent.


For any \(q > q^*_s\), \(l_R\) is an increasing and concave function of \(q\) since by (12)

\[
\frac{\partial l_R}{\partial q} = \frac{1-\delta \rho - \partial c_P(l_R, q)}{1-\rho} > 0,
\]

\[
\frac{\partial^2 l_R}{\partial q^2} = \frac{-1-\delta \rho \partial^2 c_P(l_R, q)}{1-\rho} < 0.
\]

When \(q = q^*_s\), \(c_P = \frac{b-a}{\delta \rho} = c_{PR}\) at \(l^*_s\), so we get \(l_R = l^*_s = l_F\). For any \(q > q^*_s\), \(l_R > l_F\) is equivalent to

\[
-\delta(1-\delta \rho)c_P + b(1-\delta \rho) - (1-\delta)a > a\delta(1-\rho) - \delta(1-\rho)(1-\delta \rho)c_F
\]

\[\Leftrightarrow \ \delta(c_F - c_P) + b - a - \delta \rho c_F > 0,
\]

where the last inequality comes from \(c_P(l, q) < c_F < \frac{b-a}{\delta \rho}\) for \(q > q^*_s\) and \(l > l^*_F\). When \(l = a\), \(c_{PR} = \frac{\rho(a-l^*_s)}{1-\delta \rho} > 0\); so when \(l_R = a\), \(c_P(l_R, \bar{q}) = c_{PR}(l_R) > 0\). In contrast, when \(l_F = a\), we have \(c_F = c_P = c_S = 0\) and legal quality must have reached the highest possible level.


1) \(q < q^*_s\). When \(q < q^*_s\) and hence \(c_F > \frac{b-a}{\delta \rho}\), the corresponding threshold \(l_F(q)\) is denoted by \(l^*_F < l^*_s\). Players with \(l \leq l^*_F < l^*_s\) strictly prefer FR to PL, since \(V_{0F} = \frac{l}{1-\delta} > \frac{l^*_F}{1-\delta} = V_F - c_F\). Those in the middle with \(l \in (l^*_F, l^*_s)\) have to compare \(V_{0F}\) under FR with \(V_P - c_P\) under PL, where \(V_{0F} = \frac{l}{1-\delta} = (V_P - c_P)_{(l=l^*_s, q=q^*_s)} > (V_P - c_P)_{(l < l^*_s, q < q^*_s)}\) holds since \(V_P - c_P\) increases in both \(l\) and \(q\). So agents prefer FR to PL. When \(l > l^*_s > l^*_F\), we have \(c_P > c_S > c_{PR}\) so that PR is strictly preferred to PL. So when \(q < q^*_s\), FR is chosen when \(l < l^*_s\) and PR when \(l > l^*_s\). Similar arguments apply to the case with \(q = q^*_s\) where players are indifferent between FR and FL when \(l < l^*_s\) and still choose PR when \(l > l^*_s\).
2) $q > q_\ast$. When $q > q_\ast$ and hence $c_F < \frac{b-n}{\delta P}$, the corresponding threshold $l_F(q)$ is denoted by $\frac{l_R}{1-\delta} > l_\ast$. Players with $l \leq l_\ast < \frac{l_R}{1-\delta}$ strictly prefer FL to FR since $V_{0F} = \frac{l}{1-\delta} < \frac{l_R}{1-\delta} = V_F - c_F$. Players with $l \in [l_\ast, l_R]$ prefer FL to PR since $V_{0F} < V_F - c_F$:

$$V_{0P} < \frac{a-b(1-\delta + \delta(1-\rho))^R}{\delta(1-\delta\rho)} < \frac{l_R}{1-\delta} = V_F - c_F$$

$$\iff a-b(1-\delta + \delta(1-\rho))^R < \delta(1-\delta\rho)^R$$

$$\iff l_R > \frac{a-(1-\delta^R)\rho}{\delta^R} = l_\ast.$$

So FL is chosen for any project $l \leq l_R$. Since $c_F(l, q) > c_{PR}(l)$ holds for $l > l_R$ while the opposite is true when $l < l_R$, PL is chosen for $l \in [l_F, l_R]$ while PR for $l \in [l_R, a]$.

5. Proof of Proposition 3.

Repeating the calculation in the basic model, we get

$$V_P(\alpha) = \frac{a + \delta(1-\rho)(l + \alpha)/(1-\delta)}{(1-\delta\rho)},$$

$$\delta c_{PR}(\alpha) = b - \frac{a(1-\delta + \delta(1-\rho)(l + \alpha)}{(1-\delta\rho)} = bQ(c_P, q) + \delta c_P,$$

$$c_S(\alpha) = \frac{a - (l + \alpha)}{1-\delta\rho},$$

$$l_\ast(\alpha) = \frac{a - b(1-\delta\rho)}{\delta\rho} - \alpha,$$

$$l_F(q, \alpha) = a - (1-\delta\rho)c_F - \alpha,$$

$$l_R(q, \alpha) = l_R(q, 0) - \alpha.$$

$$\frac{-\partial^2 c_P(q, l, \alpha)}{\partial q \partial \alpha} = \frac{\delta(1-\rho)}{1-\delta\rho} \frac{\partial}{\partial \alpha} \left( \frac{1}{bQ_c(c_p, q) + \delta} \right) = \frac{\delta(1-\rho)}{1-\delta\rho} \frac{Q_{cc}(c_p, q)}{bQ_c(c_p, q) + \delta} < 0.$$

The payoffs and costs for fair-weather matches remain the same as before.


The FOC illustrates the trade-off between reduced costs in using legal contracts and the marginal cost of improving legal quality:

$$\frac{(1-\delta\rho)}{(1-\delta)} G(l_{F,t+1}) \frac{-\partial c_F}{\partial q_{t+1}} + \int_{l_{F,t+1}}^{l_{R,t+1}} \frac{-\partial c_{P,F,t+1}}{\partial q_{t+1}} dG(l) - C_1(q_{t+1}, q_t)k_t^{-1} \leq 0, \quad 0 \text{ if } q_{t+1} > q_\ast.$$  \hspace{1cm} (20)

Since $C_2(q_{t+1}, q_t) < 0$ and $k_t$ increases over time, it is less costly to invest in the legal system at later times when both $q_t$ and $k_t$ are higher. Suppose the first time the equality holds is $T_0$, and the associated optimal legal quality is $q_{T_0}^* > q^\ast$. Then for any $t < T_0$, we have
$q_t = 0$. Thus $T_0$ is uniquely determined by

$$k_{T_0-1} = \left[\frac{(1-\delta)p}{(1-\delta)}G(l_{F,T_0}) - \partial C_{F,T_0} \right] \int_{l_{F,T_0}}^{l_{R,T_0}} -\frac{\partial C_{P,T_0}}{\partial q_{T_0}} dG(l)^{-1}C_1(q_{T_0},0)$$

(21)

The LHS in the FOC (20) decreases in $\alpha$ since

$$\frac{\partial LHS}{\partial \alpha} = \frac{1-\delta p}{1-\delta} \frac{\partial C_{F,t+1}}{\partial q_{t+1}} G'(l_{F,t+1}) - \frac{\partial C_{P,t+1}}{\partial q_{t+1}} l_{F,t+1} G'(l_{F,t+1})$$

$$- \int_{l_{F,t+1}}^{l_{R,t+1}} \frac{\partial^2 C_{P,t+1}}{\partial q_{t+1} \partial \alpha} dG(l) + \frac{\partial C_{P,t+1}}{\partial q_{t+1}} l_{R,t+1} G'(l_{R,t+1})$$

$$\leq - \int_{l_{F,t+1}}^{l_{R,t+1}} \frac{\partial^2 C_{P,t+1}}{\partial q_{t+1} \partial \alpha} dG(l) + \frac{\partial C_{P,t+1}}{\partial q_{t+1}} l_{R,t+1} G(l_{R,t+1}) < 0,$$

where the first inequality is reached by $\frac{\partial C_{F,t+1}}{\partial q_{t+1}} \leq \frac{\partial C_{P,t+1}}{\partial q_{t+1}} l_{F,t+1} < 0$, and the second inequality by $\frac{\partial^2 C_{P,t+1}}{\partial q_{t+1} \partial \alpha} > 0$. So we have

$$\frac{\partial q_{t+1}^*}{\partial \alpha} = -\frac{\partial LHS}{\partial \alpha} / SOC < 0,$$

that is, the optimal legal quality is lower when $\alpha$ is higher. Similarly, since the marginal gain of improving the legal system decreases in $\alpha$, the investment in legal system starts later. Furthermore, in each period the legal quality is also lower not only because $\alpha$ is higher, but also because the previous legal quality is also lower.

7. Proof of Proposition 5.

When FR is politically dominant, the relevant dominant interest group in terms of legal development is FL, whose objective function is

$$\max_{q_{t+1}} \pi_{FL}(q_{t+1}) - G(l_{F,t+1})C(q_{t+1}, q_t)k_{t-1}^{-1} = G(l_{F,t+1})(l_{F,t+1} - C(q_{t+1}, q_t)k_{t-1}^{-1}).$$

The FOC is

$$G(l_{F,t+1})[l'_{F,t+1} - C_1(q_{t+1}, q_t)k_{t-1}^{-1}] + G'(l_{F,t+1})l'_{F,t+1}[l_{F,t+1} - C(q_{t+1}, q_t)k_{t-1}^{-1}] \begin{cases} < 0 & \text{if } q_{t+1}^{FR} = 0, \\ = 0 & \text{if } q_{t+1}^{FR} > q^*. \end{cases}$$

Since the marginal gain $l'_{F,t+1}$ for an FL agent is larger than that of a PL agent due to $l'_{F,t+1} > d'_{P,t+1}$, and the second term in the LHS of the FOC is positive, the LHS is larger than that in the social optimal case, so the optimal choice $q_{t+1}^{FR}$ is larger than $q_{t+1}^*$ at any period $t$, and legal development starts earlier.

When the joint group of PL and FL is politically dominant, its objective function is

$$\max_{q_{t+1}} \pi_{FL}(q_{t+1}) + \pi_{PL}(q_{t+1}) - [1 - G(l_{R,t+1})]C(q_{t+1}, q_t)k_t^{-1},$$

The FOC is (15) for $q_{t+1}^{PR} > q^*$. But as long as $q_{t+1}^{PR} \leq q_E$, the PR group, who has no interest in legal development, is still politically dominant, and hence the optimal legal quality is zero. Only when $q_{t+1}^{PR} > q_E$ is true does the joint group of PL and FL becomes politically dominant, and hence $q_{t+1}^{PR}$ is the optimal choice. Since the first two terms on the LHS of (15) are the same as in the social optimal case, while the sum of the last two terms is larger, the optimal choice $q_{t+1}^{PR}$ is larger than $q_t^*$ for the same $q_t$ and $k_t$. The legal development process starts later when the threshold $q_E$ is higher, which happens when income inequality is higher.