

**Village versus Market Social Capital:
An Approach to Development**

Krishna B. Kumar and John G. Matsusaka

USC CLEO Research Paper No. C05-5



CLEO RESEARCH PAPER SERIES

Sponsored by the John M. Olin Foundation

University of Southern California Law School
Los Angeles, CA 90089-0071

*This paper can be downloaded without charge from the Social Science Research Network
electronic library at <http://ssrn.com/abstract=574803>*

Village versus Market Social Capital: An Approach to Development

Krishna B. Kumar and John G. Matsusaka

RAND & Duke University and University of Southern California

This paper develops a theory in which there are two types of social capital to enforce contracts: “village” capital relies on personal networks and repeat play; “market” capital relies on third parties such as auditors and courts. Village capital is efficient when most trading is local, but only market capital can support trading between strangers that allows extensive division of labor and industrialization. We show that economies with low cost of accumulating village capital (say, because people live close together) are richer than economies with high costs when long distance trade is difficult, but are slower to transition to impersonal market exchange (industrialize) when long distance trade becomes feasible. The model provides one way to understand why the wealthiest economies in 1600 AD, China, India, and the Islamic Middle East, failed to industrialize as quickly as the West.

July 2006

* Please direct written correspondence to the second author at USC Marshall School of Business, Los Angeles CA 90089-1427, kumar@rand.org, matsusak@usc.edu. We are grateful for comments from Marco Bassetto, Cristina De Nardi, Yasushi Hamao, Anthony Marino, Christopher Phelan, Romain Ranciere, Fanghui Song, Kei-Mu Yi, Jan Zabochnik, Fernando Zapatero, and workshop participants at Duke University, Indian School of Business, Minneapolis Fed, Rand, and USC. USC provided financial support.

I. Introduction

Differences across countries in economic performance and development appear to depend on “social capital” as well as differences in capital and labor inputs, factor endowments, and technology.¹ Yet social capital remains an elusive concept, serving as an umbrella term for a variety of empirical variables, such as trust in others, density of social networks, and honesty. The process by which it is accumulated and put to work remains something of a mystery. The mystery deepens when viewed at the micro level. Social capital is generally assumed to reduce the cost of transacting or cooperating. Game theory suggests that cooperation is easiest to achieve in contexts where the parties are engaged in repeated interaction and are well informed about each other (Kandori, 1992; Moore, 1995). From this perspective, many developing nations seem like ideal environments for contracting, with their localized economies based on kinship and patron-client relations, repeated play, and transacting parties who know each other well. And indeed, there are many studies showing how parties in developing and transition economies are able to maintain an impressive amount of cooperation using sophisticated informal contracts supported by repeated play and personal networks.² Why are economies that seem to meet the conditions for efficient contracting so often poorer than other economies where transacting parties are strangers and do not transact repeatedly?

The idea we propose is that less developed economies may be well endowed with social capital, but it is the wrong kind of social capital. We distinguish two types of social capital that can be used to enforce contracts. “Village” capital takes the form of social networks, kinship, patron-client relations, and in-depth knowledge about trading partners. “Market” capital takes the form of knowledge about how to use third party enforcement institutions such as courts, auditors, standardized accounting procedures, credit ratings,

¹ For evidence that the “standard” factors alone cannot explain income differences, see Engerman and Sokoloff (1997), Prescott (1998), and Hall and Jones (1999). On the ability of “social capital” (or “social infrastructure”) to account for some of the unexplained variation see La Porta et al. (1997), Knack and Keefer (1997), and Hall and Jones (1999). For a survey of the social capital literature, see Durlauf and Fafchamps (2005).

² See Bates (1990), Fafchamps and Minton (1999), Ostrom (1990), and Wade (1988) to list a few examples.

and commercial law. In our view, either type of capital can be optimal in the right environment. Village capital works best when economic activity is primarily local, involving transactions between members of the same social network, while market capital is effective for transactions between strangers who may not trade again in the future. Because village capital is inherently limited by the size of the social network, only market capital can support the extensive markets, specialization, and division of labor that are prerequisites for industrialization.³

This paper develops a model of these two types of social capital and studies how the accumulation of social capital influences the path of development. Social capital allows transacting parties to use the available enforcement mechanisms (village capital can use social networks, market capital can use courts), and thus affects economic performance by making contracting credible, allowing parties to make relationship specific investments. The stock of social capital also influences the accumulation of social capital by subsequent generations because of learning externalities (children raised in the midst of a dense social network are likely to develop the skills to function in that network) and because parents may want their children to have the same type of social capital as they have.

The optimal type of social capital for an economy depends on the return from trading locally versus the return from trading with distant strangers. In a preindustrial environment where transportation and communication costs are high, trading is overwhelming local (Crone, 1989), and those economies that are most able to accumulate village capital become the wealthiest.⁴ When new technologies are developed that

³ As discussed at length below, “village” and “market” are convenient metaphors to describe the mechanism used to enforce contracts, but should not be taken too literally.

⁴ “The fact that agriculture and manufacture alike produced little meant that all pre-industrial societies were dominated by scarcity. ... At the same time, the inadequate nature of the means of transportation and communication meant that most people lived in very local worlds. These are the two fundamental features to which we shall return time and again.” (p. 14) “The peasants were hampered by the fact that they could not profitably carry their goods for sale or exchange for more than 4-5 miles or so because the costs of transport were too high (unless they could send them by sea, or, in some unusual cases, via frozen rivers or snow-packed roads.) Hence, such trade as they engaged in tended to be extremely local or, as some would term it, cellular.” (Crone, 1989, p. 23).

significantly reduce transportation costs, it becomes optimal to trade with people who are not kin and belong to a different social network in order to take advantage of extensive markets and division of labor, but doing so requires development of market capital to support exchanges between strangers. We call this process of replacing village capital with market capital “industrialization” or “modernization.” One of our main results shows that because of externalities, economies with a large initial stock of village capital find it more difficult to transition to a market economy than countries with a small stock of village capital. Thus, we show not only how some economies can be trapped in a bad equilibrium with the wrong type of social capital, but also that there is a predictable and somewhat counterintuitive pattern: those economies that were once the most advanced (had the most village capital in preindustrial times) are the most likely to be caught in the trap and fall behind.

We believe that thinking in terms of two types of social capital can help unravel some of the puzzles in the literature. As discussed above, it can explain why economies with extensive personal networks fail to develop even though they have a large amount of social capital: the social capital they have is unsuitable for a market economy. It also provides a way to understand a central puzzle of economic development: why China, India, and the Islamic Middle East, the wealthiest and most advanced regions of the world in the late Middle Ages, were slower to industrialize than the relatively backward region of Europe. Existing explanations tend to focus on why Europe industrialized first without considering why the other regions were more advanced to begin with, but we view these facts as two sides of the same coin. In our view, it was precisely those factors that created the preindustrial prosperity of China, India, and the Islamic states that made it difficult for them to modernize: since trading was overwhelmingly local in preindustrial times, regions that had a relative advantage in accumulating village capital were the richest, but their stocks of village capital and relative efficiency at accumulating village capital impeded conversion to market capital when technological innovations made impersonal trading feasible. In this way, our model offers a resolution to a “paradox” noted by a leading historian of medieval Islam (Udovitch, 1979, p. 273):

“The very factors—status and personal-social relations—which assured the smooth and successful functioning of credit and merchant banking activities in the Islamic Mediterranean world during most of the medieval period, effectively prevented their growth, elaboration, and development into independent, stable organizational forms. Given the slowness and unpredictability of communications between geographically distant locations, and given the sheer physical and psychological limitations on individual social intercourse, the scale of economic activities was necessarily restricted to numerous small, even intimate, circles. The possibility of expansion into a larger, more cohesive structure was precluded by the comparatively narrow social basis on which economic life was conducted.”

Our analysis also predicts that in societies with large stocks of village capital, individuals may actively resist modernization. Modernization in our view is inextricably linked to a shift from village to market social capital. Development requires unwinding the web of family and kin obligations that govern life in a traditional economy and replacing it with a social structure in which individuals have more autonomy. Individuals may this fight modernization in order to preserve their “way of life” – consumption benefits they receive from the existing structure of social relations, such as filial piety and extended families.

Our approach to development is driven by two key ideas. The first is that institutions are not self-executing—individuals must learn how to use them. It is widely recognized that economic development depends on the creation of institutions to support market transactions (North, 1990), and institutions play a central role in our analysis. However, in our view, pro-growth institutions cannot be established simply by adopting the right written documents or appointing honest judges and regulatory officials; market institutions become effective only when the population at large accumulates the human capital necessary to use the institutions. An example we discuss below is the British government’s attempt to establish Western-style courts in India in the 19th century, an effort that was unsuccessful because of social pressure on individuals to avoid the courts

and rely on village elders for dispute resolution. Our analysis follows Weingast (1997), who argues that the rule of law is not self-executing, but requires complementary attitudes and actions of citizens. Institutions matter in our framework, but are themselves reliant on a society's social capital.⁵

The other critical idea in our analysis is that there are two kinds of social capital. The idea of different types of social capital has not been explored in the literature to date, although Krueger and Kumar (2004a, 2004b) use the idea of different types of (conventional) human capital to explain growth differences between the United States and Europe. Assuming two types of social capital provides a resolution to the puzzle of why people in developing countries do not have more of the social capital that the empirical literature identifies as so important for prosperity. Casual observation suggests that parents in poor countries spend at least as much time as parents in wealthy economies socializing their children and integrating them into family and community social networks, which should build social capital. The problem is that although children do develop social capital in developing countries, it may be the wrong kind of social capital for market transactions. This view is consistent with evidence reported by Bertrand and Schoar (2006) that the presence of a strong family system in a country is associated with poor contemporary economic performance. The assumption of two types of social capital is what allows us to explain why some countries seem to have too little social capital without having to maintain that they are incapable of investing in it, lack the appropriate personal traits, or simply had the misfortune to be born into a dysfunctional culture.

The paper proceeds as follows. Section II develops the model and characterizes the equilibria. Section III derives the main results. Section IV reviews historical evidence on preindustrial Europe, China, India, and the Islamic Middle East, and their responses to industrialization. Section V discusses other implications. Section VI considers robustness. Section VII concludes.

⁵ The idea that institutions are partially embodied in human capital finds support in Osili and Paulson (2003) which shows that the willingness of immigrants to participate in American financial markets depends on the type of institutions they were exposed to as children in their home countries.

II. A Model with Two Types of Social Capital

At each point of time, there is a measure one of agents who are identical in all respects except for the type of social capital they have, either V-capital (“village capital”) that is useful for enforcing contracts between kin and other people who are known and will be encountered again, or M-capital (“market capital”) that is useful for enforcing contracts with strangers who are unlikely to be encountered again. Social capital does not have a direct effect on production, and each individual has only one type of social capital. At the start of each period, a measure m of the population has M-capital. The distribution of social capital can change over time but is fixed within a period. We have in mind that a period represents a generation and social capital can only change across generations. As will be seen, m is the state variable in this economy. We first characterize production decisions in a single period taking m as given, and then introduce dynamics that endogenize the capital stock.

A. Assumptions of the One-Period Model

1. Trading Partners/Locations

Agents independently choose between trading with a person in their social network or with a person outside their network. Trades between people in the same network are enforced using institutions that can be accessed with V-capital, and for short are said to take place in a “village.” Trades between people that do not belong to the same social network are enforced with institutions that can be accessed with M-capital and are said to take place in the “market.” We chose the terms “village” and “market” to suggest that trades between people who are in the same social network will often take place locally while trades between strangers can take place at distant trade centers (such as a medieval fair) but nothing in our model precludes people in a distant city from relying on their social networks (if they meet someone from the same network) or people in villages from trading with strangers who pass through.

2. Production

Once agents have decided whether to seek a trading partner in the village or market, each is randomly matched with another in the same location and the two have the opportunity to sign a contract and “go into business” together. The production environment is a simplified case of a symmetric holdup model such as Hart and Moore (1990) in which each party can make a “reliance investment” (Shavell, 1998). The baseline output for a business is normalized to zero. Each agent can make a relationship-specific investment at a cost k that allows him to increase output to an amount $y > k$ when it is time to produce. For example, one party might invest in identifying a low cost group of suppliers and the other might develop a list of customers.

The effective price per unit of output is $\theta_i = e_i - t_i$, where $i \in \{M, V\}$. The effective price is different for market and village businesses for two reasons. The parameter e captures differences in the efficiency of production: because personal networks are inherently limited in scope, local traders have less diversity of partners and division of labor is limited. Ben-Porath (1980, p. 14) observed, “The transactional advantages of the family cannot compensate for the fact that within its confines the returns from impersonal specialization and division of labor are not fully realizable.” We incorporate this into the model by assuming $e^M > e^V$.⁶ The parameter t captures transportation and communication costs associated with trading. Village transactions are less costly in this respect: $t_M > t_V$. Without loss of generality, we normalize $e_V = 1$ and $t_V = 0$ so that $\theta_V = 1$ and the effective price in the market is $\theta \equiv \theta_M = e_M - t_M$. The purpose of decomposing price in this way is to be able to study how the economy responds to technological innovations that reduce the cost of trading over distances in an environment where division of labor favors market exchange. In particular, we have in mind that $\theta < 1$ in preindustrial times because t_M is extremely large, but $\theta > 1$ after transportation and communication costs fall beginning the 17th century.

⁶ We take the superiority of market versus local trade (along this dimension) as given, but it could be derived from more fundamental assumptions, such as Dixit-Stiglitz preferences for diversity a la Romer (1990). Dixit (2003) also develops a model of the limits of self-enforcing contracts when external enforcement is available.

3. Contracts and Enforcement

Each period is divided into subperiods. In the startup period, parties sign a contract that stipulates the required investment of each party, damages for nonperformance, and a profit-sharing arrangement. After the contract is settled, each party then independently does or does not make the reliance investment. When the time for production arrives, each party observes whether the other party invested. The parties can seek damages if the other party was required to invest but failed to do so, and can also attempt to renegotiate the original profit-sharing arrangement. Social capital allows the holder to appeal to external authorities to enforce the initial contract provided the person has the correct type of social capital for his trading environment. Specifically, a seller with V-capital in a village can call on family connections, social pressure, patron-client relations, and so on, while a seller with M-capital in the market can turn to courts, regulators, and other impartial enforcers.⁷ However, a V-person trading in a market lacks the knowledge to call upon the enforcement mechanisms in the market, and an M-person trading in a village is unable to use social networks to defend the contract.⁸ We assume damages are sufficiently large that a person would rather invest than pay damages, and the costs of seeking damages is sufficiently low that an aggrieved party would always seek damages if possible. Together, these assumptions imply that a party will honor his contractual commitments if his trading partner has the right type of social capital. After possibly renegotiating the contract, production occurs, output is sold, and the partnership ends. We assume cash flow is apportioned by dividing the surplus equally (the Nash bargaining outcome with equal weights), and each party's reservation value is 0 if negotiation breaks down.

⁷ Microfoundations of the idea that exchanges can be supported by reciprocity or third parties are developed in Kranton (1996) and Dixit (2003). Their models display a trading externality, as does ours, because traders using one type of enforcement mechanism impose costs on traders using the other mechanism, and thus provide some justification for our approach.

⁸ We are assuming that market institutions cannot be used in the village. That is, people who trade in the village do not write notarized contracts using language that would be enforceable in a court, but rather follow practices and customs (the proverbial “sealed with a handshake”) that allow interpersonal institutions to be called on. Here again, “village” and “market” transactions should be understood as referring to the underlying enforcement institutions more than the physical location of the meeting.

B. Equilibrium Production

The production arrangement for any trading pair depends on their social capital and where they trade. The first-best outcome is for both to invest because $y > k$. We are interested in the situation where hold-up can be a problem, which occurs when $y < \frac{4}{3}k$ and $\theta y < \frac{4}{3}k$, as discussed below, so we maintain these parameter assumptions throughout. There are three possible cases for trades in the market.

Case 1. M-person meets M-person in the market

Since both parties can enforce the contract, hold-up is not a danger and they can achieve the first-best. Both parties invest, yielding a surplus of $2\theta y - 2k$, and each person earns $r_{MM} = \theta y - k$.

Case 2. V-person meets V-person in the market

Because neither person has the appropriate social capital, the initial contract cannot be enforced and the surplus is always apportioned by renegotiation. If both parties were to invest, each would earn $\theta y - k$, as in Case 1. If only one person were to invest, the post-investment surplus would be θy , giving a return of $.5\theta y - k$ to the person who invested and $.5\theta y$ to the person who did not invest. Because the investment k is sunk, it plays no role in ex post bargaining. The person who did not invest would be better off than if he had invested because $.5\theta y < k$ by our assumption that $\theta y < \frac{4}{3}k$. The same condition also makes it optimal not to invest if the other person does not invest. Therefore, neither person invests, and each person earns $r_{VV} = 0$.

Case 3. M-person meets V-person in the market

The V-person cannot be required to invest because he is vulnerable to being held up and, as shown in Case 2, the M-person would gain from holding him up in renegotiation. The M-person is willing to invest given a large enough share of revenue because he can defend the initial contract against hold up. The surplus when only the M-

person invests is $\theta y - k$ so each person earns $r_{MV} = .5(\theta y - k)$ – revenue is divided $.5(\theta y + k)$ for the M-person and $.5(\theta y - k)$ for the V-person.⁹

The return from trading in the village is determined analogously. The differences are first, that V-capital and not M-capital can be used to enforce the initial contract, and second, that the value of the final good is 1 instead of θ . So when two V-persons meet in the village, each earns $y - k$; when a V-person meets an M-person each earns $.5(y - k)$, and two M-people earn zero.

All agents prefer to trade with agents who have social capital that can tap the enforcement institutions available at the trading location. Thus, an externality associated with social capital emerges endogenously. Social capital affects not only the individual's return but also the return of individual's trading partner: $r_{VV} < r_{MV} < r_{MM}$. This idea that social capital is institution-specific distinguishes our approach from pure coordination models, like the culture model of Lazear (1995, 1999).

C. Equilibrium Trading Locations and Income

We can now characterize equilibrium trading locations and income for a given m . We begin by assuming that $\theta > 1$. Let $\pi_I(L)$ denote the expected payoff for a person with I-capital who trades in location $L \in \{M, V\}$ and let x denote the endogenously determined fraction of people in the market with M-capital.¹⁰ The payoff for an M-person

⁹A different contract would require both parties to invest, give the V-person a fixed payment F , and make the M-person the residual claimant. The V-person will agree to this contract if and only if $F \geq k$. The M-person then earns $2\theta y - k - F$ if he invests and $.5\theta y$ if he does not invest and renegotiates, so he will agree to this contract if and only if $F \leq 1.5\theta y - k$. Given our assumption $\theta y < (4/3)k$, there does not exist an F for which the contract is acceptable to both parties. We make this assumption specifically to rule out achievement of a first-best outcome so we can study a situation where hold up is a potential problem and enforcement can be valuable.

¹⁰In our model, the amount of “trust” is captured by x , the probability that a contract will be honored in the market. Trust in our model is not a trait, but an equilibrium value that represents the effectiveness of social capital in enforcing contracts. For a model that treats trust as a personal trait, see Francois and Zabojnik (2005).

trading in the market is $\pi_M(M) = xr_{MM} + (1-x)r_{MV}$. Because the most an M-person could earn in the village is $.5(y-k)$, which is less than the smallest payoff he can earn in the market by trading with a V-person, r_{MV} , all M-people trade in the market. M-people prefer the market because of the higher effective price and their ability to enforce contracts there. Since all M-people trade in the market, only V-people trade in the village, all pairings in the village are between V-people, and the expected payoff in the village is $\pi_V(V) = y - k$. A person with V-capital chooses a trading location by comparing $\pi_V(V)$ with the payoff he would earn in the market, $\pi_V(M) = xr_{MV}$. Since $\pi_V(M)$ is increasing in x , V-people enter the market and drive down x until their payoff is equal in the village and the market. If there not enough V-people in the economy to equalize the payoffs to V-people in the village and market, then all V-people will trade in the market ($x = 1$). Let $x_0 = 2(y-k)/(\theta y - k)$ denote the fraction of M-people in the market that solves $\pi_V(M) = \pi_V(V)$.¹¹

LEMMA 1 (TRADING LOCATIONS). Suppose $\theta > 1$. If $1 \leq x_0$ then all V-agents trade in the village. If $m \leq x_0 < 1$ then V-agents comprise $1 - x_0$ of the traders in the market and the rest trade in the village. If $x_0 < m$ then all V-agents trade in the market.

Because x_0 is a function of θ , Lemma 1 links trading locations to the stock of social capital and the productivity of the market relative to the village. For sufficiently low θ , all V-people trade in the village. As θ rises, at some point V-people find the market attractive, and they flow into the market until the returns in the market and village are equal. For sufficiently high θ , all V-people are in the market. Lemma 1 also indicates that as the number of M-people in the economy increases, more V-people choose to trade in the market. The state variable m maps into the endogenously generated x (“trust”) in

¹¹ When $\theta < 1$, the outcomes are symmetric: since village trading is more productive, all V-people trade in the village and M-people flow from the market to the village to equalize their return in the two locations.

the following way. If $x_0 \geq 1$, then $x = 1$ for all m . If $0 < x_0 < 1$, then $x = x_0$ for $m \in [0, x_0]$ and $x = m$ for $m \in [x_0, 1]$.

Aggregate income is $\Pi(m) = m\pi_M(M) + (1-m)\max\{\pi_V(V), \pi_V(M)\}$. Given that we normalized the population size to 1, Π can also be interpreted as income per capita.

LEMMA 2 (AGGREGATE INCOME). Suppose $\theta > 1$. If $1 \leq x_0$ then $\Pi = (\theta - 1)my + y - k$. If $m \leq x_0 < 1$ then $\Pi = .5m(\theta y - k) + y - k$. If $x_0 < m$ then $\Pi = m(\theta y - k)$.

Lemma 2 yields comparative statics that are useful in the analysis of long run development. We are particularly interested in how the economy responds over time when θ increases (due to a fall in t_M), which is a trigger for industrialization. For now, we observe that in the one-period model, when θ is sufficiently low ($1 \leq x_0$), no V-people trade in the market and $d\Pi/d\theta = my$. When θ is in the intermediate range ($m \leq x_0 < 1$), V-people trade in the market and the village and $d\Pi/d\theta = .5my$. The presence of V-people in the market causes the average market transaction to become less efficient than when θ is low. Symptoms include fewer contracts and less investment. When θ is sufficiently high enough ($x_0 < m$), all V-people participate in the market, and again $d\Pi/d\theta = my$. Even though all V-people are in the market, there are enough M-people to prevent the deterioration in trading efficiency seen in the previous case. Lemma 2 shows that aggregate income is increasing in m , as well as θ .

Trading decisions in the one-period model are inefficient because too many V-people choose to trade in the market. A planner would take into account the reduction in earnings of the M-people when a V-person enters the market. Thus, there is a negative externality associated with people who have the wrong type of social capital.

D. The Social Capital Accumulation Process

Now we turn to the evolution of social capital over time. The economy continues for an infinite number of periods. Each agent is an adult for one period, during which he trades and also guides the social capital accumulation of his single child. Parents can

choose to send children to school, tutors, and so on to learn accounting, law, and other skills that comprise M-capital, or keep them at home working, interacting with relatives, and engaged in community activities that build V-capital. Village capital can also be created by forming marriage alliances (for example, in parts of rural India it was long the custom for a man to marry his niece) and giving gifts (which anthropological studies indicate is an important expenditure in many local economies (Bates, 1990)). In addition to the deliberate choices of the parent, social capital accumulation is influenced by prevailing social conditions since children learn from watching people around them (Bisin and Topa (2003)). All else equal, a child is more likely to accumulate village capital if he or she grows up in a community with dense personal networks than in a house on a desolate prairie.

Our social capital accumulation process is an adaptation of the cultural transmission model developed in a series of papers by Bisin, Topa, and Verdier (BTV).¹² The probability a child acquires I-capital is ϕ_I defined as

$$(1) \quad \begin{aligned} \phi_M &= hf(m); \\ \phi_V &= 1 - hf(m); \end{aligned}$$

where $h \in [\underline{h}, \bar{h}]$ is the amount of “time” spent learning M-capital (formal schooling), chosen by the parent, and f is an increasing, weakly concave function. The term $f(m)$ captures the effect of the population at large on the accumulation process and plays a critical role in our analysis. A child is more likely to acquire M-capital when m is large than when it is small, holding constant time spent learning M-capital. We assume that $0 < \underline{h} < \bar{h} < 1$ and $0 < f(0) < f(1) < 1$ so that both outcomes are possible; there is always some chance a child will acquire social capital that does not reflect the parent’s preference or the social norm.¹³

¹² See Bisin and Verdier (2001), Bisin and Topa (2003), Bisin et al. (2004), and the references therein.

¹³ In the BTV approach, a child is matched to a role model/teacher chosen by parents with some probability, and otherwise is matched to a random adult in the population. Our process can be expressed in BTV terms by letting d be the probability (selected by the parent) that a child is matched to a V-capital role

Finally, we assume that M-capital is more expensive to acquire than V-capital. The per unit cost of h is $w > 0$, and the cost of V-capital is normalized to zero. While w can be viewed as a direct resource cost, it also includes the opportunity cost of attending school instead of engaging in household production. When children have abundant employment opportunities or schools are scarce (as in many less developed economies), the value of w is high.

E. Steady States

Let $\pi_I(m)$ denote the one-period payoff of a parent with I-capital who optimally chooses a trading location, and let β be the intergenerational discount rate. The Bellman equation of a person with I-capital is:

$$(2) \quad u_I(m) = \max_h \{ \pi_I(m) - hw + \beta \phi_M u_M(m') + \beta \phi_V u_V(m') \},$$

where m' is the posited value of m in the next period. The equilibrium law of motion for m consistent with the behavior implied by the Bellman equation is denoted Φ , so $m' = \Phi(m)$. The first order condition for h in (2) is

$$(3) \quad \beta f(m)(u_M(m') - u_V(m')) \begin{matrix} > \\ < \end{matrix} w.$$

The left hand side is the marginal benefit of schooling, the difference between the value of having M-capital and V-capital in the next period, discounted by the intergenerational discount rate and the probability that social effects will reinforce the effect of schooling in forming M-capital. The right hand side is the marginal cost of schooling. The problem

model and accumulates V-capital. With probability $1 - d$, the child is matched to random adult who imparts M-capital with probability $f(m)$ and V-capital with probability $1 - f(m)$. Then the child learns V-capital with probability $\phi_V = d + (1 - d)(1 - f(m))$, which boils down to our formulation when $h = 1 - d$. Unlike a standard BTV model, we have damped the social effect with the concave function f .

is linear in h so the solution is either $h = \underline{h}$ when the inequality is $<$, and $h = \bar{h}$ when the inequality is $>$. Because the social capital accumulation process does not depend on the parent's type (except through social pressure in the aggregate), both types of parents choose the same h for their children.¹⁴ Therefore, the law of motion is simply $\Phi = hf(m)$.

From (2), $u_M - u_V = \pi_M(m) - \pi_V(m) \equiv \Delta$. The first order condition (3) can be rewritten in the convenient form

$$(3') \quad \beta f(m) \Delta(\theta) \begin{matrix} > \\ = \\ < \end{matrix} w.$$

For the case $\theta > 1$, it is straightforward to use the payoffs calculated above to find that $\Delta = .5(\theta y - k)$.¹⁵ Therefore, Δ is continuous and increasing in θ and independent of m . Since f is increasing in m , there is at most one value of m that solves $\beta f(m) \Delta(\theta) = w$. Define the critical value μ as:

$$\mu = \begin{cases} 0 & \text{if } \beta f(0) \Delta(\theta) > w; \\ 1 & \text{if } \beta f(1) \Delta(\theta) < w; \\ z & \text{otherwise where } \beta f(z) \Delta(\theta) = w. \end{cases}$$

Because $h = \underline{h}$ if $m < \mu$, and $h = \bar{h}$ if $m > \mu$, the equilibrium transition function is

$$\Phi = \begin{cases} \underline{h} f(m) & \text{if } m < \mu; \\ \bar{h} f(m) & \text{if } m > \mu. \end{cases}$$

¹⁴ Our formulation also implies that the parent's type does not directly influence the child's type. One of our main results is that aggregate social capital influences accumulation and creates inertia. The effect would be amplified if parental type mattered. See Section VI.

¹⁵ For the case $\theta < 1$, V-capital earns more than M-capital, so $\Delta < 0$. Given the cost of accumulating M-capital, all parents choose $h = \underline{h}$.

Figure 1 illustrates one possibility. The light curves represent $\underline{h}f$ and $\bar{h}f$, while the dark curves represent the equilibrium Φ . There can be one or two steady states, both or which are stable, depending on the location of μ :

LEMMA 3. Suppose $\theta > 1$. Define m_0 and m_1 to solve $\underline{h}f(m_0) = m_0$ and $\bar{h}f(m_1) = m_1$.

- If $\mu < m_0$ then there is a unique steady state with $m = m_1$ in which all parents choose $h = \bar{h}$ for their children.
- If $m_0 < \mu < m_1$ then there are two steady states. In one steady state, $m = m_0$ and all parents choose $h = \underline{h}$; in the other, $m = m_1$ and all parents choose $h = \bar{h}$. The aggregate payoff Π is lower at m_0 than m_1 .
- If $m_1 < \mu$ then there is a unique steady state with $m = m_0$ in which all parents choose $h = \underline{h}$ for their children.

Lemma 3 identifies two qualitatively different steady states: m_0 , in which no parents send their children to school, and m_1 , in which all parents send their children to school. We call the first case a “V-capital equilibrium” and the second an “M-capital equilibrium,” although there will be agents with both types of social capital in any steady state because the social capital transmission process is noisy. We see that there is a unique V-capital equilibrium for sufficiently high μ , and a unique M-capital equilibrium for sufficiently low μ . The definition of μ and (3') imply that an M-capital equilibrium prevails given a sufficiently large β or a sufficiently low w (and conversely for a unique V-capital equilibrium). As parents care more about their children and as the cost of schooling falls, parents are more likely to invest in M-capital. The possible equilibria are also affected by the underlying parameters of the one-period model through Δ : an increase in θ increases Δ , reducing μ , making the M-capital equilibrium more likely.

The case of $m_0 < \mu < m_1$ is interesting because then initial conditions matter. If the economy begins with $m < \mu$, it transitions to the V-capital equilibrium. If the economy begins with $m > \mu$, it transitions to the M-capital equilibrium. Thus, an

economy that begins with abundant V-capital can be locked into the V-capital equilibrium. This economy has dynamic “increasing returns” that give rise to multiple steady states because the likelihood that a child becomes an M-person is increasing in the fraction of M-people in the economy due to the possibility of outside socialization.

The appearance of multiple equilibria is not a new idea in thinking about development. The most novel feature of our analysis, shown next, is in how the initial conditions influence the economy’s response to new technologies, giving rise to a predictable reversal of fortune: economies that were least prosperous when θ is low are the ones most likely to industrialize when θ increases.

III. Industrial Revolution and Stagnation

In this section we analyze the factors that determine whether an economy industrializes or stagnates when technology changes. One motivation for our paper is the question of why industrialization took place first in the West, especially Western Europe, and not China, India, or the Middle East. Of these four great civilizations, Europe at first glance appears to have been the least likely to modernize. In the preindustrial 16th and 17th centuries, China, the Ottoman Empire, and (arguably) India were the wealthiest and most advanced regions of the world, while the feudal states of Europe were poor and backward in comparison.

Industrialization emerged over several centuries and involved innovations in law, banking, finance, organization, and technology. Its essence was mechanization that allowed economies of scale in production, the replacement of human labor by inanimate energy sources, and extensive division of labor. Because industrial enterprises involved many more people than preindustrial enterprises – more workers, more suppliers, more customers – they could not be exploited by purely local transactions. Thus, the prerequisite for industrialization was innovations in transportation and communication that dramatically reduced the cost of trading with distant strangers. Advances in navigation, shipbuilding, and then the steam engine made it possible to cross oceans, sail against the wind, and travel along seas and rivers that were not previously navigable.

Construction of canals and railroads reduced transportation costs inland. Communication costs plunged with cheaper transportation and then development of the telegraph. Yet technology cannot easily explain why the West industrialized while the other regions stagnated. In the Middle Ages, Europe lagged China in technology (Needham, 1954-) and the Islamic Middle East in science and culture (Lewis, 1995). Moreover, technological innovations diffused across Eurasia (Needham, 1954-) so that even if one region was a leader in developing new technology, the others could have followed soon after. The question is why Europe was able to evolve institutions that allowed the new technologies to be deployed and the gains from mechanization, economies of scale, and specialization to be reaped.¹⁶

We treat industrialization as the process of shifting the basis of the economy from V-capital to M-capital. The importance of market institutions such as commercial law and independent courts is a longstanding theme in the development literature (North and Thomas, 1973; North, 1990). Market institutions, however, are not self-executing. They are ineffective if individuals lack the skills to use them, as seen, for example, in 19th century India where natives preferred to rely on village elders instead of Western-style courts set up by the British in the 19th century (see below). Our view is that industrialization requires both institutions and the social capital to employ the institutions. Here we focus on the accumulation of M-capital and assume that supporting market institutions will be elastically supplied if the population acquires M-capital. This is not meant to downplay important economic and political problems associated with adoption of institutions, but to let us focus on the less-explored issue of how economies develop the social capital to use their institutions.

The preindustrial period is characterized by localized production with little scope for trade between strangers. The main cause of localized production for most of human history was high transportation and communication costs, t . Since a high t implies a low θ , we study an economy that begins with $\theta < 1$ (local trade is efficient). Consistent with view that technological innovations, particularly in transportation and communications,

¹⁶ For broad discussions of preindustrial societies and the transition to an industrialized economy see Croner(1989), North (1990), and Jones (2003).

were the fuel for industrialization, we explore how the economy reacts when t exogenously declines, resulting in $\theta' > 1$ (market trade is efficient).¹⁷ If the economy transitions to market exchange supported by M-capital we say it “industrializes” and if it remains focused on less efficient village transactions we say it “stagnates.” We are interested in why some economies seem to take advantage of the new technologies and industrialize while others do not and continue to operate economies based on V-capital. Although the model is somewhat involved, our first result establishes a simple necessary and sufficient condition for industrialization in response to a technology change.

PROPOSITION 1. Suppose initial market productivity is $\theta < 1$. If market productivity increases to $\theta' > 1$, the economy industrializes if and only if $\mu(\theta') < m_0$.

Proof: Given that initial market productivity is $\theta < 1$, all parents choose $h = \underline{h}$, and the initial equilibrium is m_0 . Observe that μ is decreasing in θ through Δ . From Lemma 3, there are three cases. First, if $\mu(\theta') > m_1$ then there is a unique steady state m_0 . Second, if $m_0 < \mu(\theta') < m_1$, then there are two steady states. The economy will stay at m_0 because it begins there. Third, when $\mu(\theta') < m_0$, the unique steady state is m_1 . Only in the third case will the economy jump at the point of impact to the higher transition function and transition over time from m_0 to m_1 .

Proposition 1 implies that whether or not an economy develops depends on initial conditions. The lower is the initial fraction of M-capital, the less likely development will be triggered by any given increase in market technology. An economy heavily invested in V-capital (low m) when trading was local will find it more difficult to industrialize than an economy with little V-capital. Why don't parents teach their children M-capital when market transactions become more efficient? The main reason is that they are worried that

¹⁷ Technological innovations in mechanization and the substitution of inanimate for human energy sources allow mass production that is likely to increase e for market exchange, driving an additional wedge between market and village production.

social pressure will overwhelm their efforts and the cost of training will be wasted. Socialization effects might prevent children from learning M-capital even if they are sent to school.

Another implication is that industrialization is easier for economies with low costs of schooling, w (a low value of w reduces μ .) The cost of schooling may be high, for example, if existing production arrangements provide ample opportunities for children to work. Initial conditions may also influence development through w . If, as seems plausible, w is not fixed but decreases with m (personal relations are relatively easier to build in a world with pre-existing dense social networks), high initial levels of V-capital will also inhibit development by raising the relative price of M-capital.

It is interesting to note the path that will be followed by a developing economy. All V-people trade in the village in the initial equilibrium. When θ increases and the country heads down the road to industrialization, adjustment to the new equilibrium is not instantaneous. The first sign of industrialization will be entry of V-people into the market. Previously, only (the few) M-people traded in the market and they were able to achieve first-best production outcomes. The entry of V-people will disrupt the market, causing contracting to break down in some cases and reducing relationship-specific investment in the market. The market will appear to be moving in the wrong direction and part of the gains from improved technology will be dissipated by the inability to enforce contracts. Income will nevertheless rise in response to the higher θ but not as much as when all V-people have entered the market (Lemma 2).

Proposition 1 indicates that economies rich in V-capital will have difficulty developing. This begs the question of why some countries would have higher levels of V-capital than others to begin with. More subtly, there is the possibility that the factor causing an economy to be rich in V-capital might actually counteract the V-capital externality that inhibits development in some other way, for example, through the accumulation decision. Our next result shows that if initial differences in the stock of V-capital are caused by differences in the transmission technology, it remains the case that economies rich in V-capital are slow to develop. The force that brings about preindustrial prosperity tends to reinforce the force that inhibits development.

Consider two economies that are identical in all respects except f . The “dense” country has f^D and the “sparse” country has f^S , where $f^D(m) < f^S(m)$ for all m : young people in the dense country are more likely to accumulate V-capital, all else equal.

PROPOSITION 2. Suppose initially $\theta < 1$ with equilibria m_0^D and m_0^S for the dense and sparse economies, respectively, and then θ increases to $\theta' > 1$. Then (a) the dense country is richer initially, and (b) the sparse country will industrialize for a lower θ' than the dense country.

Proof: (a) From the definition $m_0 = \underline{h}f(m_0)$, the dense economy begins with more V-capital than the sparse economy, $m_0^D < m_0^S$. With $\theta < 1$, all V-people trade in the village while M-people may trade in the market or the village. Regardless, the $\theta < 1$ analog of Lemma 2 implies that income is decreasing in m , so that $\Pi^D > \Pi^S$: the dense economy is richer initially.

(b) Now suppose θ rises to $\theta' > 1$. From Proposition 1, an economy will industrialize if and only if $\mu(\theta') < m_0$. Define θ^D and θ^S to be the minimum θ' such that transition occurs in each economy. From the definition of μ , $\mu^D(\theta) \geq \mu^S(\theta)$ for all θ , and μ is nonincreasing in θ . Together with the fact that $m_0^D < m_0^S$, it follows that $\theta^D > \theta^S$.

Proposition 2 is driven by two forces. First, people in the sparse economy are more willing to invest in M-capital since their investment is more likely to bear fruit all else equal. Second, the sparse economy begins with more M-capital, which also increases the chance that investment in M-capital will succeed. If we imagine θ gradually rising over time due to falling transportation costs, the sparse economy will transition before the dense economy. If two economies differ in their ability to accumulate V-capital, the economy with an advantage in V-capital accumulation will be wealthier in preindustrial times, but will require a higher technology parameter before it will industrialize.

Proposition 2 says that if countries differ in their transmission technologies, the ones that are best at transmitting V-capital will be the most prosperous in preindustrial times, but will be the slowest to industrialize in response to technology improvements. We believe this implication is a distinctive feature of our analysis. There are several alternative explanations for why some countries industrialize faster than others, but they do not typically predict that the wealthiest preindustrial economies will be laggards in development.¹⁸

IV. Historical Observations on Rise of the West

Our theory links industrialization to the initial stock of V-capital. In our view, China, India, and the Islamic Middle East began with more V-capital than Europe, which made them richer in preindustrial times but impeded development when transportation, communication, and production innovations made industrialization feasible in the 18th century. Here we present capsule summaries of the importance of V-capital in preindustrial times, and discuss the factors that created unequal initial stocks.

A. China

China in the late Middle Ages was probably the most technologically and economically advanced region of the world. Even as late as the rein of the Qianlong Emperor (1735-1796), China was able to impress the West – “China is a much richer country than any part of Europe,” wrote Adam Smith (1776, Book I, Ch. XI) – and seemed to be laying the groundwork for industrialization, with growth of a merchant class, commercialization, and interregional trade. Fairbank (1992, p. 186), an eminent historian of China, wrote, “We are left with the impression that as of 1750 or so the preindustrial societies of China and Europe had much in common; indeed, they probably

¹⁸ The failure of China, India, and the Islamic Middle East to develop has been blamed on culture, religion, and political failures, among other things. See Jones (2003) for an overview and references.

seemed in appearance to be more like each other than like the Western states that would emerge transformed by the Industrial Revolution.”

Commercial activity in China was supported extensively by personal networks. For millennia, social relations in China revolved around the family, the defining unit of economic life. In some cases, one lineage might occupy an entire village. Much more so than in the West, joint families were common in which several sons and their wives would live together under the same roof, kinship relations were patriarchal, marriages were strictly arranged, and children were expected to respect their elders and define their interests in terms of the family rather than individually (Whyte, 1996). The dominance of the family and personal relations spilled over into commerce: “Business relations were not cold impersonal matters governed by the general principles of the law and of contract in a world apart from home and family. Business was a segment of the whole web of friendship, kinship obligations, and personal relations that supported Chinese life.”¹⁹ China had an impressive legal code by 1500 and the state created an empire-wide system of courts, “but it was only meant as a last resort, decent people being assembled to submit their disputes to arbitration by lineage heads, gentry, guilds, and the like.”²⁰ Instead of courts,

“Resolution of conflicts among the people was . . . achieved through various customary and nonofficial channels. Conflicts arising from business deals and contracts might be settled by craft or merchant guilds. Disputes between neighbors might be mediated by village elders, neighborhood associations, or gentry members. In particular, the heads of extended family (lineage) or clan organizations, in addition to maintaining the religious rituals of ancestor reverence, supporting schools for clan members’ children, and arranging marriages, would make every effort to keep their members out of court by assuring their tax payments and settling disputes among them.”²¹

¹⁹ Fairbank (1992, p. 186).

²⁰ Crone (1989, p. 158).

²¹ Fairbank (1992, p. 185).

Family networks served China well during the centuries when most economic activity was local. In the view of one historian (Crone 1989, p. 173), “China is a star example of a successful civilization: the problems inherent in pre-industrial organization had here been solved with such expertise that people could do more thinking and accumulate more wealth than ever before without thereby undermining the prevailing order. China reached the pinnacle of economic development possible under pre-industrial conditions and stopped.” It stopped, in our view, because the dense personal networks that kept the local economy running impeded adoption of market institutions. “China has been a stronghold of the family system and has derived both strength and inertia from it,” concluded Fairbank (1992, p. 18).

B. India

India was another candidate for industrialization in the 18th century. Under the Great Mughal emperors from Akbar (1556-1605) to Aurangzeb (1658-1707), the population of the subcontinent reached 165 million (compared to 100 million in Europe, which had a greater area). India had a monetary economy in which bankers using sophisticated systems of double-entry book-keeping could move money across the subcontinent using *hundis* (bills of exchange).²² Specialist weavers were organized into workshops that produced for export to Europe and other parts of Asia. Other exports included handicrafts and bulk grains like Bengal rice (sent to Java) and Keralan rice (sent to Persian Gulf) (Bayly, 1985; Jones, 2003). The contrast between India under Akbar and England under Elizabeth I, whose reigns covered exactly the same years, is stark (Roberts, 1980, p. 42): “Akbar’s empire was one of the most powerful in the world, his court one of the most sumptuous and he and his successors ruled over a civilization more glorious and spectacular than anything India had known since the Guptas, while Queen Elizabeth’s kingdom, barely a great power, even in European terms, was crippled by debt and contained fewer people than modern Calcutta.”

²² For descriptions of banking and trade in Mughal India, see Habib (1964) and Mallick (1991).

Trade in India, like the other great Eastern civilizations, relied to a significant degree on social networks. Even though the central government tried to set up third party enforcement institutions, village institutions continued to dominate economic life:

“Even during the Mughal period, when the government was more centralized than at any other time before the British conquest, Mughal law enforcement seldom reached the village level. . . . [T]here was little need for the Mughals to establish such a system, since more localized and customary structures for settling disputes and keeping the peace existed almost everywhere, and operated independently of the Mughals. Intravillage disputes and infractions of local rules would be settled within the village, and disputes among members of the same caste might be settled by the caste *panchayet* or by a member of the ruling group of the area, who might also be called upon to settle village disputes.”²³

Traditional (“indigenous”) banking practices relied extensively on social networks:

“The borrowers in the informal market are ‘known’ parties – under continuous surveillance in the closely packed lanes of the urban wholesale markets. Each bale of cloth that goes in and out is observed by neighbors, the finance brokers and bankers among them; an expensive night on the town is reported and judged the next morning in market gossip. In contrast to the relatively anonymous world of Western businessmen, even in the larger metropolitan centers Indian businessmen live their lives in a narrow social ambit. . . . In fact, the people in the market not only have a 24-hour relationship, they typically have one that extends over generations. We asked one finance broker how he evaluated ‘new borrowers’ – he answered that he never took them. All his clients were children and

²³ Calkins (1968-1969, p. 403).

grandchildren of businessmen with whom he and his father and grandfather had done business.”²⁴

Similarly, a detailed examination of the South Indian Chettiars during the colonial period emphasizes that, “[t]he Chettiars built their commercial empire out of a complex network of interdependent family business firms. ... This is not to say that their banking system resembled an economist’s model of Western-style banking systems. In the Chettiar system, banking firms and other communal institutions, as well, were all tied together by relationships of territory, descent, marriage, and common cult membership.”²⁵

C. Islamic Middle East

Lewis (1995, pp. 177) notes that during the Middle Ages “the commerce of the Islamic Middle East was in every way ahead of that of Europe – richer, larger, better organized, with more commodities to sell and more money to buy, and a vastly more sophisticated network of trading relations.” At the apex of the Ottoman Empire, during the rule of Suleyman the Magnificent (1520-1566), the Ottoman army was better organized, equipped, and formidable than any in Europe, and European visitors were routinely impressed by the splendor of the sultan’s court compared to courts of their home countries.

To a significant degree, it appears that the commerce of the Islamic states in the Middle Ages was grounded on relational transactions and enforcement mechanisms that worked through relatively small social networks. As Udovitch (1979) observed in the passage we cited in the introduction, social networks functioned well when most trade was localized, but seemed to impede the adoption of market institutions. North (1998, pp. 20-21) reached a similar conclusion: “The traders from the Islamic world developed in-group social communications networks to enforce collective action which, while effective

²⁴ This quotation from Timberg and Aiyar (1984, p.45) describes traditional practice in the “indigenous” banking sector in the late 1970s, which still supplied about 20 percent of commercial credit at that time. The authors note that these traditional practices date back centuries in some cases.

²⁵ Rudner (1989, p. 428).

in relatively small homogeneous ethnic groups, do not lend themselves to the impersonal exchange that arises from the growing size of markets and diverse ethnic traders.”²⁶

D. Factors Influencing the Accumulation of V-Capital

A question that naturally arises is why China, India, and the Islamic East had larger stocks of village social capital to begin with. To adequately answer this question would be beyond the scope of this paper, but, as suggested by Proposition 2, we suspect that one contributing factor was population density, which made accumulation and transmission of village social capital easier. In 1600, for example, population density was 38 per square kilometer in China and 41 per square kilometer in India, compared to 22 per square kilometer in Europe.²⁷ Demographic evidence shows that preindustrial European households were less extensive households in China and India (Hajnal, 1982). Europe’s population density was constrained by the lower productivity of agriculture compared to China and India. Europe lacked the extensive alluvial deltas and river valleys of the East, and did not enjoy the high output per acre that came from rice culture (Bairoch, 1988).²⁸

Europe may have been more inclined to develop market capital in preindustrial times by a greater propensity for long distance trade. To be sure, most European trade

²⁶ For detailed descriptions of Islamic commerce see Udovitch (1970) and Kuran (2003, 2004).

²⁷ Population for individual countries is from McEvedy and Jones (1978), and regional aggregates are from Klasen and Nestmann (2004). “China” is China proper, that is, excluding Mongolia, Turkestan, and Tibet. Density is harder to calculate for the Islamic Middle East. In 1600, the density was 142 per square kilometer in Egypt (using only the cultivated area of 35,000 km²), 30 per square kilometer in Iran, and 11 per square kilometer in Turkey.

²⁸ The idea that development is impeded by a dense population emerges from both our model and the historical evidence. It stands in contrast to an argument in the economics literature since Adam Smith that density facilitates economic growth. We believe both views may be correct: density hurts in the transition to market capital, but helps once the economy is industrialized. Acemoglu, Johnson, and Robinson (2002) document that European colonies in areas that were densely populated in 1500, such as Aztecs and Incas, failed to modernize and were relatively poor by the end of the twentieth century, while colonies established in sparsely populated areas, such as North America, Australia, and Singapore, were early modernizers and are now among the richest nations.

was local. However, the geography of Europe lent itself to long distance trade more than the other regions due to the unusually high ratio of navigable water routes caused by the long indented coastline and numerous navigable rivers (Jones, 2003) (although China came close, especially after completion of the Grand Canal system under the Yuan circa 1300 AD). In contrast, India was split into a large number of nearly separate markets by poor communications and the high cost of land carriage. Few navigable rivers were available and coastal shipping only connected the peripheral areas (Jones, 2003, p. 199). Political and economic fragmentation is often considered the distinctive feature of Indian civilization before the British arrived (Morris, 1967).

Europeans may also have been encouraged to develop contract enforcement mechanisms that did not rely on kinship and personal networks by the fragmentation of the continent into competing states. With the exception of India before the Mughals, the other three regions were unified under a single political power for centuries preceding the Industrial Revolution. The competitive environment in Europe brought forth a variety of institutional innovations friendly to economic development as the states struggled to find revenue sources to fund their armies (North, 1998). Our model suggests that fragmentation may have also had the benefit of forcing people to learn how to trade with people from different language, cultural, and political groups, much like Europeans today are likely to learn a second language.

E. V-capital as an Impediment to Development

Our analysis suggests that large stocks of V-capital will be an impediment to development by making it hard to economies to accumulate M-capital. There is evidence that village social capital continued to be central to economic life in the developing regions well into the 20th century if not to the present. For example, as much as 80 percent of agricultural credit in India was still provided by village moneylenders in 1950, and about 20 percent of commercial credit was provided by so-called “indigenous bankers” (informal credit markets) in the late 1970s (Timber and Aiyar, 1984; Dantwala, 1952). At an aggregate level, Bertrand and Schoar (2006) find that the presence of a strong family system in a country today is negatively correlated with its economic

performance, and that with a family system variable, trust as conventionally measured is not a significant covariate of national income.

Greif (1994) contains an interesting comparison of two groups of long distance traders in the Mediterranean in the Middle Ages. The critical transaction problem for both groups involved agents who handled the merchant's goods abroad. The tight-knit Maghribis from the Muslim world managed their agency problems using social networks to communicate and collectively punish deviators, while the European Genoese developed a legal system for the registration of contracts and established permanent courts. When opportunities arose to expand trade to previously inaccessible areas, Maghribi traders responded by employing other Maghribis as agents, while the Genoese were able to contract with non-Genoan agents. Unlike the Maghribi solution that was limited by the relatively small size of the social network (apparently only numbering in the hundreds), the Genoese solution could be applied at a large scale.

V. Other Implications for Development

A. Education Policy

Industrialization is inefficiently rare in our model because of an externality in the accumulation of M-capital. Consider a social planner chooses how to education children, assuming that trading location and production decisions will be made optimally by individuals. The planner's Bellman equation is:

$$W(m) = \max_h \{ m\pi_M(m) + (1-m)\pi_V(m) - hw + \beta W(m') \}.$$

The planner chooses the same amount of schooling for every person, and the transition function for an individual remains (1). Given the infinite population, the fraction of people with M-capital in the next period is a deterministic quantity $m' = hf(m)$ so the planner can control the evolution of m through the choice of h . The planner's first order condition is

$$(4) \quad \beta f W' \begin{matrix} > \\ = \\ < \end{matrix} w.$$

Condition (4) differs from the private schooling decision (3') in the term W' , which replaces Δ . The envelope condition is $W' = \Delta + m\pi'_M + (1-m)\pi'_V + \beta h f' W'(m') > \Delta$, given that payoffs increase with the fraction of M-types in the market. Thus, the planner perceives a higher marginal benefit from investment in M-capital than private individuals perceive. Put differently, investment in schooling is too low in the decentralized outcome. There are two reasons for this. The first is that private individuals do not take into account that their M-children will provide a transaction cost saving to others. Second, they ignore the fact that accumulation of M-capital by their children will make it easier for future generations to accumulate M-capital via socialization.

One implication is that subsidies to schooling can lead to more efficient development. Another implication is a possible rationale for compulsory education in developing countries. However, the type of schooling matters: it has to be schooling that increases M-capital. Education that teaches how to use market institutions would help. Education in which students invest in community relations, say working on community projects, would be counterproductive if it facilitates accumulation of V-capital. A related implication is that attempts to foster development by encouraging development of V-capital (community projects, local governance and decisionmaking, etc.) may be counterproductive, particularly if they end up discouraging individuals from accumulating M-capital.

At first glance, Japan appears to be a counterexample to our theory. The island's population was extremely dense in the preindustrial period – 49 per square kilometer in 1600, and 87 per square kilometer in the 18th century – and the importance of family there rivals China, suggesting Japan was richly endowed with village capital. According to our model, this should have created a significant obstacle for development. Yet Japan was able to industrialize following the Meiji Restoration of 1868, joining the ranks of wealthiest Western nations in the second half of the 20th century.

We conjecture that Japan was able to industrialize while other regions with extensive village capital were not because of its education policy. One way to overcome

the inertia from too much village capital is to reduce the cost of acquiring market capital. This was the deliberate strategy followed during the Meiji period. A new Western-based education system was instituted that involved, among other things, sending thousands of students to the United States and hiring more than 3,000 Westerners to teach science, mathematics, technology, and foreign languages. While education in the preindustrial period was reserved for the rich, during the Meiji period it became universal. Primary school attendance was 98 percent for boys and 93 percent for girls in 1950. The system was also made compulsory, with a requirement of four years of schooling in 1872, six years in 1907, and 15 years by 1947.²⁹

B. Resistance to Development

Development in our approach is the replacement of V-capital with market capital. V-capital is supported by and reinforces kinship, extended families, and respect for elders by the younger generation. Development, when seen as a shift in the nature of social capital, therefore changes not only income levels but the nature of relations between parents, children, relatives, neighbors, and others in the community. If parents derive consumption benefits from their children investing in V-capital, the opportunity cost of accumulating M-capital in equation (3) is higher, raising the barrier for development.

We believe the loss of consumption benefits from V-capital can explain part of the hostility toward “Westernization” in many traditional societies. Modern industrialization in our view is inextricably linked to destruction of the “old ways” of life. China in the 19th century tried without success to Westernize while at the same time preserving “Chinese values” (Fairbank, 1992). Modernization has been more successful in China over the last two decades, but it has been accompanied by complaints about the decline of filial piety among the younger generations.³⁰ A good illustration of the

²⁹ *Japan: A Country Study* (1992), by the Federal Research Division of the Library of Congress, available at www.country-studies.com.

³⁰ Speaking of his 11-year-old son, a Chinese father worried, “If Huanbin receives too much Western culture, in the future he may not cherish family relations, forget his ancestors and not go back to our hometown.” (Lee, 2005). See also, “China’s Growth Places Strain On a Family’s Ties: Brothers with

resistance V-capital creates for modernization are the problems faced by the British when they tried to set up Western-style courts in India in the 19th century. Individuals were pressured by village relations not to use the courts and when they did kinship relations and the weakness of impersonal obligations of civic virtue led to pervasive problems of false witness (Rudolph and Rudolph, 1965). Even in the mid-20th century, “taking disputes to the local elders is considered to be better than taking them to the urban law courts. Disapproval attaches to the man who goes to the city for justice. Such a man is thought to be flouting the authority of the elders and therefore acting against the authority of the village.”³¹

Not all V-capital generates consumption benefits, however. The Soviet Union and communist Eastern Europe industrialized using a command-and-control system that was based on village capital in the form of personal relations with bureaucrats (Levin and Satarov, 2000, p. 120): “The system of total party control taught people to seek protection in party committees and not in courts: suing was considered to be almost an indecent act.” Since people derive minimal consumption benefits from this type of village capital – indeed, it may even be disliked with its overtones of corruption – we would not expect deep-seated opposition to Westernization in post-communist states.

C. Other Transition Difficulties

Finally, our theory can explain some problems that arise in the transition from V-capital to M-capital. In the early stages of transition, people with V-capital enter the market. Because they do not know how to use market institutions, the average market transaction becomes less efficient. Contracting becomes cumbersome, parties avoid fixed investments and long term contracts, and property rights become less secure. In general, the market seems less efficient, which it is on average, even while it expands.

Second, although we do not model it, some V-agents will continue to trade using their V-capital to support their transactions. One manifestation of this would be contract enforcement by organized crime groups. Official corruption is another (Levin and

Different Goals Split Over Business Venture As Father Feels Ignored,” by Kathy Chen, *Wall Street Journal*, April 13, 2005, p. A1.

³¹ Attributed to M. N. Srinivas in Rudolph and Rudolph (1965, p. 30).

Satarov, 2000, p. 117, 120): “It is important to note that the rapid and radical changes in Russia have occurred with the majority of state officials keeping their posts. Many of those who retain their former positions are not capable of adjusting to the new market conditions. . . . Not having found formal legal protection, entrepreneurs are obliged to seek special arrangements by buying unlawful services from state officials.” The use of V-capital by criminal groups to support exchanges can be effective and even create the appearance of order, much like Chicago was seen by many to run efficiently under the patronage system of the first Mayor Daley. However, the scope of economic activity is limited when governed by V-capital. Economic progress will only pick up speed once transition economies shift to M-capital, which could take as long as a generation. Our analysis thus agrees with the conventional view that transition economies must construct market institutions, except that we would add that functional market institutions will be difficult to sustain until enough M-capital has been accumulated.

VI. Robustness

We have simplified our model as much as possible in order to illustrate our main points in Propositions 1 and 2: economies that thrived during the era of localized, personalized trade by accumulating village capital were precisely the ones that found it difficult to accumulate market capital and industrialize by engaging in distant, anonymous trade. In this section, we briefly discuss the robustness of these central propositions to extensions of the model.

Our transmission technology assumes that parents do not have a preference for children of their own type. As our discussion of resistance to development suggests, this is not always the case. One way to capture this in our framework (similar to BTV) is by assuming that the intergenerational discount factor β is higher for a child of one’s own type. The dynamic program for a parent of type $I = M, V$ then becomes

$$(2') \quad u_I(m) = \max_{h_I} \{ \pi_I(m) - hw + \beta_{M,I} \phi_M u_M(m') + \beta_{V,I} \phi_V u_V(m') \}.$$

The first subscript in the intergenerational discount factor refers to the child and the second to the parent. For simplicity, we assume $\beta_{M,M} = \beta_{V,V} = \beta_2 > \beta_{M,V} = \beta_{V,M} = \beta_1$.

The main difference between this formulation and our basic one in Section III is that a child's education (socialization) now differs by parental type. The first-order conditions for h , the analogs of (3), are now

$$\begin{aligned} [h_V]: f(m)(\beta_1 u_M(m') - \beta_2 u_V(m')) &\stackrel{>}{=} w \\ &\stackrel{<}{=} \\ [h_M]: f(m)(\beta_2 u_M(m') - \beta_1 u_V(m')) &\stackrel{>}{=} w. \\ &\stackrel{<}{=} \end{aligned}$$

For any given continuation values of u , the marginal benefit of schooling is higher for M-parents than for V-parents. For M-parents, there is no conflict between the parents' desire to increase their child's utility and their desire to have a child with same type of social capital. For V-parents there is a conflict, capturing the tension discussed in Section V.B, of traditional societies facing the loss of existing family-based institutions as they embark on material progress.

Instead of the single critical value μ , beyond which parents opt for the maximum amount of schooling, we now have a critical value for each type of parent: μ_V, μ_M . Given the assumptions on the intergenerational discount factors and the above first-order conditions, it follows that $\mu_V > \mu_M$. M-parents school their children to the maximum amount for a wider range of m . While μ_M and μ_V can be zero or one, we ignore these corner solutions and focus on interior solutions in order to give straightforward comparisons with our basic formulation. The $m \in [0,1]$ interval can be partitioned into three regions: if $m \in [0, \mu_M)$ then $h_V = h_M = \underline{h}$; if $m \in [\mu_M, \mu_V)$ then $h_V = \underline{h}$ and $h_M = \bar{h}$; and if $m \in [\mu_V, 1]$ then $h_V = h_M = \bar{h}$. The equilibrium transition function is then

$$\Phi = \begin{cases} \underline{h}f(m) & \text{if } m \in [0, \mu_M); \\ (m\bar{h} + (1-m)\underline{h})f(m) & \text{if } m \in [\mu_M, \mu_V); \\ \bar{h}f(m) & \text{if } m \in [\mu_V, 1]. \end{cases}$$

The possible steady states are shown in Figure 2. The two curves used to create the equilibrium transition functions earlier (see Figure 1) remain, with m_0 and m_1 defined as before. The change is a third curve, equal to the m -weighted average of the other two that intersects the 45-degree line at m_2 . It is easy to see that $m_0 < m_2 < m_1$. Depending on how μ_V and μ_M compare to m_0 , m_1 , and m_2 , there could be one, two, or three steady states. In any case, the steady state with the highest m can be viewed as a market economy and the lower one(s) as a village economy or an intermediate market economy.

It can be seen that the spirit of Proposition 1 is preserved. The m_0 equilibrium results when $\mu_M > m_1$. If we define industrialization as the process of the economy “escaping” this equilibrium, then industrialization happens if and only if $\mu_M(\theta') < m_0$. If it is also the case that if $\mu_V(\theta') < m_0$ the economy will transit over time to the steady state with the highest possible market trades, m_1 ; otherwise, the economy reaches the intermediate market position of m_2 .

Likewise, the spirit of Proposition 2 is also preserved. The entire set of transition curves shift upward for the sparse economy with higher f . Therefore, the two forces that drive the result – people in the sparse economy earn more from an investment in M-capital and, given their higher initial stock of M-capital, are more likely to successfully instill M-capital in their children – are both preserved. Proposition 2 can be stated without modification, and the proof would involve the use of μ_M instead of μ .

What if parents did not have a preference for children of their own type, but instead were better at transmitting capital of their own type? For example, suppose M- and V-parents have the same intergenerational discount factor, but M-parents have an advantage in transmitting M-capital by reinforcing principles learned at school so that $\phi_M = Ahf(m)$ where $A > 1$. V-parents continue to have the transmission function (1). The first-order conditions would then reflect a higher marginal benefit of schooling for

M-parents than for V-parents, and the subsequent analysis would parallel the case of parental preferences for children of own type. There is a critical value for each type of parent, μ_V and μ_M . There are also three transition curves, although they are different from Figure 2. Given this characterization, both propositions follow through in a suitably modified form. Indeed, the advantage that M-parents have in transmitting M-capital would only amplify the inertia to industrialization that a dense village economy with fewer M-parents would exhibit when θ increases.

In other words, social capital externalities that cause increasing returns, multiplicity of steady states, and dependence on initial conditions, are responsible for our main results and these are preserved in extensions where parents prefer children of their own type and affect the transmission of market capital to their children.

Is the discreteness of parental types and the resulting discontinuity in the transition function crucial for our results? The jump in the transition function is not critical; the propositions depend primarily on its convexity. The case of continuous parental types is more complicated. To see the issues involved, suppose there were a continuum of parental types indexed by the percentage of their social capital that is M-capital. (In our basic framework, the V-people had zero percent M-capital, M-people had 100 percent M-capital and they were the only types.) The state variable, previously a fraction m , becomes a function, the distribution of people in the economy according to their percentage of M-capital. A transmission function could be specified for inculcating a (continuous) level of M-capital in children. The dynamic transition would involve mapping a current period distribution function to a future one based on endogenous agent decisions, and it is hard to see what would happen without working out the model. As long as the socialization process continues to exhibit externalities and dynamic increasing returns, intuition suggests that multiple equilibria will still be possible, and variants of Propositions 1 and 2 may arise.

Certain assumptions in the one-period model can also be relaxed, the equal division of the surplus and random matching of trading partners. The essential properties of the one-period model are that the gap between the expected utility of people with M-capital and people with V-capital is (i) increasing in the market technology and (ii) nondecreasing in the fraction of people with M-capital. Property (i) causes people to flow

to the market when technology improves, and (ii) prevents the growth of the market sector from reducing the incentive to accumulate M-capital. A change in our assumption of equal division of the surplus to an alternative fixed sharing rule would not alter property (i) or (ii). If people could choose their trading partners, the return for people with the right social capital would rise (because they would trade with each other when possible) and the return from people with the wrong social capital would fall, but properties (i) and (ii) would still arise.

VII. Conclusion

A flourishing empirical literature shows that economic development is related to social capital and adoption of market institutions such as rule of law. Yet the evidence begs the question why some countries and not others have managed to accumulate social capital and adopt the right institutions. Why do poor countries seem to have so little social capital in aggregate, even though theory suggests they are well-positioned to have it, and micro studies show they often do have it? Why have some countries been able to adopt the right institutions for industrialization while others seem trapped in village economies? And why were the economies with the most effective institutions in the preindustrial world, as measured by their prosperity and technological advancement, the slowest to industrialize?

Our paper provides a theory of development that offers an answer to these questions. The theory is grounded in two ideas that have not been emphasized in the literature. The first idea is that there are two types of social capital: “village” social capital takes the form of personal relations and social networks and is effective in supporting transactions between people in the same network; “market” social capital takes the form of knowledge about commercial law, courts, and other third party institutions, and is effective in supporting transactions between strangers. The second idea is that institutions are not self-enforcing – individuals must develop skills and knowledge to use them. Industrialization, in our view, requires the adoption of market

institutions such as rule of law, but those institutions are only effective if the population has the knowledge to use them.

Our answer for why poor countries seem to have so little social capital is that existing research tends to measure *market* social capital, such as trust in strangers. Our analysis and a great deal of micro evidence suggests that these countries would do much better if social capital were measured in terms of kinship and other personal networks, patron-client relations, and so on. Poor countries may have ample social capital, but it is the wrong kind of social capital for enforcing trades between strangers that are central to industrialization. Trust is not unique to Western economies although the way it is created may be: “In the pre-industrial world, trust was always of overriding importance, with the result that such job market as existed was dominated by personal networks: I would recommend you and you would recommend my son; you would recommend my nephew and I would recommend your friend.”³²

Our model shows that externalities in the accumulation and use of social capital make it difficult for economies to convert from one type of social capital to the other type. Village capital is efficient when most trade is local, and preindustrial societies optimally invest in such capital. The problem is that when transportation and communication costs fall enough to make trade with strangers feasible, a large stock of village capital impedes adoption of market capital. Economies without dense social networks find it easiest to industrialize. Consistent with this idea, historical evidence suggests that industrialization emerged in Europe in the 18th century instead of the more advanced societies of China, India, and the Islamic Middle East because Europe began with the least village capital. This reversal of fortune is a distinctive factor in our analysis: the very factors that lead to preindustrial prosperity hinder industrialization when technological conditions change.

The premise of our analysis is that development requires both institutions and the knowledge how to use the institutions; neither is effective on its own. This suggests that the debate over whether institutions or human capital cause growth (discussed in Glaeser, et al., 2004) may be framed too restrictively. Our other premise that there are two types

³² Crone (1989, p. 32).

of education, and both must be considered to account for development, suggests that unidimensional metrics of human capital may leave out an important part of the story.

In the service of parsimony we chose not to include in our model some factors that we think are important for development, chief among them politics. Our analysis assumes that market institutions are elastically supplied once the populace develops the skills required to use them. However, history is replete with examples where governments opposed the establishment of market institutions in order to curry favor with powerful interest groups. Our analysis suggests that members of the “older generation” may be one such group, opposing modernization in order to preserve consumption benefits from village capital, in which case politics might be driven by the stock of social capital itself.

References

- Acemoglu, Daron, Simon Johnson, and James C. Robinson, "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," *Quarterly Journal of Economics*, November 2002, Vol. 117(4), 1231-1294.
- Bairoch, Paul, *Cities and Economic Development: From the Dawn of History to the Present*, Chicago, IL: University of Chicago Press, 1988.
- Bates, Robert H., "Capital, Kinship, and Conflict: The Structuring Influence of Capital in Kinship Societies," *Canadian Journal of African Studies*, 1990, Vol. 24(2), 151-164.
- Bayly, C.A., "State and Economy in India over Seven Hundred Years," *Economic History Review*, November 1985, Vol. 38(4), 583-596.
- Ben-Porath, Yoram, "The F-Connection: Families, Friends, and Firms and the Organization of Exchange," *Population and Development Review*, March 1980, Vol. 6(1), 1-30.
- Bertrand, Marianne and Antoinette Schoar, "The Role of Family in Family Firms," *Journal of Economic Perspectives*, Spring 2006, Vol. 20(2), 73-96.
- Bisin, Alberto and Giorgio Topa, "Empirical Models of Transmission of Culture: Some Examples," *Journal of the European Economic Association (Papers and Proceedings)*, April/May 2003, Vol. XX, 363-375.
- Bisin, Alberto, Giorgio Topa, and Thierry Verdier, "Religious Inter-marriage and Socialization in the United States," *Journal of Political Economy*, June 2004, Vol. 112(3), 615-664.

Bisin, Alberto and Thierry Verdier, "The Economics of Cultural Transmission and the Dynamics of Preferences," *Journal of Economic Theory*, April 2001, Vol. 97(2), 298-319.

Calkins, Philip B., "A Note on Lawyers in Muslim India," *Law and Society Review*, November 1968-February 1969, Vol. 3(2/3), 403-406.

Crone, Patricia, *Pre-Industrial Societies: Anatomy of the Pre-Modern World*, Oxford, UK: Oxford University Press, 1989/2003.

Dantwala, M.L., "Agricultural Credit in India – The Missing Link," *Pacific Affairs*, December 1952, Vol. 25(4), 349-359.

Dixit, Avinash, "Trade Expansion and Contract Enforcement," *Journal of Political Economy*, December 2003, Vol. 111(6), 1293-1317.

Durlauf, Steven N. and Marcel Fafchamps, "Social Capital," in *Handbook of Economic Growth*, edited by P. Aghion and S. N. Durlauf, Amsterdam: North Holland, 2005.

Engerman, Stanley L. and Kenneth L. Sokoloff, "Factor Endowments, Institutions, and Differential Paths of Growth Among New World Economies: A View from Economic Historians of the United States," in *How Latin America Fell Behind*, edited by Stephen Haber, Stanford, CA: Stanford University Press, 1997.

Fafchamps, Marcel and Bart Minten, "Relationships and Traders in Madagascar," *Journal of Development Studies*, August 1999, Vol. 35(6), 1-35.

Fairbank, John King, *China: A New History*, Cambridge, MA: The Belknap Press of Harvard University Press, 1992.

Francois, Patrick and Jan Zabojsnik, "Trust, Social Capital, and Economic Development," *Journal of the European Economic Association*, March 2005, Vol. 3(1), 51-94..

Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, "Do Institutions Cause Growth?," *Journal of Economic Growth*, September 2004, Vol. 9(3), 271-304.

Greif, Avner, "Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies," *Journal of Political Economy*, October 1994, Vol. 102(5), 912-950.

Habib, Irfan, "Usury in Medieval India," *Comparative Studies in Society and History*, July 1964, Vol. 6(4), 393-419.

Hall, Robert E. and Charles I. Jones, "Why Do Some Countries Produce so Much More Output per Worker than Others?," *Quarterly Journal of Economics*, February 1999, Vol. 114(1), 83-116.

Hajnal, John, "Two Kinds of Preindustrial Household Formation System (sic)," *Population and Development Review*, September 1982, Vol. 8(3), 449-494.

Hart, Oliver and John Moore, "Property Rights and the Nature of the Firm," *Journal of Political Economy*, December 1990, Vol. 98(6), 1119-1158.

Jones, Eric, *The European Miracle: Environments, Economies, and Geopolitics in the History of Europe and Asia* (third edition), Cambridge, UK: Cambridge University Press, 2003.

Kandori, Michihiro, "Social Norms and Community Enforcement," *Review of Economic Studies*, January 1992, Vol. 59(1), 63-80.

- Klasen, Stephan and Thorsten Nestmann, "Population, Population Density, and Technological Change," CESifo working paper 1209, June 2004.
- Knack, Stephen and Philip Keefer, "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation," *Quarterly Journal of Economics*, November 1997, Vol. 112(4), 1251-1288.
- Kranton, Rachel E., "Reciprocal Exchange: A Self-Sustaining System," *American Economic Review*, September 1996, Vol. 86(4), 830-851.
- Krueger, Dirk and Krishna B. Kumar, "U.S.-Europe Differences in Technology-Driven Growth: Quantifying the Role of Education," *Journal of Monetary Economics*, January 2004a, Vol. 51(1), 161-190.
- Krueger, Dirk and Krishna B. Kumar, "Skill-Specific rather than General Education: A Reason for U.S.-Europe Growth Differences?," *Journal of Economic Growth*, June 2004b, Vol. 9(2), 167-207.
- Kuran, Timur, "The Islamic Commercial Crisis: Institutional Roots of Economic Underdevelopment in the Middle East," *Journal of Economic History*, June 2003, Vol. 63(2), 414-446.
- Kuran, Timur, "Why the Middle East is Economically Underdeveloped: Historical Mechanisms of Institutional Stagnation," *Journal of Economic Perspectives*, Summer 2004, Vol. 18(3), 71-90.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, "Trust in Large Organizations," *American Economic Review Papers and Proceedings*, May 1997, Vol. 87(2), 333-338.

- Lazear, Edward P., "Corporate Culture and Diffusion of Values," in *Trends in Business Organization: Do Participation and Cooperation Increase Competitiveness?*, edited by Horst Siebert, Ann Arbor, MI: University of Michigan Press, 1995.
- Lazear, Edward P., "Culture and Language," *Journal of Political Economy*, December 1999, Vol. 107(6, part 2), S95-S126.
- Lee, Don, "Generation Gap for Disney in China," *Los Angeles Times*, April 21, 2005.
- Levin, Mark and Georgy Satarov, "Corruption and Institutions in Russia," *European Journal of Political Economy*, March 2000, Vol. 16(1), 113-132.
- Lewis, Bernard, *The Middle East: A Brief History of the Last 2,000 Years*, New York, NY: Scriber, 1995.
- Mallick, B. S., *Money, Banking and Trade in Mughal India*, New Delhi, India: Rawat Publications, 1991.
- McEvedy, Colin and Richard Jones, *Atlas of World Population History*, Great Britain: Penguin Books Ltd., 1978.
- Morris, Morris David, "Values as an Obstacle to Economic Growth in South Asia: An Historical Survey," *Journal of Economic History*, December 1967, Vol. 27(4), 588-607.
- Moore, John, "Implementation, Contracts, and Renegotiation in Environments with Complete Information," in *Advances in Economic Theory* Vol. 1, edited by Jean-Jacques Laffont, Cambridge, UK: Cambridge University Press, 1995.
- Needham, Joseph (series editor), *Science and Civilization in China*, Volumes I-VII, Cambridge, UK: Cambridge University Press, 1954-.

North, Douglass C., *Institutions, Institutional Change and Economic Performance*, New York, NY: Cambridge University Press, 1990.

North, Douglass C., "The Rise of the Western World," in *Political Competition, Innovation, and Growth: A Historical Analysis*, edited by Peter Bernholz, Manfred E. Streit, and Roland Vaubel, Berlin, Germany: Springer, 1998.

North, Douglass C. and Robert Paul Thomas, *The Rise of the Western World: A New Economic History*, New York, NY: Cambridge University Press, 1973.

Osili, Una Okonkwo and Anna Paulson, "Institutional Quality and Financial Market Development: Evidence from International Migrants in the U.S.," working paper 2004-19, Federal Reserve Bank of Chicago, 2004.

Ostrom, Elinor, *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge, UK: Cambridge University Press, 1990.

Prescott, Edward C., "Needed: A Theory of Total Factor Productivity," *International Economic Review*, August 1998, Vol. 39(3), 525-551.

Roberts, J.M., *The Pelican History of the World*, Middlesex, England: Penguin Books, 1983.

Romer, Paul M., "Endogenous Technological Change," *Journal of Political Economy*, October 1990, Vol. 98, S71-S102.

Rudner, David, "Banker's Trust and the Culture of Banking among the Nattokottai Chettiars in Colonial South India," *Modern Asian Studies*, 1989, Vol. 23(3), 417-458.

- Rudolph, Lloyd I. and Susanne Hoeber Rudolph, "Barristers and Brahmins in India: Legal Cultures and Social Change," *Comparative Studies in Society and History*, October 1965, Vol. 8(1), 24-49.
- Shavell, Steven, "Contracts," in *The New Palgrave Dictionary of Economics and the Law*, edited by Peter Newman, New York, NY: Palgrave Macmillan, 1998, 436-445.
- Smith, Adam, *The Wealth of Nations*, New York, NY: The Modern Library, 1776 [1937].
- Timberg, Thomas A. and C. V. Aiyar, "Information Credit Markets in India," *Economic Development and Cultural Change*, October 1984, Vol. 33(1), 43-59.
- Udovitch, Abraham, *Partnership and Profit in Medieval Islam*, Princeton, NJ: Princeton University Press, 1970.
- Udovitch, Abraham, "Bankers without Banks: Commerce, Banking, and Society in the Islamic World of the Middle Ages," in *The Dawn of Modern Banking*, UCLA Center for Medieval and Renaissance Studies, New Haven, CT: Yale University Press, 1979.
- Wade, Robert, *Village Republics*, Cambridge, UK: Cambridge University Press, 1988.
- Weingast, Barry R., "The Political Foundations of Democracy and the Rule of Law," *American Political Science Review*, June 1997, Vol. 91(2), 245-263.
- Whyte, Martin King, "The Chinese Family and Economic Development: Obstacle or Engine?," *Economic Development and Cultural Change*, October 1996, Vol. 45(1), 1-30.

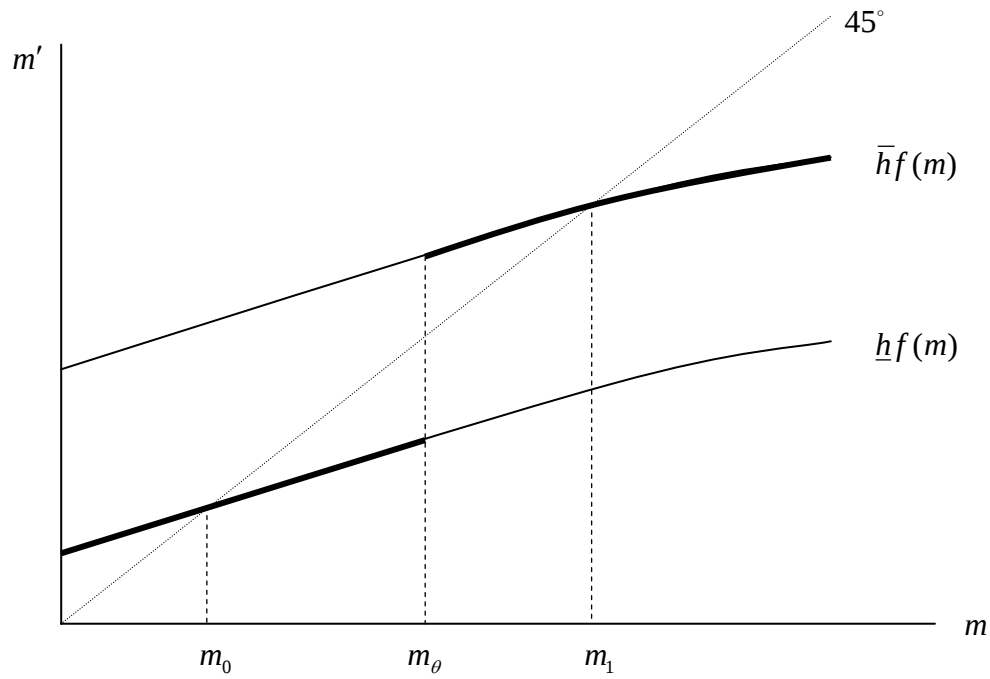


FIGURE 1. Social Capital Transition Function

The figure shows the transition function for social capital ($m \rightarrow m'$). The two concave curves are the transition functions conditional on low ($\underline{h}f$) and high ($\bar{h}f$) social capital investment. The equilibrium transition function is shaded.

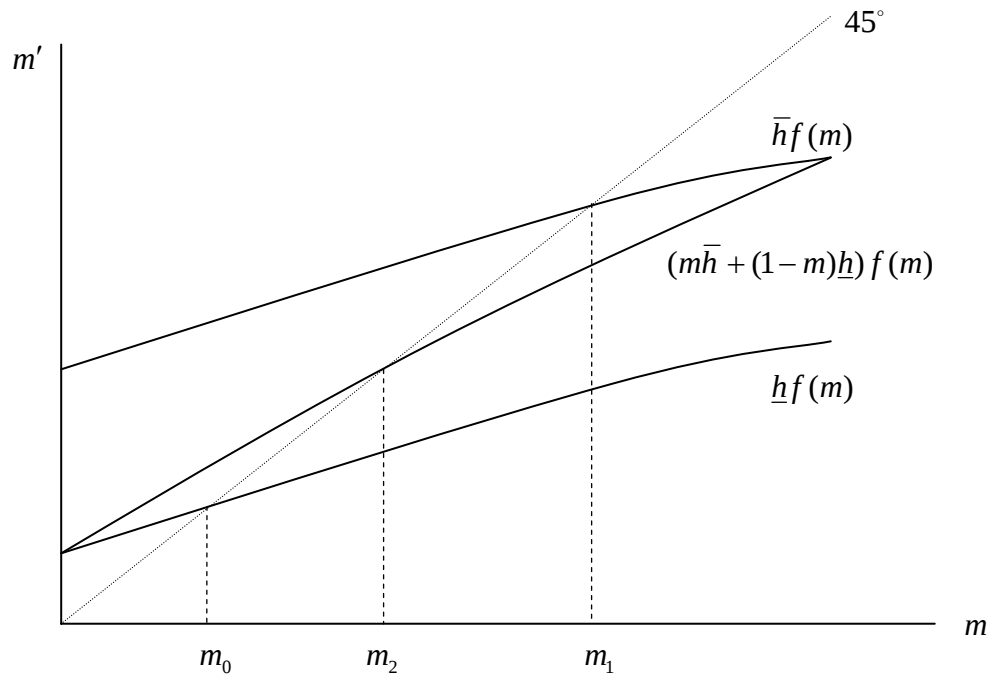


FIGURE 2. Social Capital Transition Function when Parents Prefer Children of Their Own Type

The figure shows the transition function for social capital ($m \rightarrow m'$).