

INNOVATION, INFORMATION, AND THE POVERTY OF NATIONS*

ROBERT COOTER**

ABSTRACT

Sustained growth occurs in developing nations through improvements in markets and organizations. Entrepreneurial innovation resembles biological mutation that is unpredictable before it occurs and understandable afterwards. It is unpredictable because it begins with the innovator possessing private information by which he earns extraordinary profits. It is understandable because it ends with the public figuring out the innovation and profits approaching the ordinary rate of return. These characteristics of innovation have important consequences for law and policy to foster economic growth. Specifically, government officials who rely on public information cannot predict which firms or industries will experience rapid growth. Consequently, industrial policies that promote growth are unlikely to succeed. Proponents of industrial policy today make the same mistake as the mercantilists whose interventions Adam Smith attacked as a cause of national poverty. In contrast, secure property and contract rights, as well as effective business law (especially the laws regulating financial markets), create conditions under which competition naturally produces entrepreneurial innovation and nations become rich. The main obstacle to sustained economic growth in poor countries today is ineffective civil law.

I. INTRODUCTION.....	373
II. SEPARATION OF INFORMATION AND CAPITAL	375
III. POLICY FOR GROWTH?	378
IV. WHEN LARGER IS BETTER.....	381
V. LAW FOR GROWTH.....	383
VI. INTELLECTUAL PROPERTY DEFICIT	388
VII. CONCLUSION	391

I. INTRODUCTION

What explains the poverty of nations? In the conditions of the modern world, defective law causes national poverty. Lawyers distinguish between law that controls behavior (law-in-practice) and written law (law-on-the-books). When I speak of “law,” I mean law that controls behavior, not law that is merely written down. Law that con-

* This Article is based on the Mason Ladd Lecture delivered at the Florida State University College of Law in January 2005. The author and Has Bernd Schaefer are expanding these ideas into a book entitled *Law and the Poverty of Nations*.

** Herman Selvin Professor of Law, University of California, Berkeley.

trols behavior becomes part of the routines followed by organizations and individuals. When organizations and individuals routinely follow laws, these laws become institutionalized.

A nation's wealth comes from the productivity of its citizens, which depends on resources, technology, and organization. In the past, the uneven distribution of natural resources condemned some countries to poverty. Because of vast improvements in technology, nations can now overcome poor natural resources with good technology and organization. By the end of the last century, the absence of major wars, the collapse of communism, the lowering of tariffs, and falling transportation costs removed most obstacles to exchanging goods and ideas among nations. Consequently, the international obstacles to acquiring technology are mostly gone. Whereas nations can exchange goods and ideas, they must develop organizations. By developing productive organizations, all nations can escape poverty.

Within a sound legal framework, productive organizations develop naturally from competition among people. People feel intense rivalry over wealth. To gain wealth, people and organizations can either make it or take it from others. An economy grows when rivalry among people directs them to *make* wealth. Enrichment proceeds as people compete to improve the productivity of their organizations. Good legal institutions provide a framework of competition for making wealth that enriches the nation. Conversely, an economy fails when rivalry among people directs them to *take* wealth from others. When some people take wealth from others by legal or illegal means, potential victims try to protect themselves. Offensive and defensive tactics divert efforts away from production. Defective legal institutions provide opportunities for taking wealth from others and impoverish the nation.

Like compound interest on a debt, sustained growth moves faster than the popular imagination can grasp. The question of whether growth is faster in rich or poor nations will determine whether living standards in the world converge or diverge. If poor nations grow significantly faster than rich nations, the gap between them will close surprisingly quickly. Conversely, if rich nations grow significantly faster than poor nations, the gap between them will widen surprisingly quickly. In fact, no general pattern exists for poor countries to catch up or fall further behind. Instead, some poor countries have grown faster than some rich countries, thus closing the gap, and some rich countries have grown faster than some poor countries, thus widening the gap.

To illustrate, at the beginning of the last century, England was richer per capita than Japan, and at the end of the last century Japan was richer than England. In 1900 Argentina's wealth per capita

resembled the United States, whereas northern Italy was poorer. Today, northern Italy is richer than the United States, and Argentina is poorer. If current performances continue, China will achieve a position in the world by 2025 that is unimaginable today for most people, whereas most African nations will fall significantly farther behind.¹

I begin by analyzing the innovation process. First, I will explain that economic growth unites information and capital, which is inherently difficult. Next, I will connect innovation to public policy. Government officials who rely on public information cannot predict which firms or industries will experience rapid growth. Consequently, industrial policies that promote growth are unlikely to succeed. Proponents of industrial policy today make the same mistake as the mercantilists whose interventions Adam Smith attacked as a cause of national poverty. Industrial policy cannot unite information and capital. Finally, I explain that law provides the framework to unite information and capital. Secure property and contract rights, as well as effective business law (especially the laws regulating financial markets), create conditions under which competition naturally produces innovation and nations become rich. Conversely, systematic defects in the legal institutions of poor countries retard innovation and keep countries poor.

II. SEPARATION OF INFORMATION AND CAPITAL

To begin analyzing innovation, consider two examples. First, an economist who works at a Boston investment bank received a letter that read, "I know how your bank can make \$10 million. If you give me \$1 million, I will tell you." The letter concisely illustrates the separation of information and capital in the process of innovation: the bank does not want to pay for information without first determining its worth, and the innovator fears to disclose information to the bank without first being paid. Second, a Berkeley mathematician invented bibliographic software called Endnote, which many people now have on their computers. In the early stage of developing this product, his hope and fear was to receive a call from Microsoft. The hope was that Microsoft would examine Endnote and decide to buy his company, thus making him rich. The fear was that Microsoft would examine Endnote and decide to build a competing product, thus bankrupting Endnote. Like the Boston bank, Microsoft would not pay for information without determining its worth, and after obtaining the information it would have less need to buy it.

1. Gross domestic product per person in sub-Saharan Africa has declined since 1975, roughly by the order of twenty-five percent. *The \$25 Billion Question—Aid to Africa*, *ECONOMIST*, July 2, 2005, at 24-26.

These two examples illustrate the problem of make-or-take applied to innovation. To stimulate innovations, people who make them must get paid. To develop innovations into marketable products, innovators must disclose information to investors so they can evaluate it. After the information is revealed to them, the investors may take it and not pay for it.

Further, these two examples concern innovations by an independent person. The problem of the separation of information from capital persists when the innovator is an employee of a large firm. Contracting to incentivize employees to innovate encounters similar problems as contracting to finance an independent innovator. To incentivize employees, the firm must give the innovating employee a secure right to a significant fraction of the value created by the innovation. Drafting an employment contract to achieve this result is difficult, partly because innovations are difficult to describe or value before they occur. The employment contract, consequently, seldom guarantees the innovating employee a significant fraction of the value created by the innovation. As a result, the employee may not fully use his creative powers for the firm, or the employee may try to leave the firm and take his innovation with him.

To analyze the separation of information from capital, I will explain some principles of the economics of information. Economists distinguish information into two kinds—public and private. *Public* information is available to everyone who seeks it. To illustrate, general principles of science are published in books and taught in schools. In contrast, *private* information is available only to a few people. For example, the recipe for Coca-Cola is a commercial secret.

When an innovator makes a discovery, he acquires valuable information that is private because only a few people know about it. Useful information that remains private gives the innovator a competitive advantage against his rivals. The prospect of exceptional profits draws people to use their energy and creativity to innovate. Exceptional profits, however, also attract competitors who try to learn what the innovator knows. As competitors come to understand what the innovator knows, the innovator's private information becomes public. In general, competition converts valuable private information into public information. This is true for recipes, machine designs, computer programs, organizational methods, and market opportunities.

The tendency to convert valuable private information into public information creates a characteristic life cycle of organizations. First, someone innovates and obtains capital to develop the innovation. An established firm with ample capital may employ the innovator, or the innovator may form a new firm and find outside investors. If the in-

novation is useful, the innovator's organization enjoys exceptional profits and expands faster than its competitors. In this stage, only a few people understand the innovation. Second, competitors begin to discover what the innovator knows, which erodes the innovator's profits and slows the growth of the innovator's organization. Third, competitors fully assimilate the innovation, the innovator's profits return to normal, and the organization stops expanding faster than its competitors. In this life cycle, the innovator understands the innovation in the first stage, the innovators and some competitors understand it in the second stage, and the public understands it in the third stage.

These three stages in the development of an innovation correspond roughly to the three stages of finance for a start-up firm in Silicon Valley. According to a popular quip, the first stage of funding start-up firms comes from "the 3 F's": family, friends, and fools. These "angel investors" rely partly on personal relationships that foster trust between innovator and investor. Consequently, I refer to the first stage as "relational finance."

Most innovators, however, have too few personal relationships to achieve the scale necessary to finance an innovation's development. After initial funding by the 3 F's, the second stage of funding comes from "venture capitalists," who are not family, friends, or fools. Venture capitalists are experts at ascertaining risks in the early stages of an innovation's development. Venture capitalists are also experts at organizing start-ups to extract full value from them. Unlike relational finance, venture capital is a form of private finance.

In Silicon Valley, lawyers are intermediaries between innovators and venture capitalists, and lawyers are also venture capitalists. To illustrate, the largest Silicon Valley law firm (Wilson Sonsini Goodrich & Rosati) routinely accepts payment from start-ups in the form of preferred shares and deferred debt. Collection of debt is deferred until a "significant capital event," which consists of an initial public offering or the acquisition of the start-up by an established company. If the start-up fails, the shares and debt are worthless, so the law firm is paid nothing.

In the third stage, a successful start-up offers its stock to the public. To comply with the rules of the Securities Exchange Commission, a firm that makes an initial public offering must divulge much private information about itself to the public. Thus, the third stage is public finance. The movement in financing from relational to private to public moves information from private to public. As information diffuses, the risk decreases and the expected profit rate falls towards an ordinary rate of return.

III. POLICY FOR GROWTH?

Innovation involves discovering something new. In order to foresee the future of science and technology, it is necessary to know what has not yet been discovered. Discovery and foresight are substantially inconsistent. Besides developments in science and technology, innovation in markets and business organization are unforeseeable for another reason—strategy. In some simple games like tic-tac-toe, an intelligent person can calculate all the possible moves and countermoves and play out the entire contest in his mind. These games have a predictable outcome for intelligent players, which is why intelligent people seldom play them. In other games like poker, calculating all the possible moves is too difficult, and the players decrease their predictability by bluffing and randomizing. In poker, a player's move is unpredictable before it occurs and understandable afterwards. In this respect, business competition resembles poker. For each move there is a countermove. The most successful strategy is the one that is hardest to counter, and the hardest move to counter is unforeseen.

Since discovery begins as private information, people with public information cannot foresee which organizations will innovate, become more productive, and grow faster than their competitors. The growth of competing economic organizations is inevitably unpredictable for the public, including most experts and officials of the state. However, after the cycle of growth is complete and the private information becomes public, the public can understand why the innovator's organization grew so fast.

In this respect, organizations resemble mutations. Biologists can seldom predict when mutations will occur or how far successful mutants will expand. After expansion stops, however, the biologists can understand what occurred. To illustrate, biologists did not predict the appearance and spread of the SARS virus. As the pace of the SARS epidemic slowed, however, scientists increasingly understood its origins and why it spread as it did. Similarly, economists cannot predict which economic organizations will grow in a competitive system, but economists can understand why an economic organization grew faster than its competitors after it stops doing so.

The unpredictability of business innovation has important implications for the laws and policies needed to foster economic growth. In many states, public officials proclaim the goal of economic growth and manipulate markets to achieve it. Manipulations involve taxes, subsidies, tariffs, licenses, and regulations. These manipulations are called "industrial policy," because state policy guides industrial development, or "technology policy," because state policy guides technological development. With industrial and technology policy, state offi-

cially choose the business organizations that grow. Officials thus pick the winners and losers among firms and industries.

With some exceptions, public officials have performed dismally in channeling investments to enhance growth. To illustrate, in the last half of the twentieth century many poor countries pursued industrial policies that favored manufacturing over agriculture, heavy industry over light industry, dirty industry over clean industry, fishing and cutting wood over sustainable production, and domestic consumption over exports. Most economists view these policies as mistakes that slowed economic growth.

Industrial policy also performed dismally in wealthy countries. For example, inflation-adjusted oil prices increased sharply from the mid-1970s until 1980, and then fell back to the previous low levels where they remained until turning up again in 2002. In spite of twenty years of price stability, U.S. officials used the fear of rising oil prices to justify large tax breaks for oil extraction and direct subsidies for uneconomic extraction of oil from shale. Predictions of rising oil prices by public officials proved wrong, whereas the predictions by private investors who were risking their own money in futures markets proved right. Oil policy throughout this period involved a massive waste of U.S. taxpayers' money for private gain.

The failure of industrial policy to stimulate economic growth has two causes. The first cause is motivation. The motivation of public officials to make wealth for the nation is weak, because they cannot keep it. Public officials, however, can keep the wealth that they receive in salaries or bribes. By steering industrial development, officials increase their responsibilities and justify higher salaries, and they also increase their opportunities for bribes. Industrial policy is rife with political favoritism, chicanery, cronyism, and corruption. Even so, some people convince themselves that politicians and officials will make more wealth using other people's money than private investors can make using their own money.

The second cause of industrial policy failure is lack of information. Even if officials were motivated to make wealth for the nation, they do not have the information needed to guide industrial development. The life cycle of an innovation explains the lack of information. In the first phase of the life cycle, innovators discover private information, which only becomes public at the end of the life cycle when rapid growth ceases. Consequently, public officials cannot predict growth rates of competing organizations.

Empirical studies in finance confirm this prediction. Specifically, they demonstrate that investors who only possess public information cannot do better than chance when trying to invest in companies that

will grow.² This demonstration, whose technical name is the “efficient market hypothesis,” explains why few economists are rich. Economists study the economy by using mostly public information, so they cannot do better than chance in picking successful companies. This demonstration also suggests that many investors have paid large commissions for worthless information. This realization has caused dramatic changes in the way many private investors manage their portfolios. “Churning” refers to wasteful and unnecessary trading that generates commissions for managers without increasing profits for investors. Instead of paying investment advisors to pick growth stocks, private investors who have studied finance tend to favor “passive” mutual funds, meaning funds whose managers buy a diverse portfolio of stocks and hold it.

Just as private investors cannot profit by trading on public information except by chance, so public officials cannot accelerate growth by industrial policies except by chance. Like a broker who churns a client’s portfolio, policies that allegedly redirect capital to growth industries mostly waste resources without increasing growth rates. The waste comes from using taxes to pay public officials to engage in unproductive activities, from businesses paying lobbyists to influence the officials, and from paying bribes.

Officials who act on public information do more harm than good when they try to solve the problem of separation of information and capital. What about acting on private information? Some people, such as investment bankers, have private information and use it to channel investments into organizations that will grow quickly. By performing this role, investment bankers increase the rate of the economy’s growth. Like investment bankers, should public officials use *private* information to make economic decisions?

Allowing public officials to invest in particular firms or industries based on private information carries large risks for the nation. Much like diplomatic maneuvers in foreign affairs, public investment based on private information involves secrecy. Secret policies preclude public discussion, debate, and criticism, which are necessary to dampen nepotism, favoritism, cronyism, and corruption in economic policy. Officials who pursue secret economic policies can divert wealth to friends and cronies for private purposes. Requiring officials to explain and justify their policies by using public information creates a basis for accountability. Consequently, the citizens in democracies often expect officials to base economic policies on public information.

2. According to the efficient market hypothesis, market prices incorporate all public information, so no one investor can do better than chance when relying on public information. This is the “semistrong” form of the efficient market hypothesis.

We have explained that state officials, like private investors, cannot generally identify growth industries based on public information, and allowing state officials to make economic decisions based on private information invites corruption. In some circumstances, however, public officials have successfully used private information to make investment decisions. For example, the best and brightest staff Korea's Ministry of Finance and Japan's MITI. As part of their *esprit de corps*, these officials have mutual understanding and trust that allow them to share information with each other. In the second half of the twentieth century, ministries in Korea and Japan selected industries and firms to expand, directed capital to them, and actively manipulated markets. During this period, these two countries enjoyed rapid economic growth.

Perhaps state leadership in development was desirable in Japan immediately after World War II and in Korea immediately after the Korean War. At the time, capital markets were much weaker than today. In addition, the development plan in these countries followed a logical progression that made sense and did not require private information. The logical progression first developed relatively basic manufacturing industries (for example, textiles and steel) and then proceeded to more complex goods (for example, cars and electronics).

Whether state activism caused rapid growth in Korea and Japan or merely coincided with it is disputed. By directing investment, MITI may have caused Japanese firms to flourish in the 1950s and 1960s, or MITI may have simply participated in a rapidly rising market without contributing to that rise. To illustrate the latter view, a recent article argues that MITI did not have a political mandate to direct growth in Japan, and it never did so. According to that article, the claims to the contrary were often made by self-interested officials and Marxist social scientists who poorly understood markets.³ The experience of Taiwan provides support for this conclusion. Taiwan, which is similar in some important ways to Korea and Japan, experienced rapid economic growth with less state interference and direction.

IV. WHEN LARGER IS BETTER

Development economics has a long history of defending industrial policy based on scale of production. The scale of production affects average cost. Starting with a very small company, the average cost of production usually falls as the size of a company increases. Before production is economical and the company becomes competitive, its

3. Yoshiro Miwa & J. Mark Ramseyer, *Capitalist Politicians, Socialist Bureaucrats? Legends of Government Planning from Japan*, 48 ANTITRUST BULL. 595 (2003).

size must reach a certain minimum level, called the “minimum efficient scale.” For example, an innovator who develops a new computer chip usually has to achieve a minimum level of production before the average cost falls to a level that attracts customers.

Starting a successful company requires obtaining enough financing to achieve the minimum efficient scale of production. The financial requirements vary greatly from one business to another. The minimum scale for selling fruit from a cart on the street is small, and the minimum scale for manufacturing televisions is large. In some very special cases, the minimum scale is extremely large. These are situations where returns to scale continue to increase even after the business is very large. To illustrate, designing large commercial airplanes is so expensive that the world probably has room only for a few manufacturers.

Given increasing returns to the scale of production, a minimum size is necessary for a firm or industry to be profitable, and in some circumstances private capital markets cannot provide sufficient funds to reach the minimum size needed for profitability. Many development economists thought that poor countries fit within these circumstances. According to this view, private companies in rich countries already exceed the minimum size for profitability, whereas business organizations in poor countries remain below the minimum size for profitability. Consequently, firms in poor countries need state assistance to grow to an efficient scale. Assistance was organized through public law, which directed the economy.

The “public law approach” to economic development gives a central place to administrative and regulatory law. The public law approach imagines that state officials can direct the economy by enacting laws that do not follow business practice. As officials lead the economy under this approach, the market follows the officials. Until recently, the public law approach dominated development economics. In rejecting the public law approach, I also reject the dominant tradition in development economics.

Usually, private capital markets can supply sufficient funds for new companies to achieve the minimum size required for profitability. In some circumstances, however, the minimum size is so large that private capital markets strain to supply enough money. In these circumstances, a bureaucratic elite can use public money to supplement or replace private money. To illustrate, the European Union created the Airbus consortium to achieve sufficient size to compete with the Boeing Company, which is a very large U.S. company. European governments heavily subsidized the creation of Airbus, but once it achieved a prominent position in world markets, the consortium was privatized and the subsidies were allegedly removed. Airbus and

Boeing often trade accusations that their governments clandestinely subsidize the other firm in violation of the World Trade Organization's rules.

Was the European Union prudent to use state funds to create Airbus? Commentators disagree. Perhaps Airbus is one of those exceptional cases of a good investment that is too large for the private market to finance. Or perhaps Airbus is an uneconomic folly, like the supersonic airplane the Concorde. The Concorde, whose commercial service began in 1976 and effectively ended with a deadly crash in Paris in 2000, set speed records for commercial aircraft but never came close to recouping the massive development costs paid by Great Britain and France. In any case, investment banks rarely encounter profitable opportunities that are too large for private finance, whereas governments often undertake massive public investments like the Concorde that are too unprofitable to attract private investors.

The argument for Airbus is the same one that development economists used to justify state-led growth in developing countries. The basic idea is that unprofitable companies and industries in developing countries would turn profitable by increasing sufficiently in size. To get these companies and industries to the minimum efficient scale, the state provided subsidies and tariff protection. Public officials in many developing countries have channeled state subsidies to preferred industries, and outside of Southeast Asia, these industries have performed dismally. The argument that subsidies to companies and industries will cause them to grow enough to turn profitable seems no more true in poor countries than in rich countries.

Although industrial or technology policy is unlikely to succeed, state officials can sometimes identify profitable investments of another kind. Industry needs infrastructure such as roads, water, electricity, airports, harbors, and industrial parks. Infrastructure development often requires large tracts of land owned by different people. By using the power of eminent domain, the state can overcome the problem of holdouts and assemble the necessary land. The large scale of these projects and the coordination problems created by them sometimes require the state to take the lead. Whereas a successful industrial policy would require private information, the state can successfully build infrastructure by relying on public information.

V. LAW FOR GROWTH

In rich and poor countries, industrial or technology policy cannot increase the pace of economic growth except by chance. Consequently, the state plays an indirect role in stimulating innovation and growth, primarily by supplying infrastructure and a good legal

framework. Having discussed infrastructure briefly, I return to the central topic of the legal framework for innovation. Financing innovation requires some degree of trust between innovator and investor. Trust is required because each one takes risks, especially in the early stages of innovation, that the material self-interest of the party imperfectly secures. By increasing trust between innovator and investor or, equivalently, by making trust less necessary, law extends capital markets from personal to impersonal finance and increases the flow of funds to innovators.

Property and contract laws are the foundation of economic cooperation, including cooperation between innovator and investor. I refer to the *property principle* as the proposition, “People who create wealth can keep most of it.”⁴ When implemented, the property principle motivates people to make wealth rather than take it. Legal institutions must protect the creators of wealth from predation by private persons such as criminal gangs, scheming managers, dishonest accountants, appropriating bankers, and corrupt unions. In addition, the legal framework must protect wealth creators from predation by public officials such as tax collectors, planners, licensing authorities, regulators, and politicians.

A person who foresees that thieves will probably steal everything has little incentive to produce anything. Ineffective protection of property rights has devastating economic effects in the poorest nations, where law fails to protect people who make wealth from predation by private persons and public officials. Consequently, instead of making wealth, people impoverish the nation by competing to take wealth from each other. To illustrate, producing and transporting diamonds in central Africa approaches the level of anarchy, so central Africa produces few diamonds and receives much less than the world price for them.⁵ If anarchy were replaced by a secure system of property rights, central African nations could produce diamonds with better technology, export them through the regular channels of world trade, and receive the world price.

Unlike diamond thieves, criminals in Moscow who sell security do not want to take everything from their clients. In order to sell protection, there must be something to protect. Such criminals try to impose a “security tax” that still leaves room for the shopkeeper to prosper. This example illustrates that private security of property is better than anarchy and worse than good state legal institutions.

4. The property principle assumes that we can decide who made what. This is not so easy when people make things by cooperating and combining their resources. Later, I explain why I think that this objection is more philosophical than practical.

5. This Article does not touch on the heinous abuse of human rights.

Besides motivation, making wealth requires coordinating the efforts of different people through organizations and markets. People coordinate by saying what they will do and doing what they say. According to the *contract principle*, a person can voluntarily assume legal liability for failing to do what he says. Legal liability helps people to rely on the word of others, especially people who are not friends or relatives. When people can rely on the word of others, they can extend their sphere of cooperation in time and space.

Conversely, ineffective enforcement in poor countries narrows the sphere of cooperation in time and space. Weak contract law impoverishes by keeping trade too local and keeping organizations insufficiently specialized. To illustrate, some businesses in Jakarta make cloth from cotton and sew it into clothing within a single factory. Gathering everyone into a single factory enables its owner to monitor everyone's work. Better contract law would enable the factory owner to specialize in the activities that he does best and contract out the remaining activities. An enforceable contract can lower the cost of monitoring, which facilitates dispersed production, wider markets, and larger organizations.

In poor countries, property and contract law-on-the-books tend to be sound. Because of history, property and contract law-on-the-books in a poor country often closely resemble the law of a rich country. For example, property and contract law in India and Nigeria resemble English common law, and property and contract law in South America resemble the French and Spanish civil codes. Unfortunately, property and contract law-on-the-books in poor countries also tend to be ineffective. By "ineffective" I mean that property rights are violated and contracts are broken without victims having access to legal remedies. In my view, the most pervasive and fundamental defect in the legal framework of poor countries is inadequate enforcement of property and contract law.

To illustrate, Mexican courts assess interest against delays in collecting a debt at rates below the market rate. Debtors, consequently, gain by using the law to delay repayment. One of Mexico's richest businessmen, Ricardo Salinas, began to build his fortune by figuring out how to avoid courts and still collect debts from poor people who buy consumer durables. To collect the debts, he enlisted the help of the borrower's relatives. The situation is worse in India where collecting a debt through the courts takes years or even decades. In some countries, the judges regularly take bribes to decide a case. For example, an Indonesian friend told me that instead of trying cases, his country's lower courts "auction" them.

As another example of the causes of ineffective private law, many countries have constitutions that guarantee a citizen's right to a trial.

In Chile and some other Latin American countries, this right is interpreted to mean that the court should not assess fees against the parties to a legal dispute. The absence of fees increases the quantity of cases. Heavy caseloads cause judges to dispose of most cases on the basis of written documents, without oral arguments in court.

Although there is not much oral argument in court in some Latin American countries, such as Argentina, the lawyers for the two parties routinely speak to the judge about a case outside of court proceedings, which undermines the judge's neutrality. Neutral judges resolve disputes based on law and facts, whereas biased judges resolve cases on unfair grounds, including personal relationships. To promote neutrality, many legal systems forbid the parties in a dispute to communicate with the judge outside the courtroom. For example, in the United States, an attorney is forbidden to have dinner with the judge who is deciding his case. The rule against *ex parte* communication assures that each party can hear all of the other side's arguments in court and respond to them. In its absence, doubt about the judge's neutrality creates uncertainty about property and contract rights, which burdens business activity.

Now I turn to the specialized laws that are often built on property and contracts, such as corporations, banking, securities, and bankruptcy. I begin with corporate law. When people invest in a company that they do not control, they run the risk that the people who control it will expropriate their investment. Securing noncontrolling investors against expropriation requires effective corporate laws. Developing effective laws to secure noncontrolling stockholders is harder than securing noncontrolling bondholders, because of the essential difference between stocks and bonds. Stocks entitle their holders to a share of profits. The people who control a company can manipulate reported profits in ways that are difficult to detect and prove in court. The stock market cannot flourish in most poor countries because ineffective corporate and securities laws provide insufficient protection against manipulation of noncontrolling investors.

In contrast to stocks, bonds prescribe an exact repayment schedule that the issuer must meet or else go bankrupt. The repayment obligation for bonds is easier for courts to enforce than the dividend sharing obligations for stocks. Consequently, finance in developing countries is skewed towards bonds rather than stocks. To illustrate, Ecuadorian investors in a recent year bought 150 times more bonds than stocks.

Like biological mutations, most new businesses fail, and a few succeed spectacularly. To induce investors to finance start-up businesses, the investors must enjoy a substantial fraction of the upside gain, which offsets the high likelihood that the business will fail.

Skewing finance towards bonds and away from stocks deprives investors of the upside gains, which makes them less likely to invest. Also, when entrepreneurs must borrow at fixed interest rates rather than borrowing against a share of future profits, their risk is greater. A larger stock market that permits businessmen to sell more stocks and fewer bonds would encourage entrepreneurs by allowing them to spread their risk. The skew in financing away from stocks dampens investment in start-ups and slows the pace of innovation.

In many poor communities, land is the most valuable asset. To borrow money and fund new businesses, entrepreneurs want to mortgage land. To mortgage land, the lender must have the legal power to seize land from a defaulting debtor and sell it to satisfy the debt. Legal obstacles that prevent lenders from repossessing land also prevent entrepreneurs from financing businesses by using land to secure loans. To illustrate, Indians on the Navajo Reservation in the Western United States often live in trailers rather than houses. The advantage of trailers over houses is that lenders can repossess trailers, whereas the Navajo courts will not allow outsiders to seize the house of a defaulting debtor. In places like the Navajo Reservation, solving this problem involves developing new law, not just enforcing existing law. Developing new law is tricky in this case, because the transfer of Navajo land to outsiders would quickly erode the social basis for the existence of the Navajo Nation.

I have explained that defects in property and contract law cause people to take wealth from each other, as illustrated by African diamonds and Moscow security. Similarly, state officials use public law to take wealth from its creators and keep it for themselves or give it to politically favored people. Unlike property and contract law, the defect is not just underenforcement. In addition, the defect in poor countries lies in law-on-the-books.

Two kinds of defects in public law produce bad results. First, public law creates monopoly power as a way to transfer wealth from ordinary people to the friends of politicians. To illustrate, many developing countries have state agencies with monopoly power over the purchase and export of goods produced in the countryside. In principle, these agencies smooth fluctuations in world commodity prices. In practice, these agencies force rural producers to sell below the world price. Thus, Papua New Guinea has a coffee marketing board with the exclusive right to buy coffee beans from farmers. Licenses and regulations are two other techniques for the state to create monopoly power. When a business needs a compulsory license to operate, denials of license applications restrict the entry of competitors and create monopoly profits for licensed businesses. Regulations can have the same consequences as licenses. When a business must conform to a

regulation to operate, regulations can be designed and administered to restrict the entry of competitors.

In the 1960s, British Railway workers sometimes paralyzed the system while stopping short of a strike by following every rule. Besides creating monopoly, the second defect of public law-on-the-books is excessive regulation. Like "work-to-rule," officials who enforce excessive regulations choke markets. To keep markets operating, entrepreneurs often have to bribe officials. Officials may burden markets by enforcing excessive regulations or accepting bribes to circumvent the rules, but either way the nation loses.

To illustrate, environmental regulations in the Lacandon Forest of southern Mexico are apparently more effective at generating bribes for environmental officials than at slowing the destruction of the forest. The main effect of these environmental regulations is allegedly to create a new source of bribes for the officials who do not enforce them and to increase the cost of lumbering by an amount equal to the cost of bribing officials.

Monopoly creation and overregulation often go together. To illustrate, a license may create monopoly profits for the licensee, who can use the monopoly profits to pay bribes or make political donations to the officials who grant licenses. Following the research of Hernando de Soto, researchers have documented the heavy regulatory burden to create a new company or enter a new line of business in poor countries.

While governments in poor countries overregulate in many areas, public law is underdeveloped and underenforced in other areas. For example, fish are harvested on Philippine reefs by spreading cyanide over the water. Cyanide stuns the fish for collection then sinks to the bottom and kills most living things. The Philippine reefs and the Lacandon Forest are just two examples where rapacious people plunder natural resources because environmental laws are ineffective. This behavior is rational for some individuals and irrational for society. To illustrate, overfishing is so severe in every major fishery in the world that the catch of fish would increase if less labor and capital were spent on fishing. Modern commercial fishing is analogous to a factory with too many workers: reducing the number of workers would increase total output.

VI. INTELLECTUAL PROPERTY DEFICIT

I have explained some defects in the legal framework for innovation in poor countries: ineffective law of property, contracts, and business, as well as overregulation by public law. Now I turn to the role of intellectual property in economic development. In order to analyze the law of intellectual property, I will explain two different

kinds of information. "Explicit information" refers to information that is easily reduced to a statement or formula that can be transmitted at low cost from one person to another. Explicit information especially involves science and technology, such as engineering plans, chemical processes, and computer programs. In contrast, "implicit information" refers to something that a person knows and cannot easily explain to others in a way that they can understand. To illustrate, a person may not be able to explain fully his hunch about an investment opportunity, his intuition about the reliability of a promise, or how the firm as a whole solves certain problems. Hunches, intuitions, and imbedded knowledge are forms of implicit information. Entrepreneurs tend to rely on them when developing new organizations or markets.

Technological innovation is often explicit, and entrepreneurial innovation is often implicit. Economically successful innovations often combine technology and entrepreneurship. To illustrate, the inventor of a new machine may reduce the discovery to a patent that engineers can understand, and the inventor may struggle to convince investors that buyers will want the new product made by the new machine.

Law protects property owners by awarding damages for past harm and injunctions against future trespass. To gain this protection, a property right must be definite enough to verify harm and trespass. Explicit information is often precise enough for this purpose. Consequently, the law of intellectual property, whose two primary branches are patents and copyrights, protects many technological innovations.

For explicit innovations, the innovator is afraid to tell investors about his discovery for fear that they will steal it. The innovator must trust the investors enough to disclose explicit information to them before getting full payment. Intellectual property rights in technology help to secure this trust. Consequently, the law of intellectual property is important for technological innovation.

Whereas innovators must guard against theft of explicit information, they must struggle to make implicit information understood. For implicit information, the investor must trust the innovator enough to give him money before fully understanding the innovation. To illustrate, an insurance company may be unable to convince outside investors that it has found a better way to organize its sales force.

Like all property rights, patents and copyrights are only as good as the owner's ability to enforce them. Intellectual property rights are harder to enforce than real property rights. To illustrate, Americans steal much more software than real estate. Inefficiencies in en-

forcing intellectual property rights in the United States are magnified in most poor countries, where intellectual property protection is weak.

Implicit information is usually too imprecise for anyone to own, so the law of intellectual property seldom protects it. To illustrate, recent attempts to extend patents to "business processes" in the United States have had little success and strong critics. Thus, an insurance company cannot patent a new way to organize its sales force. The law of intellectual property, consequently, is not so important for entrepreneurial innovations. However, where intellectual property law fails, the law of trade secrets sometimes succeeds.

As mentioned, explicit information especially refers to science and technology, which educated people produce in laboratories and universities. Rich countries have relatively more educated people, well-equipped laboratories, and superior universities. Consequently, explicit innovations occur more often in rich countries. For this reason, the law of patents, copyrights, and trade secrets is more important for economic growth in rich countries than in poor countries. In some cases, poor countries will do better by taking explicit innovations from rich countries instead of making them. For example, many Latin American countries have historically refused to recognize pharmaceutical patents. The citizens of these countries, consequently, have enjoyed cheap generic medicine. Similarly, China has historically not suppressed pirated software, so Chinese citizens have enjoyed cheap copies of computer programs from abroad.

These practices, however, increasingly risk violating international agreements and provoking retaliation. In effect, rich countries have lowered tariffs against imports from poor countries in exchange for poor countries agreeing to protect the intellectual property of citizens in rich countries. When poor countries fail to protect intellectual property, the rich countries can retaliate by curtailing imports. Also, when poor countries fail to protect intellectual property rights, some domestic production in poor countries suffers. To illustrate, circulation of illegally copied movies in China harms Chinese moviemakers, not just Hollywood. For these reasons, the advantage to poor countries of not protecting intellectual property may shrink or disappear.

Now I turn from explicit to implicit information. When competing in world markets, countries tend to specialize in those goods that they can produce more cheaply than other countries. Comparative advantage in cost especially comes from using cheap factors intensively in production. The factor of production that poor countries have in abundance is cheap labor. The challenge is to fit low-wage workers into organizations that release their productivity. Meeting the challenge is not so much a problem of obtaining technology as us-

ing it. Learning to use technology involves cooperating in new ways through innovations in organizations and markets.

To illustrate, a worker who emigrates from a poor country and finds a job in a rich country enjoys a sharp increase in wages, which reflects a sharp increase in productivity. The immigrant's productivity increases sharply because his labor is imbedded in a better organization with better technology. To increase worker productivity, the poor country must improve its organization and marketing. For example, in 1942 four friends in India formed Asian Paints. Over the course of twenty-five years, Asian Paints became India's largest paint company, and it now ranks among the top-ten decorative coatings companies in the world by sales. The founders of the company had to create an effective organization to take advantage of India's relatively low wage rates. Indian scientists and foreign companies provided the technology, but Indian entrepreneurs provided the organization.

Under modern conditions, good organizations can obtain technology. The harder problem for poor countries is to develop good organization. That is why the problem of innovation in poor countries is less technological and more entrepreneurial. Entrepreneurial innovation, which refers to innovations in organizations and markets, is the most crucial form of innovation for economic growth in poor countries. Entrepreneurial innovation mostly involves implicit information. Unlike explicit information, implicit information is relatively hard to transmit, so it tends to remain within the innovator's organization for some time. To reward entrepreneurs for implicit innovation, law primarily needs to secure the rights of each organization to the value that it produces. This is a problem of enforcing material property rights, not the much harder problem of enforcing intellectual property rights. To promote entrepreneurial innovation, poor countries need not extend intellectual property law to cover innovations in business organization. In the United States, patents have been extended to some types of innovations in business organization, and many economists regard granting these "business process patents" as an unfortunate mistake in United States patent policy.

VII. CONCLUSION

Economic innovation occurs when someone discovers a better way to make things or better things to make. Only a few people initially know about an innovation. Implementing an innovation requires combining private information with capital, which poses an inherent problem of trust between innovator and financier. Because officials should act on public information, industrial policy cannot help to

solve the problem. Instead, industrial policy is the state's equivalent of churning a private portfolio.

Law helps to solve this problem by providing a framework for commitment and coordination built on an account of human nature. Economic rivalries among people are intense. Rivalries directed towards making wealth enrich the nation, while rivalries directed towards taking wealth impoverish it. Two fundamental principles direct rivalries towards making wealth. The property principle asserts that people who make wealth can keep most of it. When private or public predators violate this principle, rivals are deflected from making wealth to taking it. The contract principle enables people to commit to doing what they say, so they can coordinate behavior and achieve efficient scale in organizations and markets.

Responding to these facts, rich countries rely mostly on the private sector as the engine of growth, with the public sector providing a framework of law and public goods. The best course for poor countries is to do the same. Unfortunately, many theories of economic development regard poor countries as exceptions that require more state leadership and regulation. State-led growth causes industrial policy and administrative law to crowd out the law of property and contracts. In the eighteenth century, Adam Smith caused an intellectual revolution by demonstrating that monopolies created by the state, including those created indirectly through licenses and regulations, cost the public far more than the profits enjoyed by the beneficiaries. Adam Smith's critique of the mercantilists in his day applies to much of development economics today.

All nations now have the opportunity to escape poverty by developing productive organizations. A good legal framework causes productive organizations to develop naturally from competition among people. Most poor countries have good property and contract law-on-the-books, but it is ineffective. Ineffective property and contract law is the worst defect in the laws of poor countries. Legal reform must aim to increase the effectiveness of private law and reduce regulations in public law.

Moral principles about stealing and lying are abstract and vague, so their application to business is often indeterminate. Business law remedies the problem by stipulating good practices in detail. The best business law identifies the best business practices and raises them to the level of legal obligations. For example, some ways to organize a company are better than others, and good corporate law enforces the practices of good companies. I have already explained that entrepreneurial innovation begins with private information that becomes public later. I have also explained that experts, including lawyers and economists, cannot predict most entrepreneurial innovations.

Consequently, the best business practices tend to evolve in ways that judges and lawyers cannot predict. For this reason, judges and lawyers who make business law often have to follow good business practice, not lead it.

To illustrate, Judge Mansfield modernized the English law of financial instruments in the eighteenth century by understanding the best practices that merchant banks actually followed, then raising these practices to the level of the common law. Similarly, Karl Llewellyn followed the same philosophy as Mansfield when he organized the Uniform Commercial Code project, which produced the most important business law in twentieth-century America.

I use the term “market modernization” to refer to the process of raising the best business practices to the level of law. Market modernization requires business law’s development to follow innovations in markets and organization. Innovation occurs faster when the market leads and the law follows for two reasons. First, the trajectory of entrepreneurial innovation is unpredictable from public information. Since law is based on public information, business law develops in response to business innovations after they become public knowledge. The information known by legal officials lags behind innovations in business practice, so innovation occurs faster when market practice leads and the law adapts to it. Second, learning about changes in law imposes heavy transaction costs on businesses. Since businessmen do not have time to become lawyers, they mostly use morality and business norms as their guide for what the law requires. As long as they conform to morality and accepted business practice, they hope to remain comfortably within the law. When they want to engage in a sharp practice that violates morality or accepted business practice, they consult a lawyer. However, if law departs from morality and business practice, businessmen must constantly consult lawyers when developing business strategy. I have explained that when the law follows business norms, business can proceed with relatively low transaction costs, and when law departs from business norms, the transaction costs of business increase sharply.